European Commission

GROWING A DIGITAL SOCIAL INNOVATION ECOSYSTEM FOR EUROPE

DSI FINAL REPORT

A study prepared for the European Commission DG Communications Networks, Content & Technology by:

DIGITAL SOCIAL INNOVATION

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PARTNER DESCRIPTIONS

Nesta
Nesta is the UK's innovation foundation with a mission to support innovation for the public good. Established in 1998 by central government, Nesta transitioned to an independent charity in 2012. Nesta is backed with an endowment originally provided from the UK National Lottery and works through a combination of research, investments, networks, grant funding and practical support to innovators with the aim of helping people and organisations bring great ideas to life.

The Waag Society
Waag Society, Institute for Art, Science & Technology, is an interdisciplinary non-profit media lab based in Amsterdam. Its mission is to provide meaning and give direction to the role of technology in society. Founded in 1994, Waag Society is part of the Dutch national infrastructure for the arts and culture, and a well-known participant in national and international collaboration programmes.

ESADE, Center for Innovation in Cities
The Center for Innovation in Cities is interested in the study and analysis of these innovation processes. Under the Institute of Innovation and Knowledge Management of ESADE Business and Law School, it brings together a group of academicians and practitioners with experience in open innovation, new technologies and public administration, particularly interested in improving the management of cities in the 21st century.

IRI, Institute for research and innovation
In 2006, the Centre Pompidou founded the Institute for Research and Innovation on initiative of the philosopher Bernard Stiegler. The institute has been created as part of the Centre Pompidou to anticipate, accompany and analyse the transformation of cultural practices enabled by digital technologies. IRI offers a wide-ranging foundation of talent in both understanding the theoretical sources of innovation, and cutting-edge research into technical questions and design.

FutureEverything
FutureEverything (FUTURE) is a not-for-profit digital innovation lab, festival and conference. It is a member of ENOLL (European Network of Living Labs). FUTURE engages a worldwide community in devising and testing innovations in art, society and technty. A strong city partnership in Greater Manchester enables them to work closely with Cities and to participate in EU projects such as CitySDK, Euporias, Apps4Europe and ECAS.

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FOREWORD

This report is like an open window looking out onto a wholly new, and largely unexplored, world. The emerging applications that we globally call "digital social innovations" are fascinating examples of how humans can find new ways to collaborate in amazing manners, overcoming geographical, cultural and social barriers, and reinventing the way society can thrive in a world with ever decreasing availability of natural resources.

There is only one natural resource that is now available in larger amounts than in the past: humans. Connecting them, in novel, pervasive, widespread and affordable manners, is perhaps the biggest breakthrough enabled by digital technologies.

Several names have been given to this: network effects, collective intelligence, hyperconnected societies. This hyperconnectivity is generating a new currency, more sustainable and ethical than money: data – open data. Open data increases awareness and coordination, creates new opportunities for innovation, and strengthens inclusion, participation and, ultimately, human well-being.

Society, economy, and even human psychology itself are undergoing an irreversible change, which we as citizens and policymakers are still struggling to understand. This understanding is key to anticipating possible developments, while at the same time to maximising the positive impacts on society, as well as averting the risks of misuses that inevitably accompany any step of human evolution.

I am thankful to the authors for this startling journey into a nascent field, and I am confident that this will help us all to understand how best to enable the emergence of new models for a more resilient and sustainable society.

Fabrizio Sestini

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EXECUTIVE SUMMARY

Digital technologies and the Internet have transformed many areas of business – from Google and Amazon to Airbnb and Kickstarter. Huge sums of public money have supported digital innovation in business, as well as in fields ranging from the military to espionage. But there has been much less systematic support for innovations that use digital technology to address social challenges.

Digital technologies are particularly well suited to helping civic action: mobilising large communities, sharing resources and spreading power. A growing movement of tech entrepreneurs and innovators in civil society are now developing inspiring digital solutions to social challenges. These range from social networks for those living with chronic health conditions, to online platforms for citizen participation in policymaking, to using open data to create more transparency around public spending. We call this Digital Social Innovation (DSI).

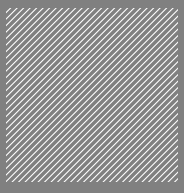
Over the last 18 months Nesta, funded by the European Commission, has led a large research project into DSI. The project seeks to define and understand the potential of DSI, to map the digital social innovators, their projects and networks, and to develop recommendations for how policymakers, from the EU to city level, can make the most of DSI.

Main findings

What is it?

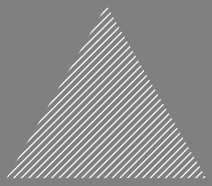
Our study of more than 130 in-depth global examples of DSI showed the diversity of the field, but also that many innovations can be understood as manifestations of four main technological trends:

- **Open Hardware**
- **Open Networks**
- **Open Data and**
- **Open Knowledge**



Open hardware: These projects are inspired by the global do-it-yourself maker movement and the spread of maker spaces. They make digital hardware available for people to adapt, hack and shape into tools for social change.

Safecast, a project that enables citizens to capture and share measurement on radiation levels, is one example of the potential of open hardware. It was founded in March 2011 as a response to the accident at the Fukushima Daiichi nuclear power plant in Japan and frustration over the lack of government transparency about local radiation levels. Using the Arduino, an open hardware circuit board with a microprocessor, Safecast built their own Geiger counters. These were given to local volunteers who used them to create large open datasets on radiation levels in Japan. All data is plotted on a map that visualises radiation levels in a given geographical area, and which is free for anyone to access. To date, Safecast has captured more than 15 million data points.



Open knowledge: This refers to large groups of citizens coming together through online platforms to collectively create and analyse new types of knowledge or crowdfund social projects. This is the part of digital social innovation where we see the most activity, from participatory democracy platforms such as FixMyStreet that enable citizens to crowdmap local issues like potholes and broken streetlights, to co-writing legislation and e-petitioning on ideas for how to improve society.

One example of the potential in mobilising citizens to create collective knowledge is the work done by Cancer Research UK on their citizen science platform Cellslider. To date Cellslider has involved more than 200,000 volunteers in analysing around two million cancer images. Other examples include how the Open Ministry (now part of the D-CENT project) has involved more than 250,000 Finns in co-writing and voting on citizen-led policy proposals, five of which have been put to a vote in the Finnish Parliament.

Open data: This refers to innovative ways of opening up, capturing, using, analyzing and interpreting data.

OpenCorporates (OC) provides a good example of the opportunities in open data. It was set up to in the wake of the financial crisis to make information about companies and the corporate world more transparent and accessible. It has since grown to become the largest open database of companies in the world, including data on 60 million companies and their subsidiaries, and search-able maps and visualizations. OC is widely used by journalists and governments seeking to understand global corporate structures.
Another example of this potential is how the city of Vienna, in Austria, has opened up more than 160 datasets on everything from budgeting to planning information. This has led local developers to create more than 109 open data-based apps for the city and its residents.

Open Networks: The fourth trend describes how citizens are developing new networks and infrastructures – e.g. sensor networks – where they connect their devices, such as phones and Internet modems, to collectively share resources and solve problems.

One example of this is Guifi.net, which was founded in 2000 as a response to the lack of broadband Internet in rural Catalonia, where commercial Internet providers weren't providing a connection. The idea was to build a 'mesh network' where each person in the network used a small radio transmitter that functioned like a wireless router to become a node in the Guifi net. With more than 23,000 nodes, Guifi.net is the largest mesh network in the world and provides Internet connection to those who would otherwise not be able to access it.

Who are the digital social innovators?

The people and organisations working on digital social innovation may not identify themselves as social innovators, and they are often in very different communities to those who traditionally work on social innovation, such as established charities and social enterprises. We've tried to explore who the people and organisations working on DSI are, what their projects look like and how the networks of digital social innovators are connected, as well as where there are gaps in the network, in order to devise new strategies to support and scale the ecosystem.

Through crowdmapping organisations on www.digitalsocial.eu, we have mapped 992 organisations with 6022 collaborative DSI projects as of January 2015. In terms of the areas of society that the DSI projects focus on, the majority focused on **education and skills** (254) and developing **new models for participation and democracy** (251), with least activity around DSI **science and technology** projects (110) and DSI **finance and economy solutions**, such as crowdfunding for social good projects (104).

The **network analysis** shows that although there are few very active organisations, most are disconnected from these stronger networks. Well connected 'hubs', including Waag Society, Nesta, Fondazione Mondo Digitale and the Institute for Network Cultures, have many connections. 26 per cent of organisations (243) have connections to at least one other organisation, with the average number of connections per organisation being almost three.

The challenges for EU

The big challenges for the EU are how to make it easier for small-scale radical innovations involving digital technology to emerge and evolve, but perhaps more important how to create the conditions for the really powerful ones to get to scale. One of the key issues for the further growth of DSI in Europe is how to better connect the many very young and small-scale organisations and innovative projects in Europe to collaboratively develop projects, share learning and best practice, and seek funding and sustainable new business models.

This research has identified the goals of policy, the policy tools and funding instruments available and **the frameworks and open standards to make it much easier for digital social innovations to spread.** The study also indicated some examples of how these actions could be implemented within the framework of the Digital Agenda for Europe and under the Horizons 2020 Work Programme.

As shown in this research, Europe has pioneered a reasonably comprehensive set of tools (also through research programmes such as CAPS), and policy actions. But the scale of innovation is still far too modest relative to the scale of the challenges. And some of the biggest barriers to impact lie in the entrenched power of incumbents who, not surprisingly, would prefer digital social innovation to remain the domain of geeks, hackers and activists.

The Commission must create the conditions where digital businesses, social entrepreneurs and DSI communities can thrive. This includes several actions:

1. Experiment with bold public and social innovations

2. Invest in the infrastructure of the 21st Century, in order to provide a privacy-aware decentralised environment for open data;

3. Educate a technology-savvy multidisciplinary workforce, and use all their powers to foster a culture of democratic and inclusive innovation.

Only by improving its social innovation capacity can Europe remain productive and competitive, and create the digital innovations for the social good that its citizens need.

What should policymakers do?

To support digital social innovation, policymakers from city to government and EU level should focus on the following five key areas.

1. **Invest in digital technologies for the social good:** Make it easier to create new Digital Social Innovation through specific regulatory and funding measures that focus on supporting non-institutional actors driving innovation in the following areas: the collaborative economy, cities and public services; open tools and distributed architectures; and citizen engagement and direct democracy.

2. **Make it easier to grow and spread DSI through public procurement:** Provide support for evidence generation, common standards and integration with public services. Focus on the financial as well as the social impact (such as health outcomes, wellbeing etc.) when procuring services. Particularly for DSI this could include valuing the network effect and digital engagement of users provided by procured services.

3. **Increase the potential value of DSI (for instance, making available distributed architectures, common frameworks, open standards and through supporting Innovation Spaces).** Overall, there is a need for a public, common framework for the design of DSI solutions and infrastructures underpinned by open protocols, open standards, open formats, regulatory mechanisms and collective governance models based on democratic and participatory processes. New financial instruments (such as crowdfunding, challenges and prizes) should be experimented with through R&D funding, while support to Innovation Spaces (such as Fab Labs, hackerspaces and makerspaces) should be increased.

4. **Enable some of the radical and disruptive innovations emerging from DSI – such as new approaches to money, consumption, democracy, education and health – to thrive:** Policymakers need to provide space for more radical ideas to be tested out in towns and cities across Europe, using knowledge about how systemic innovation can best be organised. In some cases substantial investment will be needed to achieve this.

5. **Expand the European DSI network and invest in the development of skills, and training:** This could be done through growing the digitalsocial.eu network to enable more opportunities for collaboration; increasing early stage seed-funding programmes and other types of non-financial support for DSI start-ups; supporting programmes that help people and organisations working on social innovation develop their digital skills; and building DSI capacity in Eastern Europe by facilitating collaboration between established DSI networks and organisations from the rest of the EU.

INTRODUCTION

There is a possible future in which services are explicitly designed to tackle societal challenges such as climate change and unemployment. This research project has identified, mapped and engaged communities that are constructing the emerging Digital Social Innovation (DSI) field and provides policy recommendations to foster, support, and scale DSI in Europe. We believe this research comes at a crucial time – a range of new online services are being developed just as there is renewed interest from citizens across Europe in solving social and economic challenges.

The Internet is approximately 40 years old, and its capacity for generating societal and economic value is relatively well understood, yet its potential for solving large-scale social challenges remains largely untapped. The last 20 years or so have seen the commercialisation of the world wide web take precedence over its possible uses for the social good, even though the web itself was founded at CERN to further a vision of scientific knowledge sharing. While massive commercial investment and business models fuelled the web's incredible growth, the use of platforms like Facebook to serve social good has been accidental, disputed and secondary to their primary commercial purpose.

A contradiction, therefore, exists at the heart of the Internet. Despite the existence of a technical networking layer that could spread power and give people more 'bottom-up' political and economic control over their lives, the existing commercial services built on top of this lower technical layer continues for the most part to empower existing 'top-down' centralised and established organisations in the corporate and government sector. It also often neglects smaller and possibly game-changing innovative services aimed at tackling large-scale societal challenges.

Online innovation developed specifically to effect major positive social change remains, arguably, in its infancy, with relatively few services reaching global scale. There are a few impressive success stories in obtaining a global reach, in particular campaigning sites such as Avaaz and parts of the collaborative economy and the maker movement. Yet services that exist to help communities collaborate on problems that may not fit in traditional institutional or commercial models are still underexplored and badly supported.

What is innovation?

The nature of innovation has changed dramatically over the past decade. Innovation is no longer seen as a linear step-by-step process in which R&D activities or technology pushes automatically lead to the commercialisation of new products, but rather as a collective and cumulative process that builds on past knowledge. Some innovations involve big discontinuities, such as 'radical' or 'disruptive' innovations, and others involve continuous small improvements, such as more 'incremental' innovations. Finally, innovation is a risky and uncertain process; the rate of failure is usually very high, and its impact can be difficult to measure, particularly outside of the private sector.

A new field of DSI has emerged very quickly. It points to radically new ways of organising many of the essentials of life – from money and health to democracy and education. Its forms are still emergent, some growing very fast, others still being quite marginal. It has been almost entirely invisible to policymakers and has had none of the extensive support that has gone into digital technologies for the military, government and business.
But it has the potential to contribute to three of the most important challenges facing Europe: reinventing public services, often in less costly ways; reinventing community, and how people collaborate together; and reinventing business in ways that are better aligned with human needs.

In the context of this research we define DSI as

'a type of social and collaborative innovation in which innovators, users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale and speed that was unimaginable before the rise of the Internet'.

There is great potential to exploit digital network effects, in social innovation activity and new services that generate social value, but much of this potential has not yet being realised. The goal is to enable more of these smaller innovative services to sprout and flourish and effectively help to solve global scale societal problems.

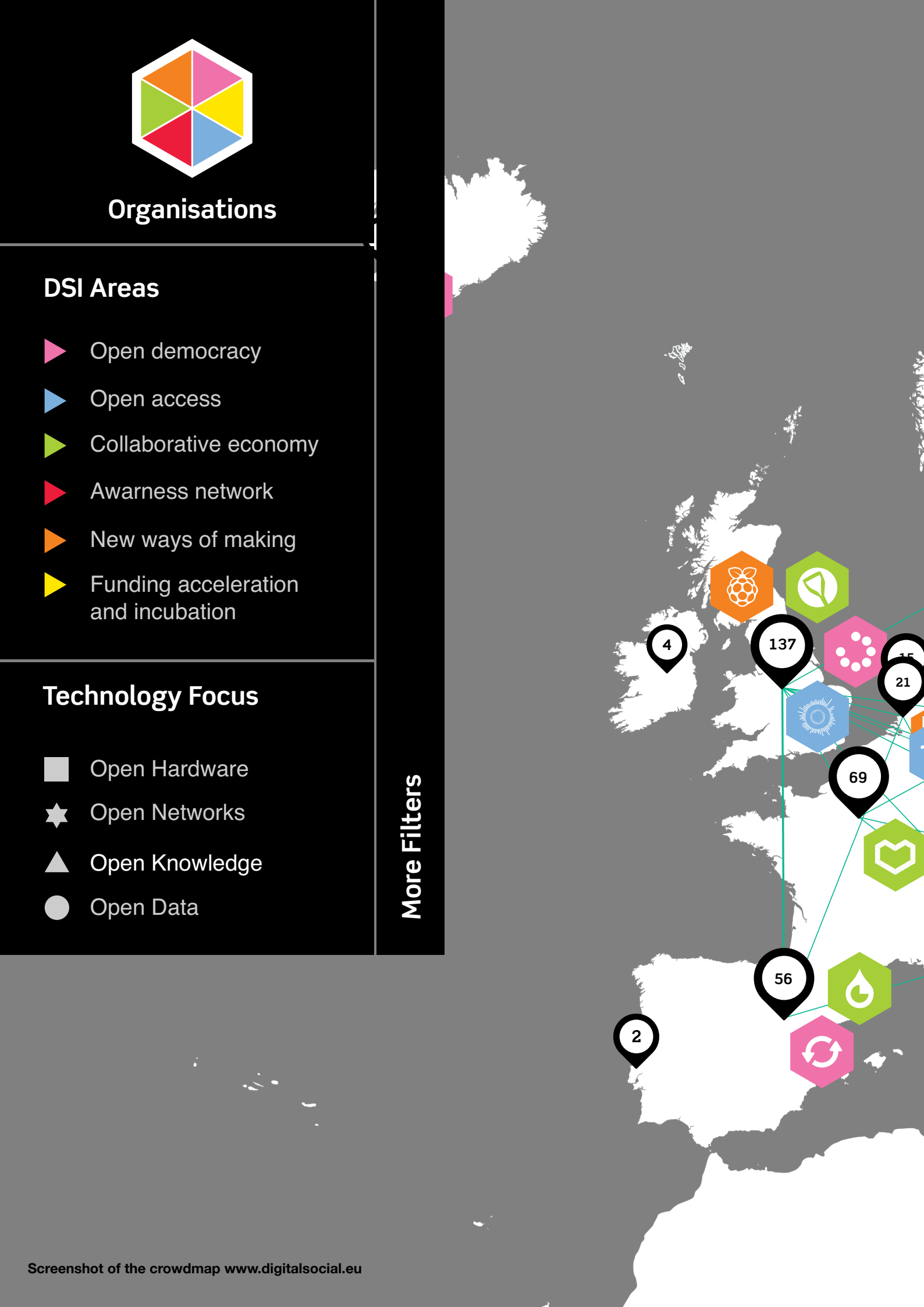
In light of these transformations, there is the need to rethink policies and instruments designed to nurture and orchestrate this innovation.

We present in this report the main insights from this research, including:

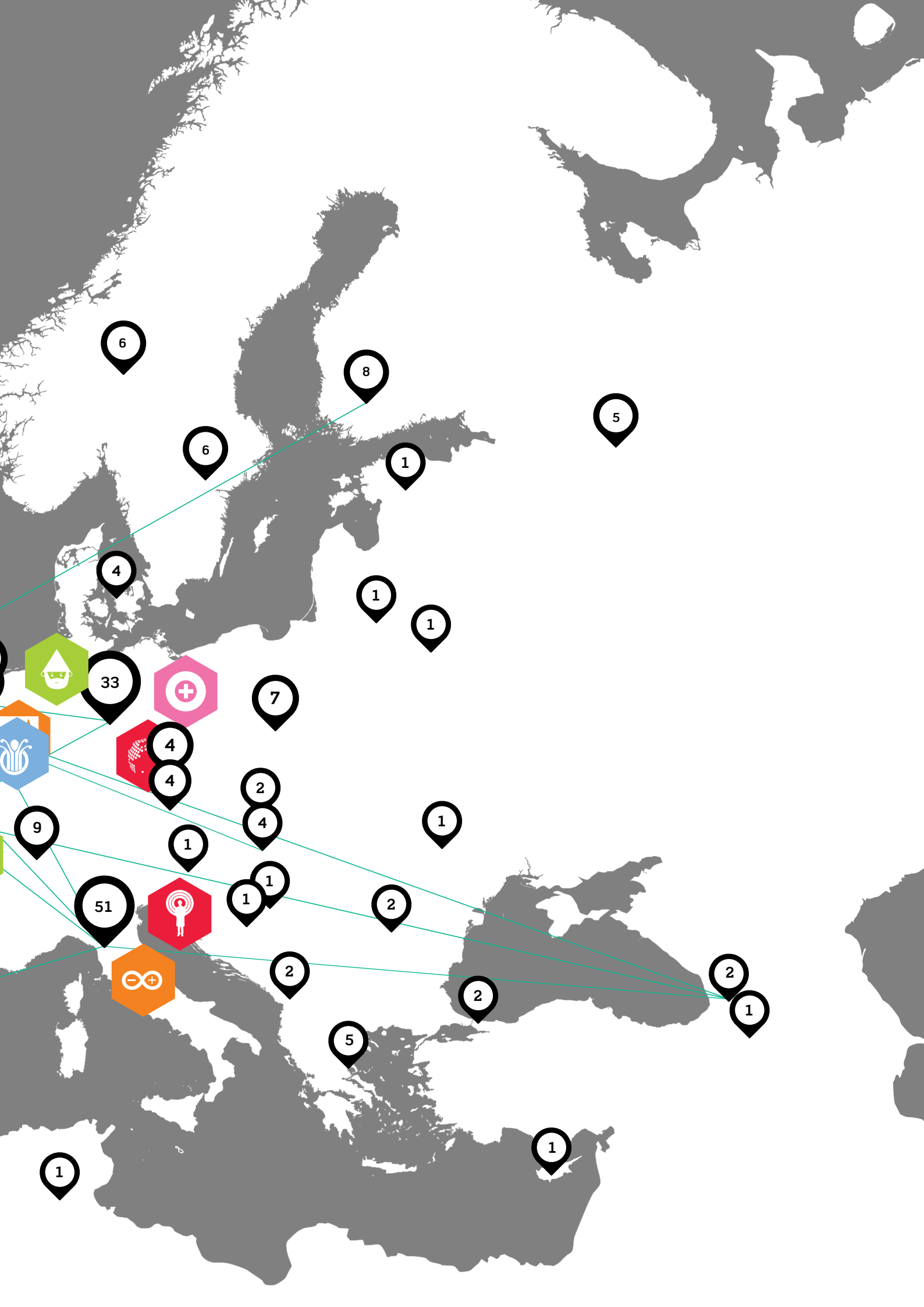
- **Defining the DSI Ecosystem:** An emerging understanding of what social innovation enabled by digital technologies is. This includes the types of technologies underpinning DSI services. These combine novel technology trends such as open data, open hardware, open networks, and open knowledge; and they give rise to new DSI areas such as: (1) open access; (2) awareness networks; (3) collaborative economy; (4) new ways of making; (5) open democracy; and (6) acceleration and incubation. **Crowdmapping DSI organisations and their activities:** 1000 organisations working on DSI in Europe have been mapped, 630 projects (as of January 2015) were identified and the way they are connected was analysed, including a network analysis of the links between organisations.

- **Co-designing policies for DSI:** Policy recommendations for DSI that can be implemented at a different level of governance are outlined. This includes mechanisms to foster DSI, regulation, policy tools and financial instruments to nourish and grow bottom-up innovation for social good.

- **Evaluation:** A variety of methodologies to evaluate the impact of DSI are discussed. Digital social innovations need to demonstrate their impact to make the case for spreading, scaling and attracting funding opportunities. Equally, as DSI evolves policymakers need to understand the extent to which the policies they are putting in place to support DSI are affective



Screenshot of the crowdmap www.digitalsocial.eu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WHY IS DIGITAL SOCIAL INNOVATION IMPORTANT?

1.1 PROJECT OVERVIEW

This research aims to explore the potential of digital tools that can effectively empower citizens, communities and social entrepreneurs to solve societal problems.

In particular, we examine how some of these digital services can take advantage of **the network effect of the Internet** (i.e. that the benefit of a network and its critical mass of users grows larger than its costs), as the Internet is increasingly the technical underpinning of the sociotechnical fabric of our societies.

We want to distinguish between two levels: 1) **the level of the technical networking infrastructure** itself provided by the Internet and 2) **the level of online services built on top of these networks**. Metcalfe's Law, (i.e. that the value of the network is in proportion to the number of members squared, so that the value of the network goes up for all users when more users are added)[1] applies to the value of technical networks like widespread smartphone usage.

For example, despite the Internet being a military-funded research project and the web a scientific project at their inceptions, the Internet and web were based on open standards and a radically decentralised architecture that could be harnessed by any actor. So the Web was able to reach a critical mass of connectivity so that both commercial entities (like Google) and non-commercial entities (like Wikipedia) were able to exploit the "network effect." Beyond the Internet, many new technologies such as open hardware may have positive network externalities.

This network effect applies in a straightforward manner for some services such as social networking sites like Facebook, and sites that require large user-bases like Wikipedia or Airbnb, but it may not apply easily to some other services such as e-democracy platforms, caring networks and local currencies**. For each kind of socially innovative service, we want to determine how they can maximise their impact using the infrastructure made available by the widespread usage of digital tools such as the Internet.**

Examples of Digital Social Innovations

There are many cases of DSI being spread throughout society and we attempt to define and cluster these in this report. They include: the **collaborative economy, local exchange and trading systems, digital currencies, and awareness networks** that incentivise experimentation with new models in a variety of domains. For example, **systems of mobility** that present alternatives to the use of individual cars (from car sharing and carpooling to bike sharing); **collaborative consumption** (including product service systems, redistribution markets and collaborative lifestyle platforms); citizen science, where the crowdsourcing of scientific data allows for some scientific research to be conducted by non-professional scientists; **new ways of making** that are experimented with in innovation hubs, such as Fab Labs, hackerspaces, living labs, urban labs and the HUB; and collaborative events such as barcamps, hackmeetings, open knowledge festivals and maker fairs.

1.2 HARNESSING COLLECTIVE INTELLIGENCE FOR THE SOCIAL GOOD

The rapid evolution of digital technologies and networks has made the ability to orchestrate knowledge and to manage creative interactions a central issue of economic and social policy. Understanding more about how collective intelligence happens, and devising and implementing effective tools for fostering it, should be a major project for Europe in the next decade. [2]

However, we need to define the kind of intelligence that is necessary to try to tackle these large-scale societal problems.[3]

In the context of digital social innovation we stress the potential of collective intelligence as:

a self-sustaining, self-directed integrated and distributed cognitive system that involves both other humans and technology to successfully solve problems beyond the cognitive capacities of any individual outside of the larger system.

Collective intelligence is required because some problems require collective coordinated action that individuals cannot accomplish by themselves. Collective intelligence is not new - almost any team or wider social system requires a level of coordination and acts intelligently in a way that goes beyond each of its members. By allowing new forms of communication, collective memory and algorithmically mediated attention, the Internet forms a natural digital substrate for collective intelligence.

Looking forward, collective intelligence is necessary for social innovation to tackle the problems facing society in today's complex and interconnected world, where grasping problems such as the financial crisis, climate change, and the demand for quality healthcare, seem to require digitally-extended collective intelligence, such as collectively tackling problems via platforms based on crowdsourcing and cognitive mapping based on real-time data analysis and visualisation.

There have been lots of attempts to harness collective intelligence to address social issues, such as climate change. In this report we identify some key initiatives such as Safecast and Smart Citizen Kit that operate in this way. However, to date these attempts have either been connected to a specific event which has not been sustained over time, or they operate at a relatively small scale. As a result they often they fail to lead to development of new solutions or systemic behavioural changes.

A potential future scenario to tackle climate change using collective intelligence could be the large-scale crowdsourcing of environmental data, where people collectively identify their own high-carbon intensive behaviour, then brainstorm and implement the changes necessary to reduce emissions and change behaviour.

Today new forms of social innovation are needed to create synergies between the social and the technical, which create new forms of value that are not limited to economic value, but that result in large-scale social impact. At the present moment, the Internet offers unprecedented opportunities for collective intelligence via its increasing ubiquity and the massive amounts of data available for collective transformation into knowledge.

1.3 DIGITAL SOCIAL INNOVATION IN THE CONTEXT OF FUTURE INTERNET IN EUROPE

This research forms part of the European Commission's thinking around its **Europe 2020 strategy** and the **European Digital Agenda**. Its ambition is to inform the development of better support, regulation and policy, as well as to help define potential funding programmes from 2015 onwards. Europe 2020 strategy is broad and ambitious and it is likely that an "out-of-the-box" strategy reliant on harnessing DSI would help to meet the Europe 2020 goals.

The evidence gathered here enables us to recommend how best to combine research, strategy, and policy for DSI in relation to the Digital Agenda for Europe and under the Horizon 2020 Work Programme, and in particular, but not limited to, the **Collective Awareness Platforms (CAPS) Programme.**

We are undergoing a transformation that involves society and the economy, driven by the fast evolution of ICT. More than five billion additional people will connect to the Internet globally in the next ten years, whilst over twenty billion objects will be connected to the Internet, transmitting data coming from people, sensors, the environment and objects themselves. However, we cannot expect the Internet **by itself** to drive innovation to help citizens address major societal challenges.

If we observe the Internet during its early phases when it was primarily funded by research and defense, its founding principles, such as **network neutrality, equitable service, and peer-to-peer architecture,** were crucial to build **a universal, open and distributed infrastructure** (avoiding points of centralisation by design, with the notable exception of the domain name system) that allowed the emergence of creativity and bottom-up innovation.

To a large extent these founding principles still exist. **On the network level**, there is still an ongoing defence of network neutrality. **On the level of platforms** for client operating systems such as Windows and Android, open standards have fostered innovation by allowing technologies like web browsers to be implemented over different underlying platforms, avoiding proprietary systems and vendor lock-in on the web. This was a hard and contested battle, which turned out to be the best way to do things, even commercially.

Yet **on the level of services**, the emerging cloud model of some services (proprietary social networks, big data providers, implementations of the Internet of Things), is convenient for users but also "locks users in" at the expense of security, privacy and openness: protocols are often proprietary, the systems are centralised (particularly in terms of ownership and decision processes) and interoperability between systems is not a requirement.

This centralised model prevents new and small companies from building innovative applications, as their applications need access to social data held on third-party sites and permissions to get into proprietary 'app stores.' The lack of standards forces developers to create multiple versions of the same social application for different closed platforms and hampers bottom-up disruptive innovation to happen.
A main Internet trend-threat is recognised today: an increasing concentration of power in services in the hands of a few data aggregators, none of which are based in Europe (Google controlling nearly 82% of the global search market and 98% of the mobile search market, Facebook dominating the social networking and identity ecosystem, while Apple, Amazon and Microsoft control the mobile market and cloud-based services platforms).

Apple has started a market that was entirely new; Google has developed the open source Android operating system and spawned innovation in applications worldwide; Facebook has enabled the building of thousands of apps and helped people to connect and organise. However, one danger is that firms capture collective intelligence via proprietary lock-ins, monopolistic behaviour and aggressive IP litigation rather than providing actual innovative services. Thus, there is a danger that once users are 'locked in' to various monopolies, the level of innovation in these services will decrease. Furthermore, **most users have accepted giving away their personal data in exchange for "free" services. Yet this bargain not only undermines privacy and weakens data protection but also commodifies knowledge, identity and personal data.**

There are other models that focus on innovation. As we discover in this research, while the value of big data is often only associated with efficiency and profitability, big data can also be used for social good, to improve public services and stimulate inclusive innovation.

The world wide web became successful because it was built on a set of royalty-free open standards decided through an inclusive and transparent process, via standards bodies such as the IETF and W3C, continuing to this day.

Big Data can also be used for social good, to improve public services and stimulate inclusive innovation.

Europe could provide an alternative model in the form of investment in open infrastructures on the network, service and data layer. We emphasize the importance of building European public, distributed, privacy-aware architectures that can provide the underlying open digital ecosystem on top of which innovations for the social good can flourish.

European SMEs, developers and social entrepreneurs are innovating with cheap open hardware, open source software, open knowledge, data storage and analytics and are producing valuable data about people, the environment and biometric and sensor data. The amount of data produced by open platforms and used for social innovation is still dwarfed by the amount of data collected on proprietary platforms, with the danger that much of this data is not available for the social good. For example, even the European Smart Cities project risks being dominated by US companies such as IBM, Google and Ciscos, partly because of the lack of alternatives.

Take for example the commercial success of Google: Google has already built one of the world's largest networks of computers and data centres for online-search results, and can repurpose their technology in order to expand into other data-driven services in order to increase their value, profit and marketability. For example, the company is now pushing into smart watches, smart cars, smart thermostats, smart clothes and smart cities. Their computing power can now then be used to store and analyse medical information, sensor and environmental data, which raises significant issues of privacy and competition.

Right now few of these opportunities are being taken advantage of by European social innovators, for the most part due to a lack of an open infrastructure and difficulty finding investment.

The future of the Internet should remain pluralistic, so that there is space for DSI alongside commercial services in the Cloud. In the long-term, if only a few non-European commercial bodies control all data-driven services, this threatens the ability of the European innovation system to compete

This European infrastructure would enable a whole new round of innovation that may not even be possible within current business models, with new players evolving, shaping and structuring whole new markets and societal institutions that can maximise social value and innovation.

The challenge for Europe is how it might acquire the competitive advantage in social innovation by developing distributed innovation ecosystems, rather than 'winner takes all' marketplaces whose dominant players set the terms of innovation and competition. (Bria 2012)

One of the motivations underpinning this research is investigating how Europe can embrace participatory and collaborative innovation models and experiments[5] and promote policy tools and actions that support the growth of digital technologies for the social good.

Digital social innovation could play a central role in the development of the Future Internet and the Internet of Things.

POWER TO THE PEOPLE

Wikis,
Usergenerated knowledge
P2P
Free Content Blogs
Social Networks
E-democracy

INTERNET

BIG BROTHER

Commercial services,
Entertainment (eg. IPTV)
DRM-heavy
apolitical

◀ PEOPLE
SOCIETY
COLLABORATION

▲ DISTRIBUTED

INDIVIDUALISM ▶
BUSINESS
COMPETITION

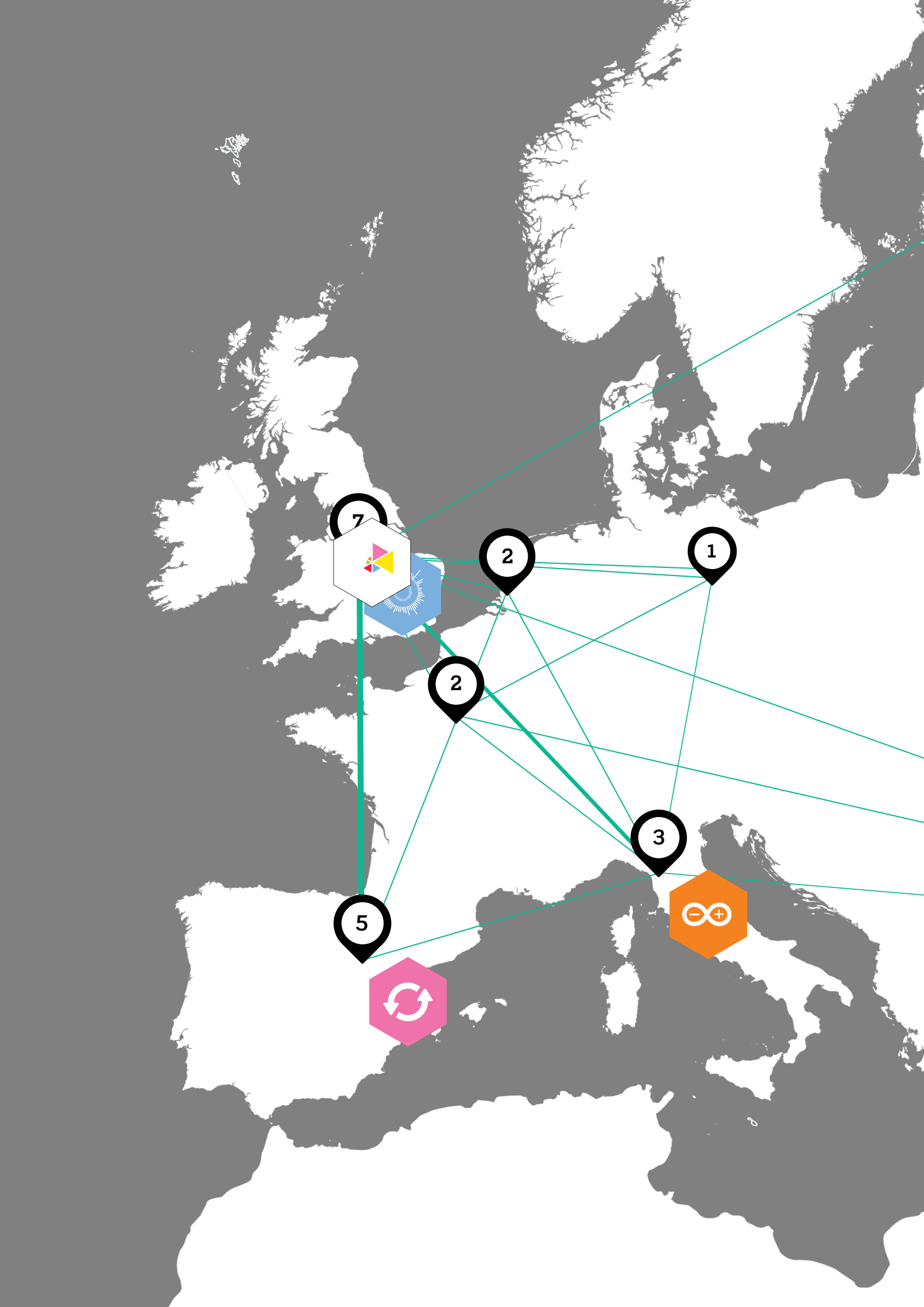
CENTRALLY ▼
CONTROLLED

Open and distributed digital ecosystems to foster grassroots social innovation and entrepreneurship.

The alternative is to accelerate innovations that align the capacities of the Internet better to social needs and that decentralise power to citizens and communities. The development of open data, federated identity, bottom-up wireless and sensor networks, open hardware and distributed social networks can potentially serve collective action and awareness. Making data available as part of a common distributed and decentralised architecture, open to all, allow new entrants to aggregate data on demand and create new services. Competition based on open standards, protocols and formats are essential to deploy interoperability between data, devices, services and networks. This vision requires more investment in fundamental research to promote net-neutrality, strong encryption, banning of trivial patents, open standards and free software together with the multi-stakeholder governance model. Avoiding anti-competitive dynamics and lock-in would engage all particapents in the value chain and allow for a replicable and sustainable solution. It would also enable new economic models, including those beyond GDP and commons-based, as alternatives to the centralised models of the current dominant global platforms that often monetise and sell personal data

Creation and consolidation of new monopolies: Platform Lock-ins and a battle amongst proprietary vertically integrated digital ecosystems:

A major risk for the Future Internet is the realisation of the 'Big Brother' scenario, with big industrial players (mainly US-based) reinforcing their dominant position by implementing platform lock-in strategies, enforcing extensions of copyright and patents, appropriating users' data and discriminating network traffic. By centralising computing, data storage and service provision (via the Cloud), and by striking strategic alliances between the largest Over-The-Top (OTT)iand largest network operators, there is a risk that the innovation ecosystem will become more closed, favouring incumbents and dominant players, thereby in time constraining user-driven innovations, particularly ones that don't involve monetary payment. This currently seems the most probable scenario, since we are seeing a consolidation of existing powers at every layer of the Internet ecosystem. Even more worrying, the latest NSA data-gate showed that intelligence agencies and governments have been engaging in mass surveillance operations, with huge implication on civil liberties and privacy.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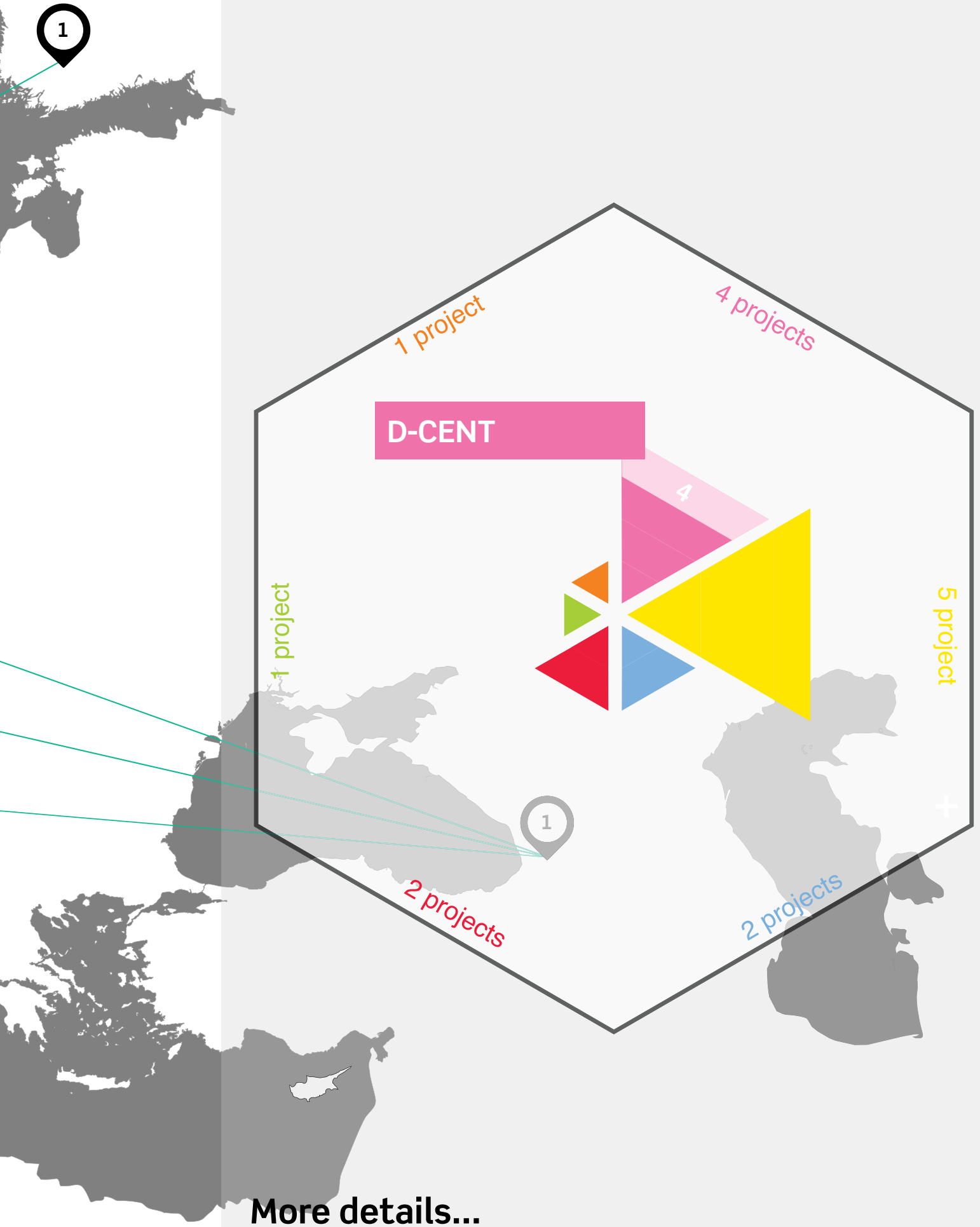
Nesta



More details...

2

MAPPING THE DSI ECOSYSTEM

2.1 DSI ECOSYSTEM: AN EMERGING TYPOLOGY OF THE DSI FIELD

Digital Social Innovation is a relatively new field of study, with little existing knowledge on who the digital social innovators are, what types of activities they are involved in and how they are using digital tools to achieve a social impact. Therefore, the first task for this study was to take a 'deep dive' into practice and to look in more detail at the different types of organisations involved with DSI and the activities these organisations are involved in.

The overarching purpose of this chapter is to give an overview of the lessons we have derived from the case studies and how we have used that to map the DSI field.

The analysis of practice enabled us to develop the framework, which has been used to capture data on DSI organisation via www.digitalsocial.eu. We have mapped 1000 DSI organisations and 630 collaborative projects as of January 2015. Data is categorised by:

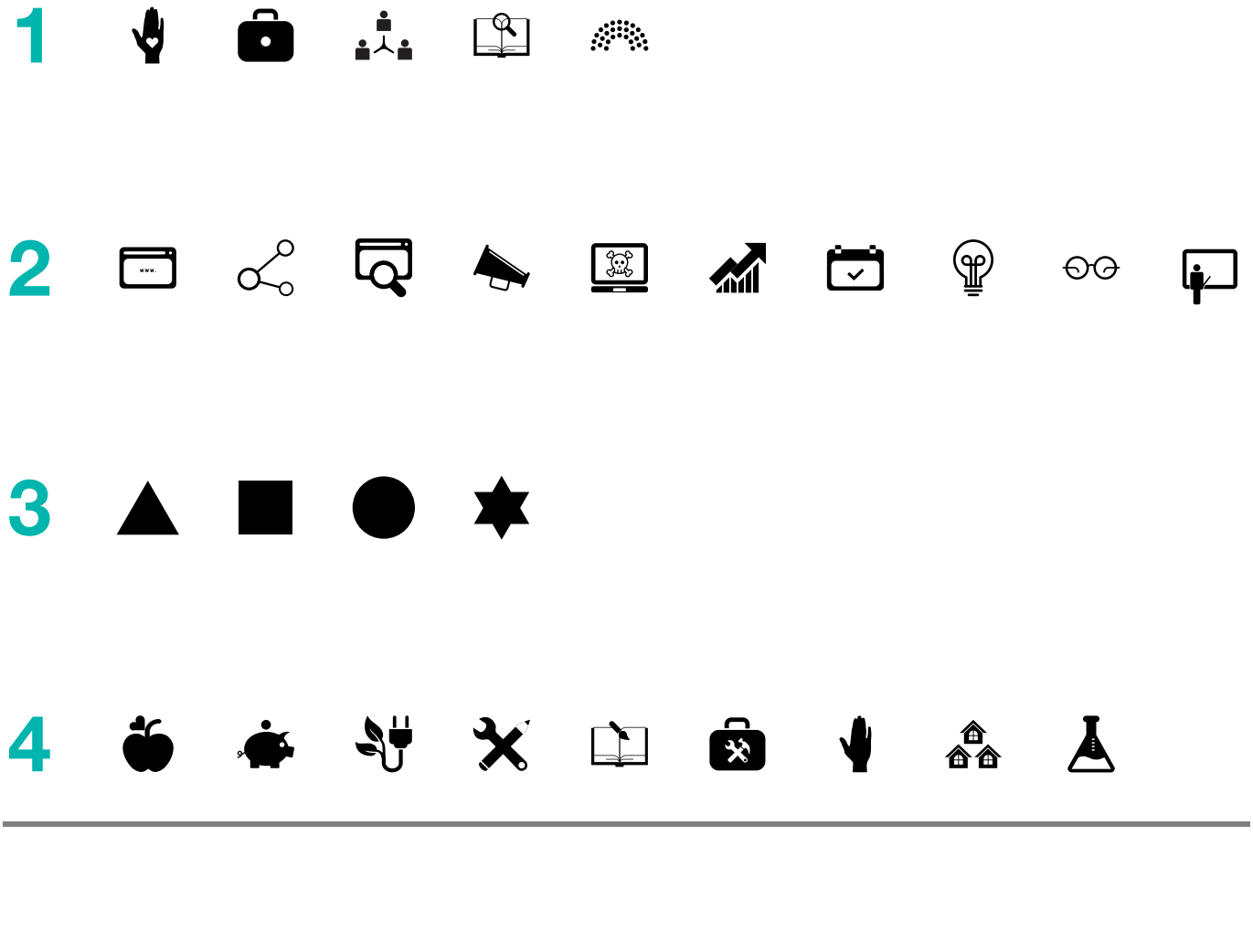
1. A typology of organisations (e.g. Government and public sector organisations, businesses, academia and research organisations, social enterprises, charities and foundations and grassroots communities)

2. The way these organisations are supporting DSI (for instance, by undertaking research, delivering a service or organising networking events and festivals)

3. The main technological trends the organisations and their activities fit under (e.g. open data, open networks, open knowledge, open hardware)

4. The area of society the organisations and their activities operate and seek an impact in. The DSI field does not have fixed boundaries; it cuts across all sectors (the public sector, private sector, third sector and social movements) and cuts across domains as diverse as (1) health, wellbeing and inclusion, (2) innovative socio-economic models, (3) energy and environment, (4) participation and open governance, (5) science, culture and education and (6) public services.

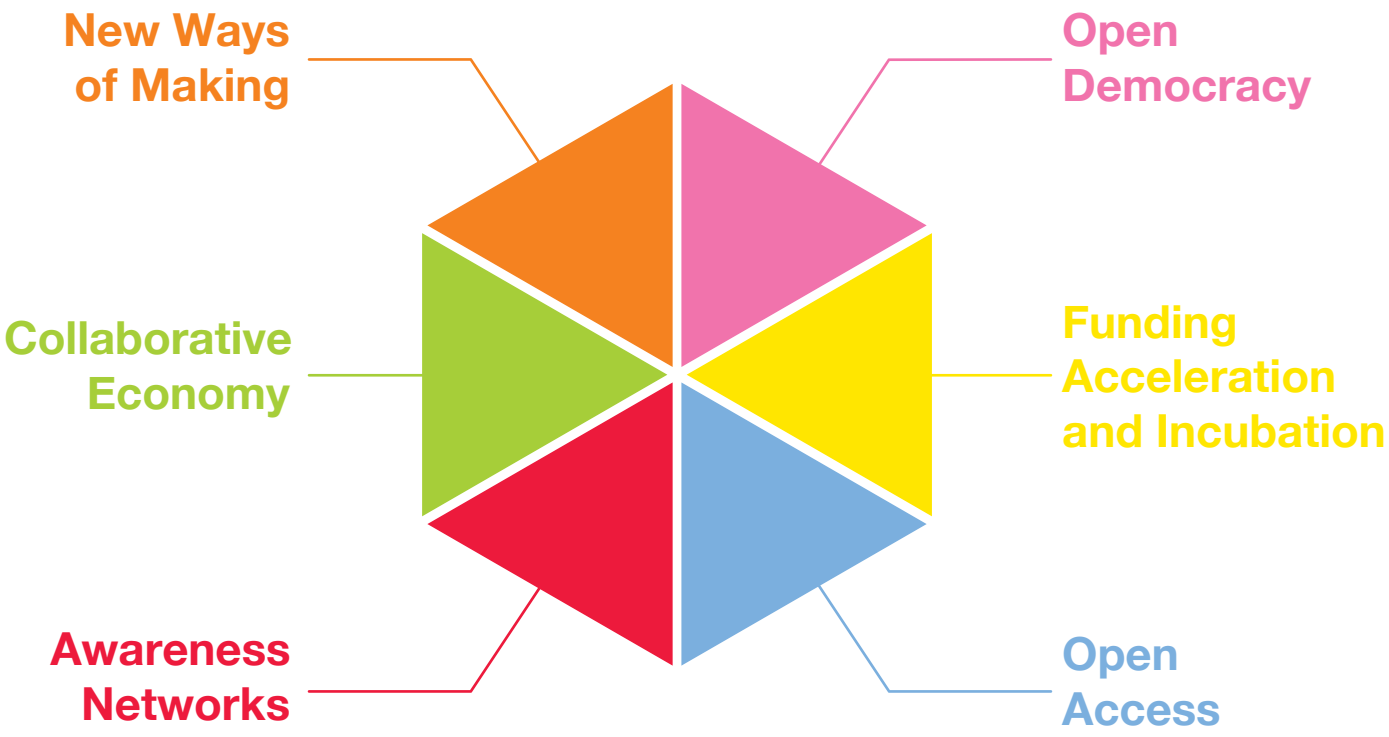
DSI Icons: **1** Organisation Type: Social Enterprise Charity or Foundation, Business, Grass Roots Organization or Community Network, Academia and Research, Government and Public Sector. **2** Project Type: Delivering a web service, Network, Research project, Research project, Advocating and campaigning, Maker and hacker spaces, Investing and Funding, Event, Incubators and Accelerators, Advisory or expert body, Education And Training. **3** Technology Trends: Open Knowledge, Open Hardware, Open Data, Open Network. **4** Areas of Society: Health and Wellbeing, Finance and Economy, Energy and Environment, Education and Skills, Culture and Arts, Work and Employment, Participation and Democracy, Neighbourhood Regeneration, Science.



2.2 DOMAINS OF DSI

The organisations and projects identified to date can roughly be grouped within six broad domains. A provisional **thematic clustering of DSI** organisations is emerging, grouping activities into **6 macro clusters** that capture the way DSI is growing and developing: **(1) New ways of making, (2) Open democracy, (3) The collaborative economy, (4) Awareness networks** enabling sustainable behaviours and lifestyles, **(5) Open Access and (6) funding, acceleration and incubation.**

Hexegan schematic of the 6 areas of DSI



COLLABORATIVE ECONOMY

New collaborative socio-economic models that present novel characteristics, and enable people to share skills, knowledge, food, clothes, housing and so on. It includes crypto digital currencies, new forms of crowdfunding and financing, new platforms for exchanges and sharing resources based on reputation and trust.

The collaborative economy – and the many other umbrella terms used to describe the rise of digital marketplaces for people to make transactions and share skills, assets and money – is fast becoming a key economic trend. Access to open digital infrastructures and technologies, that enable collective action, mobilisation and self-organisation at a large scale, has led to the emergence of new collaborative socio-economic models that present novel characteristics and enable people to share skills, knowledge, food, clothes, housing and so on. The Collaborative Economy has been documented by organisations like the △ **P2P Foundation**, Nesta, and △ **OuiShare**.

Across the world the burgeoning field of **collaborative consumption** is using digital platforms to change how people share resources and exchange goods and services, which range from household equipment to hotel rooms, cars to catering. In the UK, Nesta research documented how 25% of UK adults used Internet technologies to share assets and resources in 2013 – 2014[6].

An example, which grew out of the desire to reduce consumerism and connect neighbours, is △ **Peerby**, which started in the Netherlands. Peerby enables you to borrow the things you need from people in your neighbourhood. It is now setting up branches in the UK and USA.

△ OuiShare

SHARING ECONOMY NETWORK

OuiShare is a global collaborative consumption network founded in January 2012. The overarching aim of OuiShare is to shift the focus of the economy to one that can find new ways to connect, create and share on the web. It achieves this through two primary activities, Ouishare.net and collaborative economy events. Ouishare.net is an online community where members can post articles on collaborative consumption and anyone interested in the subject can take part in online conversations. In Europe alone, OuiShare organised 32 events in 2014 across 16 European countries, which engaged more than 2000 entrepreneurs. In addition to this the OuiShare Festival is an annual event, which brings together the global collaborative economy community. The 2014 event took place in Paris and brought together more than 1000 people working on, or interested in, the collaborative economy.

In parallel thousands of **alternative currencies** are in use – some focused on localities (e.g. the Brixton Pound in the UK or Chiemgauer in Germany); some on business-to-business transactions (e.g. the SoNantes in Nantes and Sol-violette in Toulouse, France, or Sardex in Sardegna, Italy, and the Sucre in Venezuela); some on particular sectors such as care (e.g. Fureai Kippu in Japan); and some as generic digital currencies (e.g. Bitcoin)[7]. Some of these have deliberately encouraged a changed awareness of how economies work – for example, valorising labour time equally, or linking currencies to data. In East Africa the development of **M-PESA** (a mobile financial payment system born out of social innovation) has become an avenue for nine million people to gain access to secured financial exchange services. This African success story has completely revolutionised the regional business terrain, at the same time empowering local people by providing an easy-to-use and readily available banking service that hitherto was impossible to access because of poor banking infrastructure and a strict regulatory framework.

△ Goteo

SHARING ECONOMY NETWORK

Other interesting initiatives such as Goteo are building services around the idea of the Commons, to enable communities to access and share resources to collaborate on social projects. Goteo is a social network for crowdfunding and distributed collaboration (services, infrastructure, micro tasks and other resources) for encouraging the independent development of creative initiatives that contribute to the common good, free knowledge and open code. Goteo is managed by the non-profit Open Sources Foundation that supports projects that offer some kind of collective return, such as the open source DIY shoest kit[8], a project developed with the support of Fablab Barcelona, or http://tuderechoasaber.es, a service that allows citizens to send open data information requests to Spanish public bodies.

NEW WAYS OF MAKING

An ecosystem of makers is revolutionising open design and manufacturing. 3D manufacturing tools, free CAD/CAM software and open source designs are now giving innovators better access to tools, products, skills and capabilities they need to enhance collaborative making.

A vibrant ecosystem of makers is developing across Europe and globally. Low-cost home 3D manufacturing tools (3D printers, CNC – computer numeric control – machines), free CAD/CAM software, like Blender, 123D or Sketchup, and open source designs are now giving innovators better access to the enabling infrastructures, products, skills and capabilities they need to enhance collaborative making. "Reuse, Remix, Recycle" are becoming the keywords of the open hardware and makers movement, which embodies a combination of different design and technology methods, such as fast prototyping, open design, lean development and DIY.

Open hardware seeks to shift the attention away from consumption and resource exploitation, to the creation of new capacities to build the products that people consume according to a set of shared ethics and principles. The open hardware movement in particular is about how people share knowledge, skills and tools, and how you build communities around open products. People working on open source hardware are creating new organisations, such as the **Open Source Hardware Association**, to coordinate research projects, such as the open source cars Wikispeed, and build farming tools and new fabrication machines like the RepRap and others. These products are open source and free, with a worldwide community of peers contributing to the collective discoveries.

A project like **openp2pdesign** is opening up design processes and tools to enable collaborative communities to undertake large-scale projects that can lead to innovative results in open business, open government or open data. Projects like **Open Source Ecology** are promoting a shift towards a more sustainable lifestyle.

The makers movement is showing how experiments of collaboration and open culture can be applied to design, prototyping and production.

Interesting trends are emerging at the intersection between open hardware, DIY culture, open source software and open data. Projects and areas of work like ✡ **Safecast** or **open source Geiger**, the □ **Smart Citizen Kit** and **open wearables** are showing interesting potential in combining innovative technology trends to generate unexpected services.

Organisations, from grassroots movements, think-tanks and universities to big charities and public museums are hosting small-scale workshop spaces often with digital tools and 3D printing facilities (**maker spaces and hacker spaces**). There are now 96 known active hacker spaces worldwide, with 29 in the United States, according to Hackerspaces.org. There are many more Hacklabs around the world that are not branded as hacker spaces, but are community labs that incentivise the diffusion of free and p2p culture and open technology.

Makerspaces are new and rapidly evolving hotbeds of innovation, which have been facilitated by the latest in prototyping technology, while being rooted in traditional pillars of manufacturing: engineering, design, science and art.

The MIT founded a precursor in 2002 called **Fab Lab**, and since then makerspaces have expanded from the electronics-centric hacker spaces to having a stronger emphasis on groups that attract a diversity of professionals such as artists, machinists, robotics engineers, bicycle makers, jewellery makers, photographers and fashion designers.

Waag Society in Amsterdam is one of over 100 institutions worldwide hosting a Fab Lab (part of a global movement of Fab Lab makerspaces), which has been used to develop a number or digital social innovations, including the blueprint for a prototype of a 3D printed $50 prosthesis that can be used in developing countries. An interesting example that shows the possible convergence between makerspaces and Fab Labs is **WEFAB**, a makerspace in Milan with a focus on open source, design, digital fabrication and micro enterprises.

Maker Fairs

MAKERS MOVEMENT

Maker Fairs are interesting expressions of this new form of networking events that emerged out of the big diffusion of the Makers Movement. During Maker Fairs many organisations and people gather to showcase their projects and look for future trends in a similar fashion to traditional commercial art fairs. Born in 2006 in the United States from the idea of Make Magazine, it has become over the years an event for families and fans that want to celebrate a DIY (do it yourself) approach in science, inventions, crafts and electronics.

The biggest European Maker Fair was hosted in Rome during October 2014. The Maker Faire in Rome has hosted 230 makers, of which more than half are Italian and the rest are from all over Europe. This year, Maker Faire Rome's Call4Makers received 600 projects, 74 talk and 42 workshop proposals from 33 countries. In addition to its Call4Makers, Maker Faire Rome has promoted a Call4School for projects created and developed in high schools, with the 25 best Call4School projects invited to participate in the fair.

Another interesting example of collaborative innovation environments is the possibility of setting up **Urban Labs in Cities**. When using urban labs as a tool for urban development city government can improve relationships with their citizens by testing ideas in real world settings with all relevant stakeholders: citizens, companies and scientific institutions.

One interesting example of an Urban Lab is the **Barcelona Urban Lab**. It was created to facilitate the use of urban space as a laboratory available to companies that need to test their products and services in a real environment. These pilot products and services have to respond to an unmet municipal need, thus improving public service design and delivery. One project was the adaptation of all traffic lights in the city for the blind.

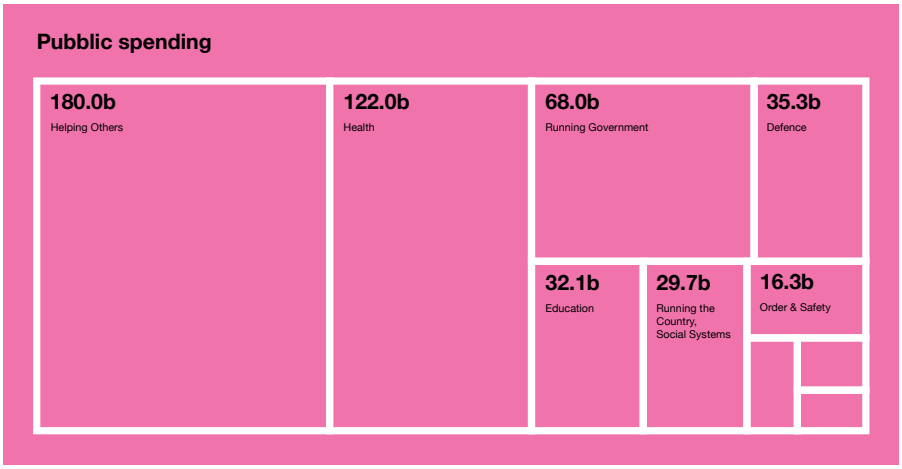
OPEN DEMOCRACY

Open democracy is transforming the traditional models of representative democracy. Digital technology can enable collective participation at a scale that was impossible before enabling citizens to be engaged in decision-making processes, collective deliberation, and mass mobilisation.

Participatory democracy strives to create opportunities for all members of a population to make meaningful contributions to political decision-making, as well as broadening the range of people who have access to such opportunities. Since so much information must be gathered for the overall decision-making process to succeed, technology can help support participatory models, especially through technological tools that enable community narratives and the accretion of knowledge.

Organisations and projects pioneering open democracy, large-scale feedback, and citizen participation through crowdsourcing legislation, such as △ **Open Ministry** or △ **Liquid Feedback**, are transforming the traditional models of representative democracy.

○ **OpenSpending** encourages transparency and accountability, whilst participatory web platforms such as **Wikigender** and ○ **Wikiprogress** developed by the OECD facilitate the linking of National statistics to actual individual living conditions.



○ Openspending

OPEN BUDGET

OpenSpending is a data sharing community and web application that aims to track every government and corporate financial transaction across the world and to present that data in a useful and engaging form. OpenSpending is maintained by a community of contributors. Anyone interested in spending data of any kind is invited to contribute data to the OpenSpending database, create visualisations using the OpenSpending software and to use the OpenSpending API. Although the OpenSpending project has a strong focus on government finance, it supports any dataset consisting of a set of transactions, each associated with a quantity of money and a time. **Where Does My Money Go** was the first OpenSpending project. It allows UK citizens to examine where their taxes were being spent through an interactive 'bubble tree' visualisation. Other Openspending projects include visualising aid spending in Uganda and OffenerHaushalt in a way that allows users to explore and drill down through the various layers of Germany's federal budget.

Organisations like ○ **MySociety** and the △ **Open Knowledge Foundation** in the UK have developed services such as **FixMyStreet,** allowing citizens to report city problems, and **CKAN,** the biggest repository of open data in Europe, which is underpinning a new bottom-up ecosystem for digital public services.

Digital technology can thus enable collective participation at a scale that was once impossible and it is attracting a variety of citizens that are finding new ways of getting engaged with decision-making processes. Addressing citizens and **incorporating direct feedback** in detecting ideas and solutions has evolved to be a widely accepted method in urban development. Online voting and challenge prizes are helpful instruments for solving the problems of governments and administrations.

Globally, cities now adopt systems like **open 311** that provide a standardised and collaborative model to track civil issues and get fast responses from local government. Crowdsourcing processes also present challenges that are often related to managing the crowd, quality or limitations of ideas, public commitment from policymakers, or lack of investment. It is crucial for successful crowdsourcing to design the activity properly to prevent excessive demands and frustrations. In Europe, interesting crowdsourcing projects for cities are emerging from the **Open Cities** project and △ **Commons4EU**, drawing on the capabilities within communities (for instance, through utilising the skills of civic innovators and hackers) to design and deliver public services that meet our societies' changing needs.

△ **Your Priorities** platform in Reykjavik is offering a successful model experimenting with citizens in Iceland, integrating large-scale deliberation into democratic decision-making. The platform crowdsources opinions on city legislation, with the most popular ideas then being debated by the city council.

△ Open Ministry

CITIZEN INITIATIVES

The Open Ministry is a Finnish non-profit, non-partisan organisation based in Helsinki, set up with the aim of enabling the crowdsourcing of legislation, promoting deliberative and participatory democracy and citizens initiatives. The Open Ministry utilises crowdsourcing and it is fully operated by volunteers independent of governmental political parties. A change of law in Finland was a major precipitating factor that made Open Ministry's mission a possibility. On 1st March 2012, the Finnish government amended the national constitution, so that any proposed legislation supported by at least 50,000 signatures (1.7 per cent of the voting population) must be put to a vote in the parliament within six months.

To get citizen proposals before parliament, the Open Ministry firstly helps citizens with an idea for a law proposal develop the initial concept idea and refine this in to a clear proposition that will be acceptable to parliament. It is then up to the citizen with the support of the Open Ministry to mobilise a minimum of 50,000 votes for the proposal, primarily through social media campaigning. If successful the proposal is brought before parliament for a debate and vote. Five proposals have been put before parliament to date, including a proposal for marriage equality, which reached over double the threshold number of votes in the first day of its campaign, thus making it virtually impossible for the parliament to ignore.

D-CENT

COLLABORATIVE POLICY-MAKING

The Open Ministry is now part of the European D-CENT project that is building privacy-aware tools and applications for direct democracy and economic empowerment. D-CENT is developing a decentralised social networking platform for large-scale collaboration and decision-making and is piloting open source solutions across Europe engaging new political partices, citizen movements and governments. Through the W3C partner, D-CENT is also helping to develop and implement open social web standard standards, contributing to the W3C Federated Social Web Working Group.

Change.org is another example. It is a free petition tool with more than 70 million users around the world. Its mission is to empower people everywhere to create the change they want to see. MoveOn (http://front.moveon.org/) is another interesting case. It is a non-profit educational and vocational organisation set up in 2001, which mobilises a community of more than 8 million Americans who use innovative technology to lead, participate in and win campaigns for progressive change.

AWARENESS NETWORKS

Individuals, and communities are now able to aggregate data coming from people and the environment in order to create a new generation of products and services, fostering behavioral change. Platforms for collaboration are used to solve environmental issues and promote sustainable behavioral changes, or to mobilise collective action and respond to community emergencies.

Some of the best examples of DSI in Europe are clearly positively impacting society. For instance **cities including Vienna and Santander** are pioneering new practices in open data and open sensor networks that are changing the provision and delivery of public services; **personal networks like Tyze** are generating new care communities that are being integrating with traditional social care provision; and sharing economy platforms like △ **Peerby** are creating new forms of relationships and services. Inspired by the open-source movement, individuals, self-organising groups and communities are beginning to aggregate the layers of data that increasingly permeate the urban environment, in order to create a new generation of products and services, fostering behavioural change[9] - for instance, platforms for collaboration to solve environmental issues and incentivise sustainable behavioural changes, such as ✡ **Safecast** and **BeAware.**

✡ Safecast

OPEN SENSOR COMMUNITY

Safecast is both the name of a Geiger counter built by the open source community as well as a global sensor network where Safecast owners can map and freely share their radiation measurements in open data sets. The overarching aim of Safecast is to encourage people to actively contribute to the generation of a body of data that might alleviate environmental problems. Safecast was founded by Sean Bonner, Joi Ito and Pieter Franken after March 11th 2011, when a 9.0 earthquake hit Japan and triggered a destructive tsunami which hit the Fukushima Daiichi nuclear power plant. In an effort to help, the partnership decided to take part in surfacing data on radiation levels across Japan, caused by the meltdown at the power plant. However, the Safecast team quickly realised that most of the devices used by the public to map radiation were of poor quality and there were massive holes in the public radiation data sets available. As a response to this, the team developed the bGiegie Geiger counter, built on the Arduino open hardware board.

The team turned to 'the crowd' via crowdfunding platform, Kickstarter, to finance the device and help launch a sensor network where bGiegie owners could share the data they were collecting. Safecast then worked with hackerspaces and used grant funding to update the counter, which amongst others enabled users to mount the counter on the outside of a car and use GPS technology to timestamp the data and log the location. All Safecast data is uploaded to an open data set, which visualises radiation levels across Japan. To date, the Safecast network has used the Geiger counter to map more than 13 million data points.

Platforms are also used to mobilise collective action and respond to community emergencies, as in the case of **Crisiscommons**, ○ **CrisisNET** and ○ **Ushahidi**.

○ CrisisNET

CRISIS MAPPING

CrisisNET is an initiative developed by Ushahidi[10], a non-profit tech company that specialises in developing free and open source software for the collection, visualisation and interactive mapping of information. The primary purpose of CrisisNET is to provide an easy to use tool which can continuously collect and organise crisis data from a variety sources, such as social media, sensors or even quasi-real-time data. The hope is that the quick and easy access to real-time crisis data will make it easier for organisations and developers to quickly to build their own applications without the need to spend days locating, identifying and processing data, thereby enabling much quicker responses to crises such as Ebola or conflicts.

These platforms can gather and integrate information, allowing participatory urban planning and improvements in social cohesion and collective wellbeing through the use of peer created information (e.g. **Action for Happiness** or **challenge.gov**). They also use effective visualisation tools to better understand environmental, social and economic indicators, and to bring them to public attention and create large-scale awareness.

OPEN ACCESS

The Open Access Ecosystem approach (including open access to content, open standards, open licensing, knowledge commons and digital rights) has the potential to empower citizens and increase participation, while preserving the openness and accessibility of the Internet infrastructure. It includes projects that are using bottom up privacy-preserving and decentralised infrastructures, and the diffusion of knowledge systems in the Public Domain.

Many activities in this area exploit the power of open data, open APIs, and citizen science such as **Open Data Challenge and Open Cities** that provide citizens with better public services, or ◯ **CitySDK** which is defining interoperable interfaces for city-scale applications. Other projects are exploring the potential of federated social networking, such as **D-CENT** and **Diaspora**, and the promotion and diffusion of knowledge systems in the public domain, such as △ **Communia**. These activities are favouring a shift towards open access and transparency, thus having an impact on the underlying norms and institutions that drive society.

Projects such as ✡ **Confine**, **Commotion** and ✡ **Tor** are using bottom-up privacy-preserving decentralised infrastructure for the open Internet constituted by open standards, open data, free and open software and open hardware.

△ **Github**, the collaborative service for open software developers, is revolutionising the way code is built, shared and maintained by a variety of projects around the globe. Important developments to re-decentralise the Internet, leveraging P2P open technologies, are happening at many levels. For instance distributed social networking projects such as Diaspora, Status.net or easy-to-run servers like arkOS – which make it easy to run your own secure cloud – and decentralised media publishing platforms, such as mediagoblin, are gaining new momentum. This open ecosystem approach has the potential to empower citizens and increase participation, while preserving the openness and accessibility of the Internet infrastructure.

Many activities in this space are driven by grassroots networks, like **Observe Hack Make**, a five day outdoor international camping festival for hackers and makers, and the **Chaos Communication Camp**, an international meeting of hackers that takes place every four years, organised by the Chaos Computer Club (CCC)[11], an informal association of hackers from across Europe.

The Chaos Computer Club (CCC)

HACKERS NETWORKS

The Chaos Computer Club (CCC), Europe's largest network of hackers, is the most prominent example of grassroots communities coming together to develop and provide information about technical and societal issues, such as surveillance, privacy, freedom of information, hacktivism and data security. The CCC is based in Germany and other German-speaking countries and currently has over 4,000 members. The CCC advocates more transparency in government, freedom of information, human rights and communication. Supporting the principles of the hacker ethic, the club also fights for free access to computers and technological infrastructure for everybody. The latest gathering of the CCC in 2012 in Hamburg, Germany, brought together 6,000 participants.

The ability to access knowledge and bottom-up infrastructures is also changing the state of **education**. It brings primary sources into every classroom and allows for more open and rapid communication between teachers and students. For instance, **The Open University**, based in the United Kingdom, and other models of distance learning have made education much more widely available. The same goes for the way scientific research is being done, with its culture being influenced through the ability to globally access and share knowledge, culture, information and code and to undertake better collaboration within the research community.

A good example of where developments in DSI could lead us is the project **Primo**, which was born out of collaboration between Arduino and designers in the Master of Advanced Studies in Interaction design at SUSPI in Lugano. Primo is made from an Arduino board, a car and a set of instruction blocks all made out of wood. Its objective is to teach the high-level abstraction of programming as a sequence of instructions to young children in schools, creating an appealing game. These kinds of projects are able to combine open hardware technologies with new learning methods to experiment with new educational practices, enhanced by the way technology is integrated within the learning environment.

Open standards

A number of organisations affect DSI in Europe through acting as expert bodies on the development of policy and strategies and advocating and campaigning for standards for DSI.

The World Wide Web Consortium (W3C).

OPEN STANDARD BODY

The **World Wide Web Consortium** (W3C), an international community that works on developing and advocating for Open Standards, the **P2P foundation**, that works on promoting peer-to-peer practices, and the **IoT Council**, promoting an open Internet of Things vision, are good examples of this. Expert bodies are essential for providing expertise and coordinating inclusive processes of decision-making amongst key stakeholders.

FUNDING, ACCELLERATION, INCUBATION

A range of incubators, accelerators, impact incvestment schemes have been set up by public and private funders to support digital innovation projects. They do this through a combination of seed fundings as well as non-financial support such as access to co-working spaces and business support and mentores

As it has been the case with the support for innovative businesses, social innovations often need support in the early idea stages to refine their business models and grow their venture. The global study Good Incubation (2014) [12] explores how social venture incubation has grown as a set of techniques to help founders develop ventures that are investable propositions, including a focus on incubators with a specific focus on supporting digital social innovators.

Incubators typically support innovators in exchange for equity, at pre-seed or seed stage. There are nearly 100 incubators/accelerators in Europe.

Large foundations and charities often play an active role in hosting and running makerspaces and incubators focusing on supporting DSI.

The work by **Nesta i**n the UK, on the tech for good incubator △ **Bethnal Green Ventures,** and **the Waag society** in Amsterdam, working on setting up and hosting one of Europe's first Fab Labs, are two examples of this in Europe. In the United States**, Code for America** provides seed funding, office space, and mentorship to civic start-ups through its accelerator.

Y Combinator was the first of its kind when it started back in 2005 and its success inspired many others. **Bethnal Green Ventures** in the UK, who support early-stage technology start-ups tackling a social or environmental problem with £15,000 and 3 months intensive support in return for 6 per cent equity, is another example.

Nowadays, the biggest names are international start-up accelerators such as **TechStars, Seedcamp** or **Startbootcamp.** But there is an increasing number of big corporation-backed accelerators, such as **Wayra** from Telefónnica or **Orange FAB** from Orange and a plethora of regional start-up acceleration programs.

The Open Data Institute (ODI)

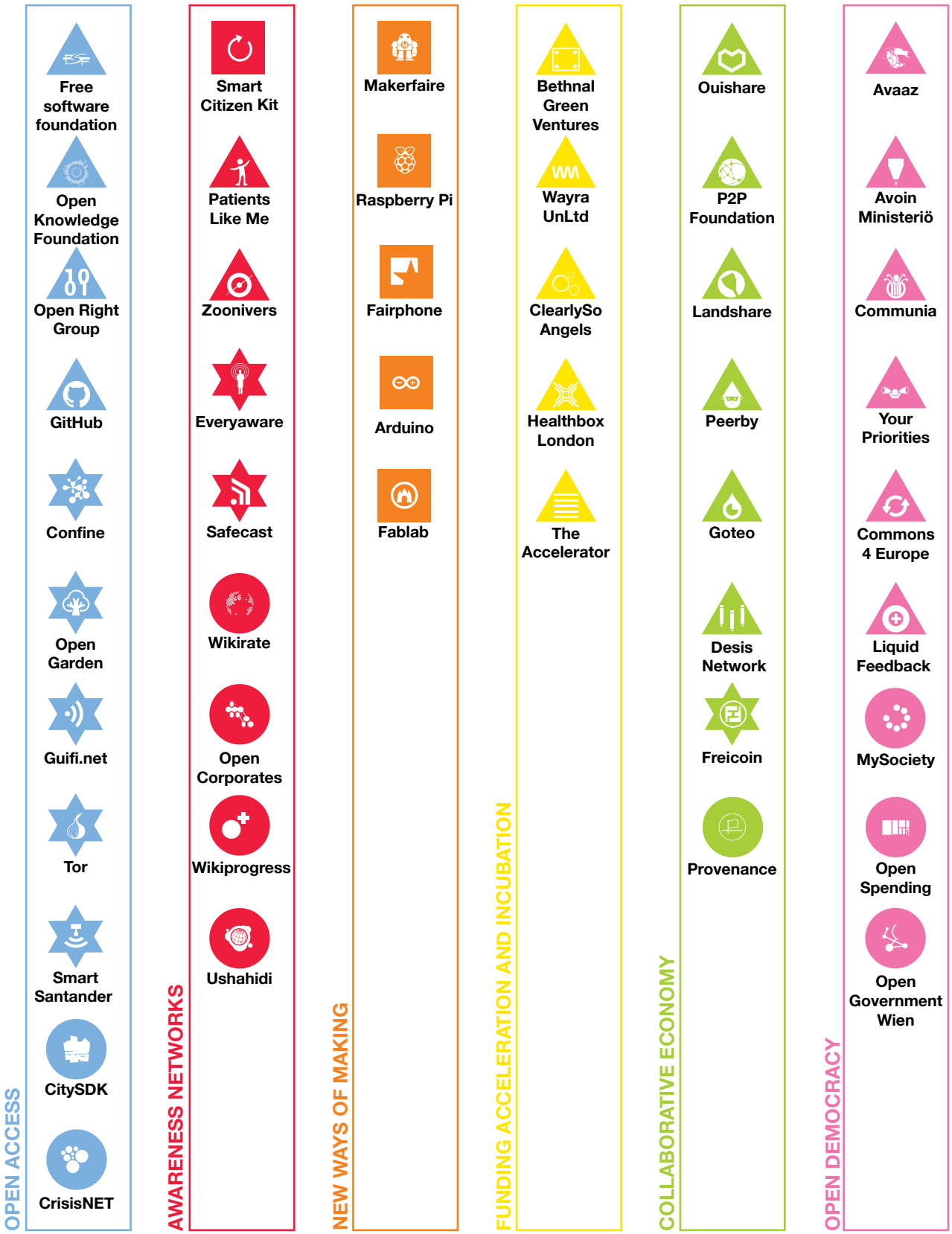
OPEN DATA ACCELLERATOR

The Open Data Institute's start up programme, which has supported organisations like **Open Corporate** and **Provenance** to grow their open data projects, is one of them.[13] Although incubators and accelerators have been always around, their presence in aiming to address social challenges has been rather limited to date.

Traditional business accelerators offer advice and resources to fledgling firms to help them grow. In contrast, **Civic Accelerators** can match cities with start-ups, private firms and non-profit organisations interested in partnering with government to provide better services, bring digital technology to cities, or change the way citizens interact with city government.

Finally, **crowdfunding platforms** serve as intermediaries to link people and to stimulate and fund new ideas. There is the growth of the alternative finance industry, including crowdfunding and P2P lending that has been deeply documented by Nesta in the UK[14]

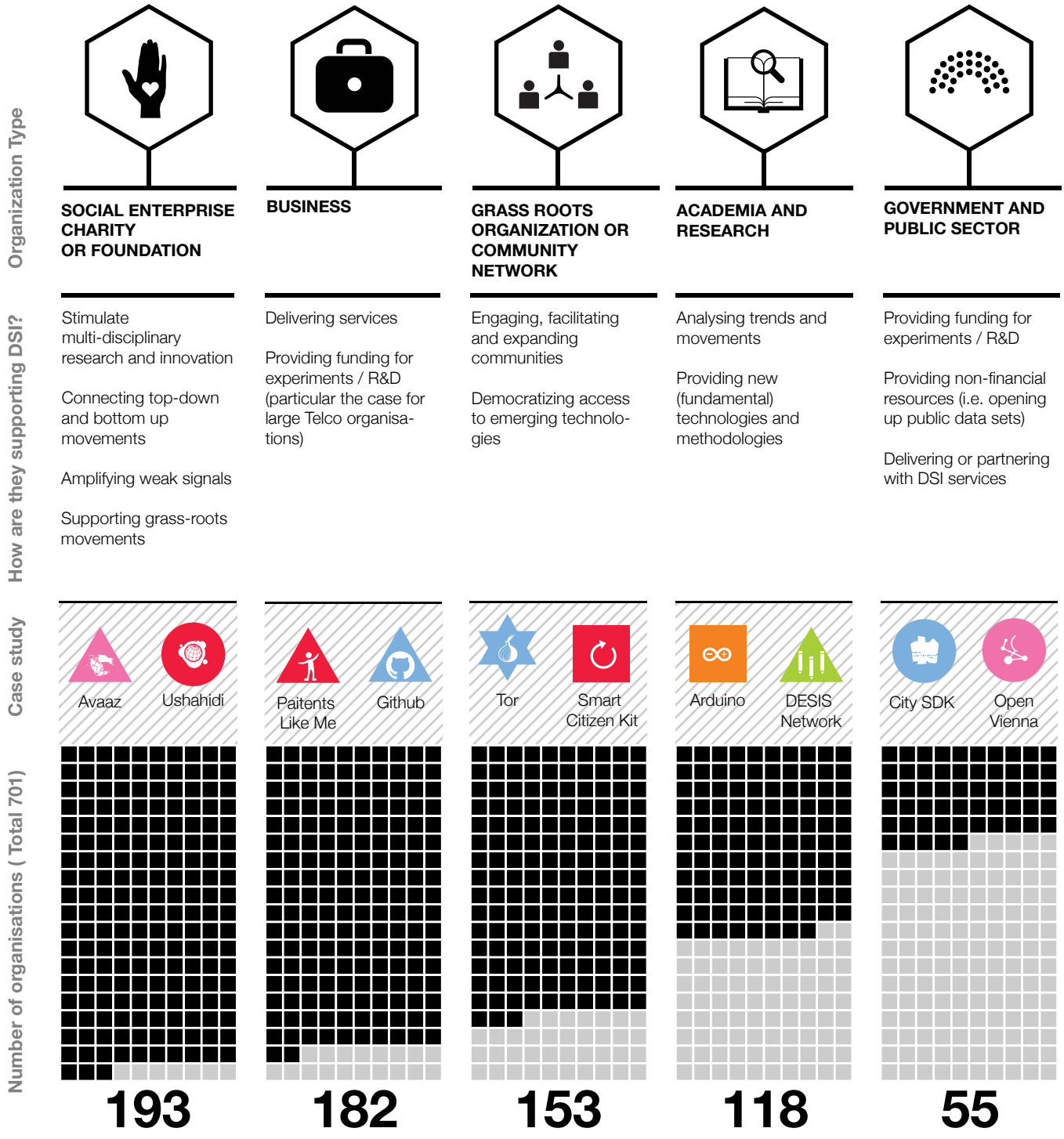
Case studies categorised into the 6 different types of DSI



2.3 WHO ARE THE ORGANISATIONS INVOLVED IN SUPPORTING OR DELIVERING DSI?

The type of organisation is a field of information sought for each of the Digital Social Innovation organisations. Figure below shows the numbers of each type of organisation as correct at time of writing (Nov 2014).

Types of organisation

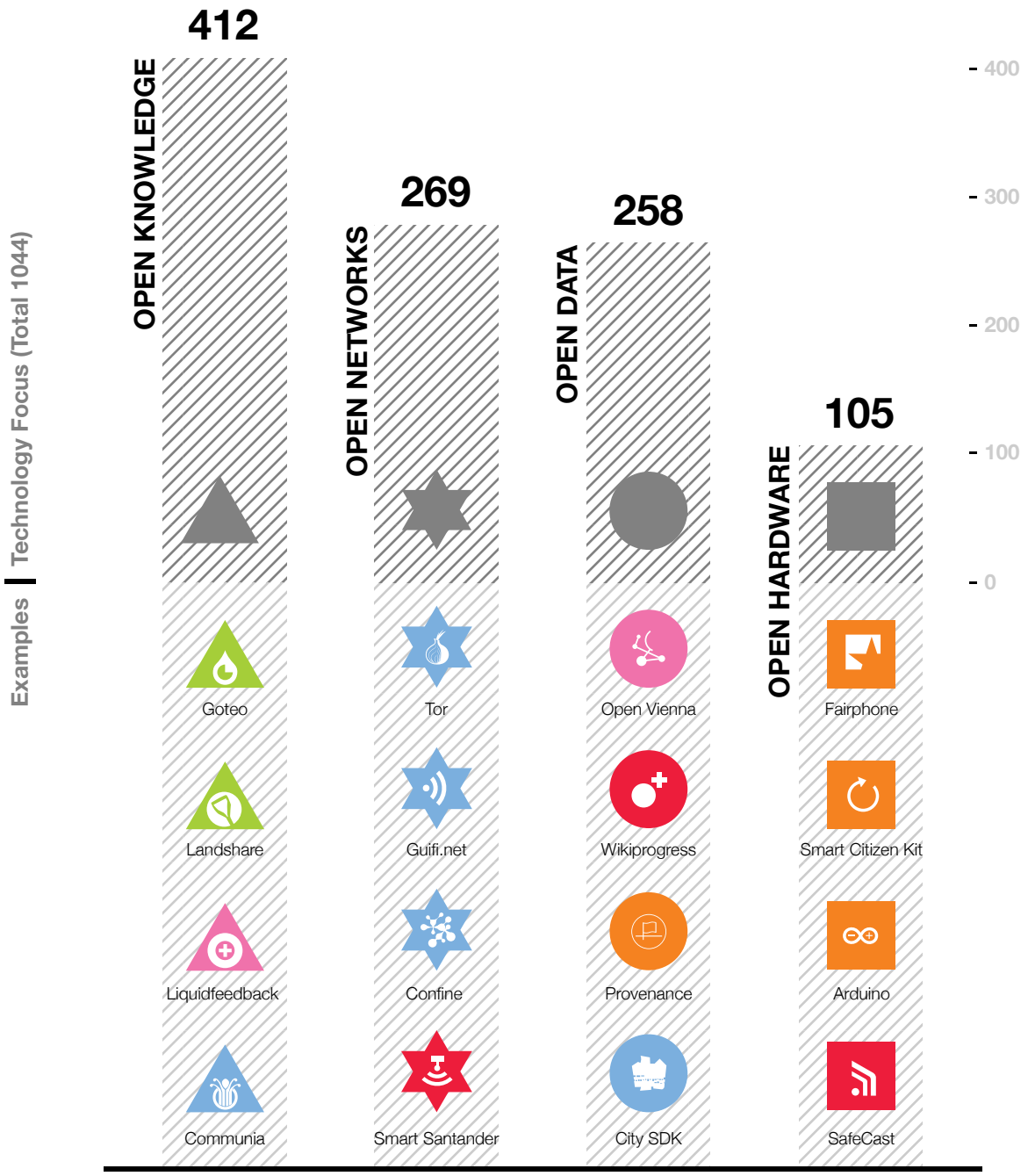


2.4 TECHNOLOGICAL TRENDS IN DIGITAL SOCIAL INNOVATION

Although there is a huge variety in the different types of DSI and the technologies these innovations use, a look across the different types of DSI we have examined to date shows four main technological 'trends' (Bollier and Clippinger 2013): open knowledge, open data, open networks, and open hardware.

Through case study analysis we have sought to build up an understanding of the extent these emerging technologies, such as open data, open networks, open hardware and open knowledge, are being harnessed by digital social innovation. Below we provide a more detailed description of how these trends can be defined, and the insights we are deriving from case studies about these. It is important to note that the activities of many of the most exciting digital social innovations can be grouped under two or more trends. Safecast, for example relied on open hardware to build the first Geiger counter sensor kit, on Crowdfunding to fund the development of kit, and on open data to share and analyse the data captured across all of the Geiger counters. Within these broader technology areas, we have been identifying a variety of more specific technologies and activities adopted by DSI activities such as: **social media, crowdsourcing, crowdfunding, big data, machine learning, 3D printing, online learning and e-petitions.**

The main technological trends in DSI



OPEN NETWORKS

Innovative combinations of network solutions and infrastructures, e.g. sensor networks, free interoperable network services, open Wifi, bottom-up-broadband, distributed social networks, p2p infrastructures

The ability to build bottom-up networking capabilities in every corner or the world and in people's everyday lives has become a key enabling factor for the spreading of the digital society. Here we describe some of the most interesting trends in the open network area, such as **wireless sensor networks, community (bottom-up) networking and privacy-aware open networks.**

A **wireless sensor network (WSN)** consists of spatially distributed wireless sensors to monitor physical conditions, such as temperature, sound, vibration, pressure, motion or pollutants, and to pass their data through the network to a single or replicated data-processing location. An **open sensor network (OSN)** is a wireless sensor network that manages open information in an open environment. An OSN stands for an interoperable sensor network, where many vendors or entities can connect their sensor solutions and those sensors interact with other ones or with the centralised data system using standard communications. The open sensor network connects the sensor with the data repository where the information is processed and stored, as it uses public data from different sensors and forwards the gathered information to the central point within a wireless environment.

Sensor networks are the key infrastructures of a smart city, providing basic data on the usage of energy, pollution, geodata, traffic, geography, tourism and other areas. Possible future services based on OSN include mobile applications that support citizens using public transport by displaying real time information on arrival and departure, or traffic information for car drivers. Another application area is the measurement of air pollution, temperature and humidity, or light sensors that provide a large variety of sensor networks and offer possibilities for developing mobile applications, which would be fed by open data from the OSN.

A number of European cities have established sensors that detect traffic density and some initiatives to monitor the arrival of public transport. Most European cities work with sensors that monitor environmental conditions. Pollution, temperature, humidity and light sensors are installed that provide information that could be used to develop applications for citizens or to be added to other applications as mashups. All mobility and environmental sensor networks could be interconnected with the OSN platform in order to provide external parties a single point to consume this data.

For instance, ✡ **Smart Santander** demonstrates the potential of creating large networks of sensors that capture activity from static sensors as well as citizens to create cities that better and more efficiently react to citizen needs. These sensors provide the opportunity to implement applications that help citizens to move around in cities.

Community networking (also known as bottom-up networking) is an emerging model for the Future Internet across Europe and beyond, where communities of citizens build, operate and own open IP-based networks, a key infrastructure for individual and collective digital participation. While commercial access networks from either commercial telecom companies or by local governments tend to follow a well-known centralised network architecture and operation model, community-owned open local IP networks are an emerging model of infrastructures that is open, decentralised and can be collectively more resilient. Internet networks have become a key infrastructure for the development of the digital economy due to the 'democratisation' of the access technologies, reducing the price and complexity in setting up wired or wireless links.

The Confine Testbed experimental facility supports experimentally-driven research on community-owned open local IP Networks. This integrated project (2011-2015) offers a testbed for experimental research that integrates (in a federation) and extends three existing community networks: ✡ **Guifi.net** (Catalonia, Spain), FunkFeuer (Wien, Austria) and AWMN (Athens, Greece). Each is in the range of 500 – 20,000 nodes, with a greater number of links and even more end users. These networks are extremely dynamic and diverse, and combine successfully different wireless and wired (optical) link technologies, fixed and ad-hoc routing schemes and management schemes. They run multiple self-provisioned, experimental and commercial services and applications. A common entry point allows researchers to select a set of resources, and then deploy, run, monitor

and experiment with services and protocols. This is done on real-world IP community networks that incorporate a wide variety of wired and wireless links, nodes, routing, applications and users. The testbed is a resource for the research community to address the limits and obstacles regarding Internet specifications that are exposed by these edge networks.

✡ Guifi.net

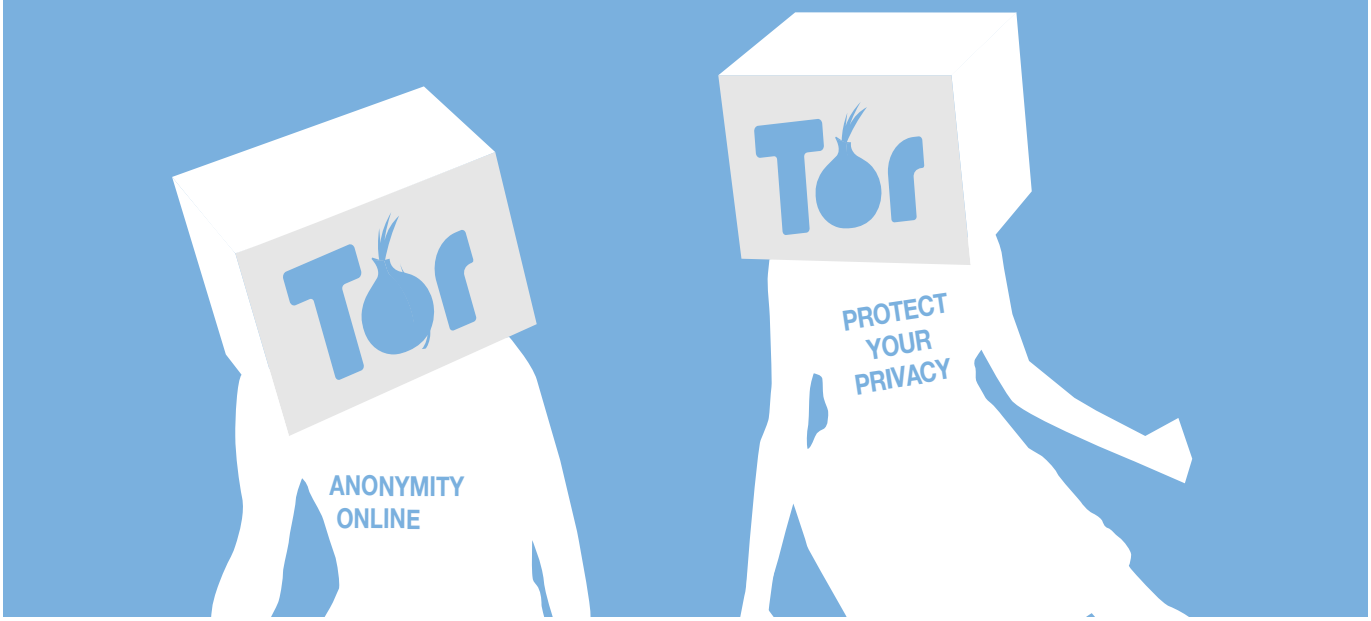
COMMUNITY NETWORKS

The **Guifi.net** initiative is developing a free, open and neutral, mostly wireless telecommunication community network. It started in Catalonia in 2004 and as of January 2012 it has more than 15,300 working nodes, most of them linked to a main network in Catalonia. Many other local networks are growing all around Spain. Guifi.net is connected to the Catalan Internet Exchange (CATNIX) as an autonomous system (AS) via optical fibre with IPv4 and IPv6.

✡ Tor

PRIVACY AWARE NETWORK

The work by **Tor** on creating secure, **privacy-aware and crypto tools** that bounce Internet users' and websites' traffic through 'relays' run by thousands of volunteers around the world, making it extremely hard for anyone to identify the source of the information or the location of the user, is one example of open networks enabling citizens to protect their digital rights online. TOR also enables software developers to create new communication tools with built-in privacy features and provides the foundation for a range of applications that allow organisations and individuals to share information over public networks without compromising their privacy. The Tor network's 4000-plus volunteer-led model relays over half a million daily users. Such tools are powerful in the hands of individuals and communities, as shown by the use of **Wikileaks** to expose government accountability and transparency by supporting journalists and other experts to access information and report key stories.



OPEN DATA

Innovative ways to capture, use, analyse, and interpret open data coming from people and from the environment

The explosion of new types of data analytics and machine learning means that it is no longer only government or corporate forecasters who have the opportunity to access and analyse data. By making data open, governments and other large organisations and companies that hold or generate data about society have the opportunity to enable citizens to hold government to account for what it spends, the contracts it gives and the assets it holds.

Local authorities are playing a leading role in implementing open data policies and driving forward the open data movement. The social benefits of open government vary from **citizen engagement to increased transparency and accountability**, as well as enhanced interaction between governments, other institutions, and the public. For instance, citizens are gaining greater insight into how their tax payments are being spent.

Beyond the social aspects, open data also supports public sector innovation by breaking the competitive advantage gained by proprietary access to data and data lock-in. Innovation is most likely to occur when data is available online in open, structured, computer-friendly formats for anyone to download, use, and analyse, as long as the privacy and data protection of all citizens is preserved and that communities are entitled to share the value and social benefits of public assets. Thus, **open data, together with open and standardised APIs** is crucial for open innovation, as developers are able to access and use public data and mesh it with other sources of data produced by the crowd to build novel applications that have a social utility.

Another important trend, boosting the diffusion of open data is the increasing number of mobile devices. Smartphones, tablets, PDAs and other devices are becoming smaller, faster, smarter, more networked and personal. Dataflows are also burgeoning as the **Internet of Things** integrates a vast universe of network-aware sensors, actuators, video cameras, RFID-tagged objects and other devices that see, hear, move, coordinate and 'reason' with each other.

For instance, the **city of Vienna has, with its Open Data in Vienna** programme, demonstrated the potential in opening up its data. The city opened its data records to the population, businesses and the scientific community. Released data ranges from statistics and geographic data on traffic and transport to economic figures. It then invited programmers and developers to make apps and web services based on the data, which to date have resulted in more than 60 applications for citizens. Other pioneering examples include the work by the Estonian Government and the not-for-profit Praxis on the Meiraha project, which focuses on opening up and visualising the Estonian budget. The citizen science project Globe at Night is yet another example of this, where citizens using the camera and geo-tagging functions on their smartphones help the research project measure global levels of light pollution, effectively coupling open data and citizen science.

Helsinki Region Infoshare

OPEN DATA FOR REGIONS

Through an entity called Helsinki Region Infoshare[34] , Helsinki and three of its neighbouring cities publish all of their data in formats that make it easy for software developers, researchers, journalists and others to analyse, combine or turn into web-based or mobile applications that citizens may find useful. The movement for more and better open data has grown significantly over the last few years through projects funded by the European Commission, such as City SDK that help cities to standardise their interfaces and reuse solutions across Europe.

There are other local governments around the world that are successfully developing open data portals. In the United States, the cities of Chicago, San Francisco, Philadelphia, and New York are only a few of the examples worth mentioning. British Columbia in Canada, the region of Piedmonte in Italy, and Metropolitan Rennes in France have also set up open data websites at the regional level that can be considered good practices, and in the Barcelona Metropolitan Region, the city of Barcelona is leading Multicouncil Open Data.

Open Data Challenge

OPEN DATA FOR REGIONS

There are several examples where Governments and the developer communities interact. One of them is the examples of competitions and challenges. One of Europe's biggest open data competitions is the **Open Data Challenge**[15]. It was organized by the Open Knowledge Foundation, the Openforum Academy and Share-PSI.eu. It offered 20,000 Euros in prizes to win and revieved a total of 430 entries from 24 European Union member states. There were several categories: Prize Idea, Prize App, Price Visualization, Better Data Award, Open Data Award, and Talis Award for Linked data. In total, 13 awards were given. There are many other competitions, such as **Apps4Finland**[16] , the biggest European apps contest organized since 2009 and **Apps for Amsterdam** promoted by the City of Amsterdam to make accessible to developers and citizens the data of the City.

OPEN KNOWLEDGE

Co-production of new knowledge and crowd mobilisation based on open content, open source and open access

The contribution of open knowledge covers the variety of ways in which citizens can use online services and platforms for mass scale social collaboration. Ordinary people today use blogs, wikis, social networks and hundreds of other collaborative platforms to manage their daily lives, solve social challenges, and to participate in e-campaigns, crowdfunding etc. Furthermore, the ability to access, use, and reuse without financial, legal, contractual and technical restrictions (alligned with the Budapest open access initiative, released as creative commons or in the public domain) is key for knowledge co-creation networks to spread. Open access provides an economic and social return through dissemination to citizens, taxpayers and researchers from other countries and other disciplines. Recent global developments have revealed increasing demands of citizens for their governments and administrations to become more participatory, transparent and accountable.

△ Communia

PUBLIC DOMAIN

Communia, a European Union-wide thematic network that focuses on strategic policy discussion of existing and emerging issues concerning the public domain in the digital environment is one example of this, as is the work by the social innovation research project **COMMUNIA**. The European Thematic Network on the Digital Public Domain is an international association based in Brussels. COMMUNIA is built on the eponymous COMMUNIA Project Thematic Network, funded by the European Commission from 2007 to 2011, which issued the Public Domain Manifesto and gathered over 50 members from academia and civil society researching the digital public domain in Europe and worldwide. **The Public Domain** is defined as the wealth of information that is free from the barriers usually associated with copyright protection, either because it is free from any copyright protection or because the right holders have decided to remove these barriers. COMMUNIA Association and its members raise awareness in, educate about, advocate for, offer expertise on, and research about the public domain in the digital age.

Along with Communia, **TEPSIE (**researching the role of ICT and social innovation) and **LIPSE (**researching innovation in public sector environments) are further examples of research activities and research networks aiming to further our understanding of DSI as a phenomenon.

Building on long-term EU research projects like **Commons4EU,** networks of EU organisations (academic and non-academic) have partnered to collectively explore the development of DSI practice through joint research and development. In the case of Commons4EU, partners got together to explore the development of collaborative web projects and bottom-up broadband technologies[15]. Other interesting examples of multidisciplinary research projects are **the Network of Excellence on Internet Science (EINS),** that aims to integrate multidisciplinary scientific understanding of Internet networks and their co-evolution with society, and the **Knowledge and Innovation Communities (KICs),** promoted by the European Institute of Innovation and Technology that are coordinating research on ICT for society in different domains, such as climate change, sustainable energy and communication technology itself.

A very interesting project, which is not funded by the European Union but shows how open research works, is **FLOK Society in Ecuador**.

FLOK

APPS CHALLENGES

FLOK is an open research project aimed at creating policy proposals and political actions to transition Ecuador to a full commons-based knowledge economy. The project is a joint research effort sponsored by the Co-ordinating Ministry of Knowledge and Human Talent, the Senescyt, (Secretaria National de Educacion Superior, Ciencia, Tecnologia e Innovacion) and the IAEN (Instituto de Altos Estudios del Estado). It seeks the involvement and input of local civil society but also includes an explicit appeal to the global co-operative and commons movements to assist them with advice and policy proposals.

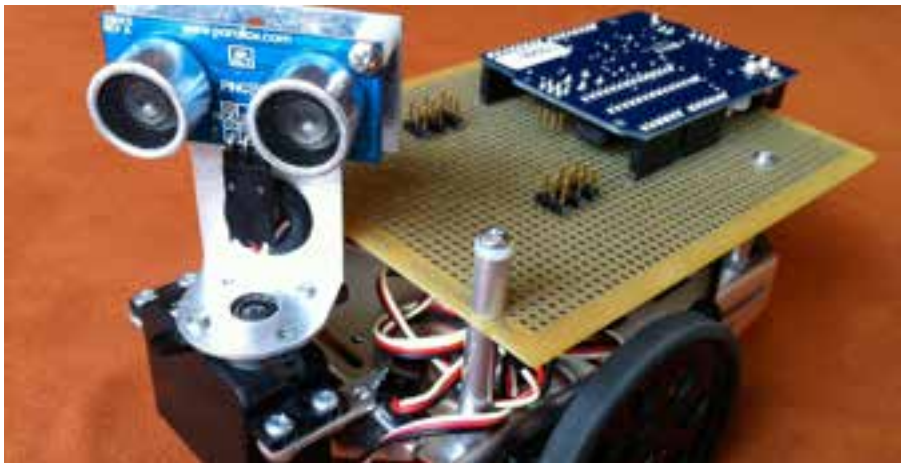
One of these policy proposals is around skills and training. A fundamental requirement for DSI is that innovators with an ambition to use technology for social good have the skillset to use and apply digital technologies. Collaborative networks of DSI organisations are able to foster these skills that often are not being provided by traditional education and training organisations. To cater to this need a number of projects have emerged, such as Apps for Goodi or the Open Data Institute's (UK) open data training sessions for charities. Real empowerment through access to knowledge and education happens when groups and individual can acquire skills and gain access to resources and opportunities to develop the knowledge and self-sufficiency toachieve inclusion in decision-making processes. These are some of the main initiatives within the DSI field that are focusing on capacity-building & constructing informal learning networks: **Fab academy; Institute for network culture; Coder dojo's**; and more generally the hacking culture of sharing skills and knowledge.

OPEN HARDWARE

new ways of making and using open hardware solutions and moving towards and Open Source Internet of Thingst

Open-source hardware consists of hardware whose blueprints are made publicly available so that anyone can study, modify, distribute, make, extend and sell hardware based on that design. The hardware's source, the design from which it is made, is available in the preferred format for making modifications to it. Ideally, open-source hardware uses readily available components and materials, standard processes, open infrastructure, unrestricted content and open-source design tools to maximise the ability of individuals to make and use hardware. Open-source hardware gives people the freedom to control their technology while sharing knowledge and encouraging commerce through the open exchange of designs.

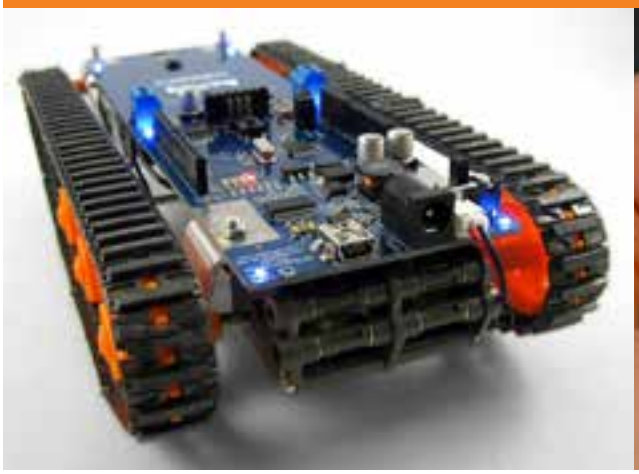
The work by organisations like ☐ **Raspberry Pi** and ☐ **Arduino** illustrates the potential in open hardware.



☐ Arduino

OPEN HARDWARE

The core to **Arduino** is a simple, ultra low-cost circuit board, based on an open-source design, armed with a microprocessor which can be programmed with open-source software tools by the user. The idea is that anyone should be able to turn an Arduino into a simple electronic device such as a light switch and sensor. In 2005, Massimo Banzi, an Italian engineer and designer, started the Arduino project to enable students at the Interaction Design Institute Ivrea (IDII) to build electronic devices using an open-source hardware board. Arduino has grown to become popular, selling more than one million units to date, largely because of its creators' decision to make the board's design 'open source', along with its quick adoption by the international maker movement of D.I.Y. hardware hobbyists, such as makerspaces and Fab Labs.

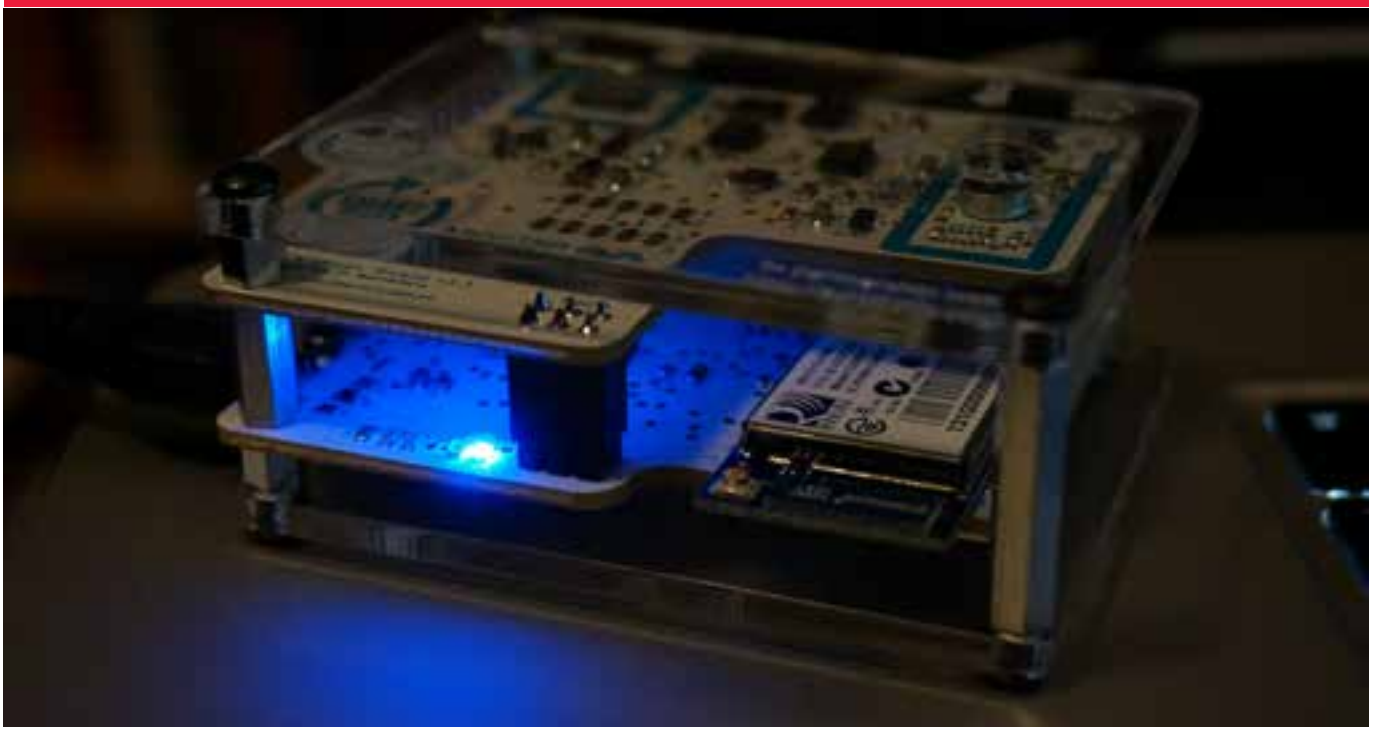


This makes Arduino a key building block of many digital social innovation initiatives relying on open hardware, such as ✡ **Safecast** and the ☐ **Smart Citizen Kit**.

Smart Citizen Kit

OPEN HARDWARE

Citizen Kit is an Arduino based sensor kit that provides sophisticated sensor network tools to citizens, enabling the measurement of levels of air pollution, noise pollution or air humidity in the vicinity of a private home, school or office. The project was originally developed within the Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia and crowdfunded via the Goteo and Kickstarter crowdfunding platforms. With its relatively low-cost model the Smart Citizen Kit sees itself as acting as a bridge between more typically technical and non-technical citizens, both seeking to solve environmental challenges in unconventional ways through better monitoring. The Smart Citizen Kit is based on two core components; the 'kit ' itself and the platform used to share data between people operating a kit. The kit is an electronic board based on the Arduino, equipped with sensors that capture data on air quality, temperature, noise, humidity and light. The board also contains a WiFi antenna that enables the direct upload of data from the sensors in real time. A number of cities, including Manchester in the UK and Amsterdam in the Netherlands, have shown an interest in supporting citizens to monitor environmental data and have launched city pilots using the Smart Citizen Kit.



Another big trend related to open hardware is the evolution of the **Internet of Things (IoT)**. People, places, and objects can be instrumented with tracking and sensing devices that continuously stream and measure data about real-world activity. This is possible due to the increasing number of **powerful smart personal devices**, which facilitate the anywhere/anytime access to the Internet, and to new services So-called Cyber Physical Systems (CPS), which are becoming increasingly important in this context. The networking of embedded ICT systems both with one another and with the Internet, is giving rise to what has been named as Industry 4.0[19]

This smart infrastructure is also increasingly "getting to know people" by aggregating personal and social data in massive data centres. This can also mean increased surveillance, prediction and control of people and the environment. However, as outlined by Rob Van Kranenburg, "successful IoT means the best possible feedback on our physical and mental health, the best possible deals based on a real time monitoring for resource allocation, the best possible decision making based on a real time data and information from open sources and the best possible alignments of my local providers with the global potential of wider communities" (Van Kranenburg 2014)

DSI AREAS

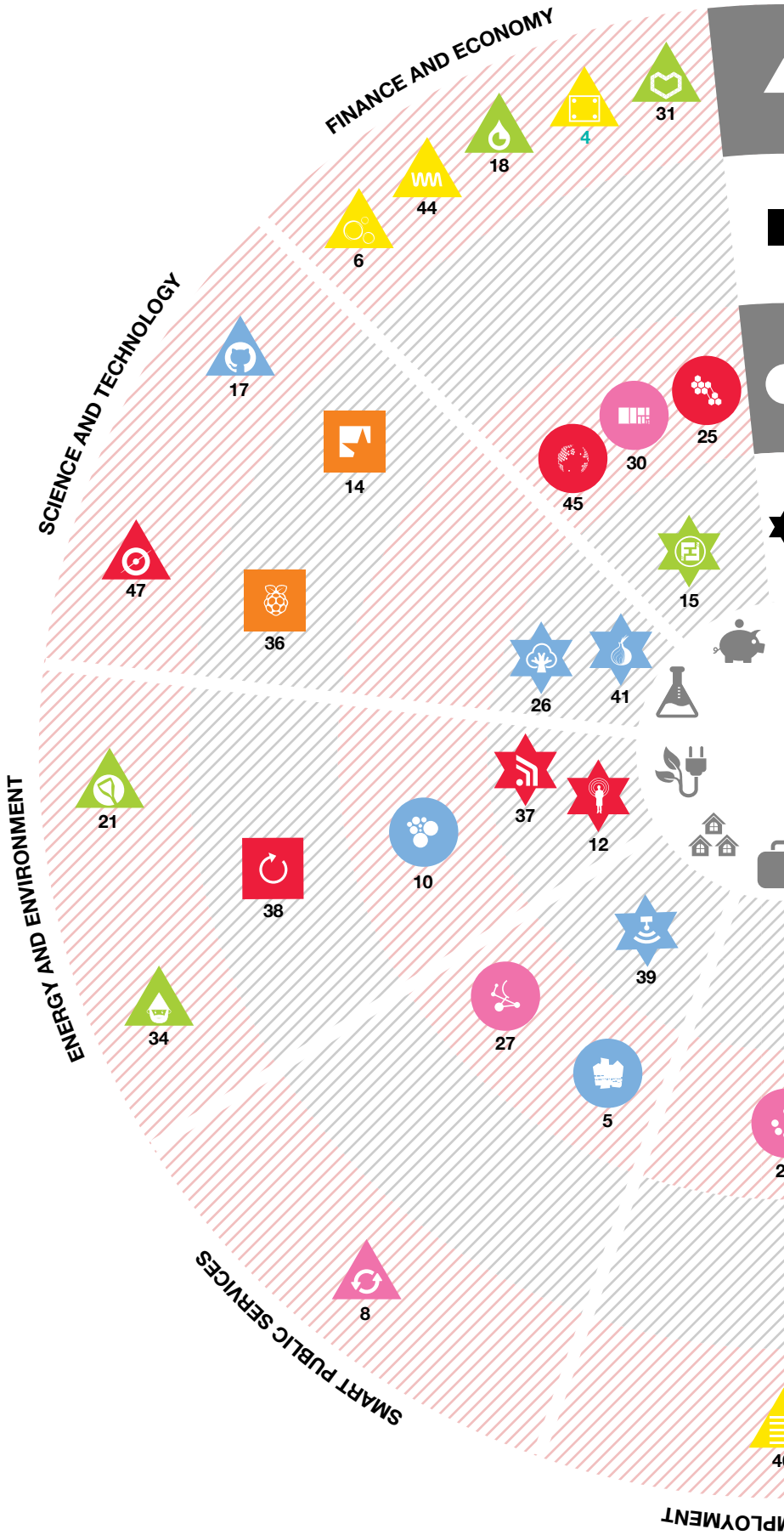
- Open democracy
- Open access
- Collaborative economy
- Awarness network
- New ways of making
- Funding acceleration and incubation

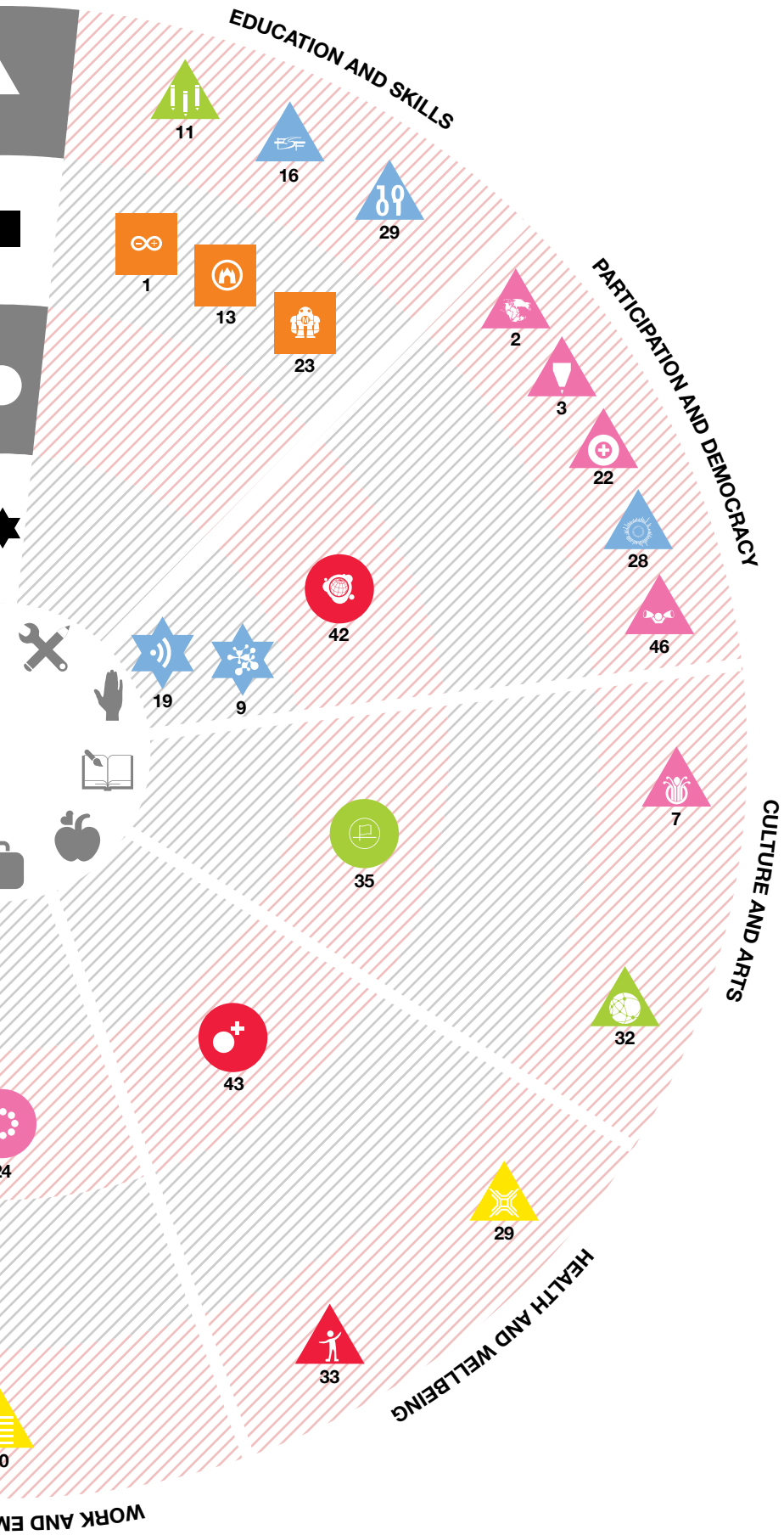
TECHNOLOGY AREAS

- Open Knowledge
- Open Hardware
- Open Data
- Open Networks

AREAS OF SOCIETY

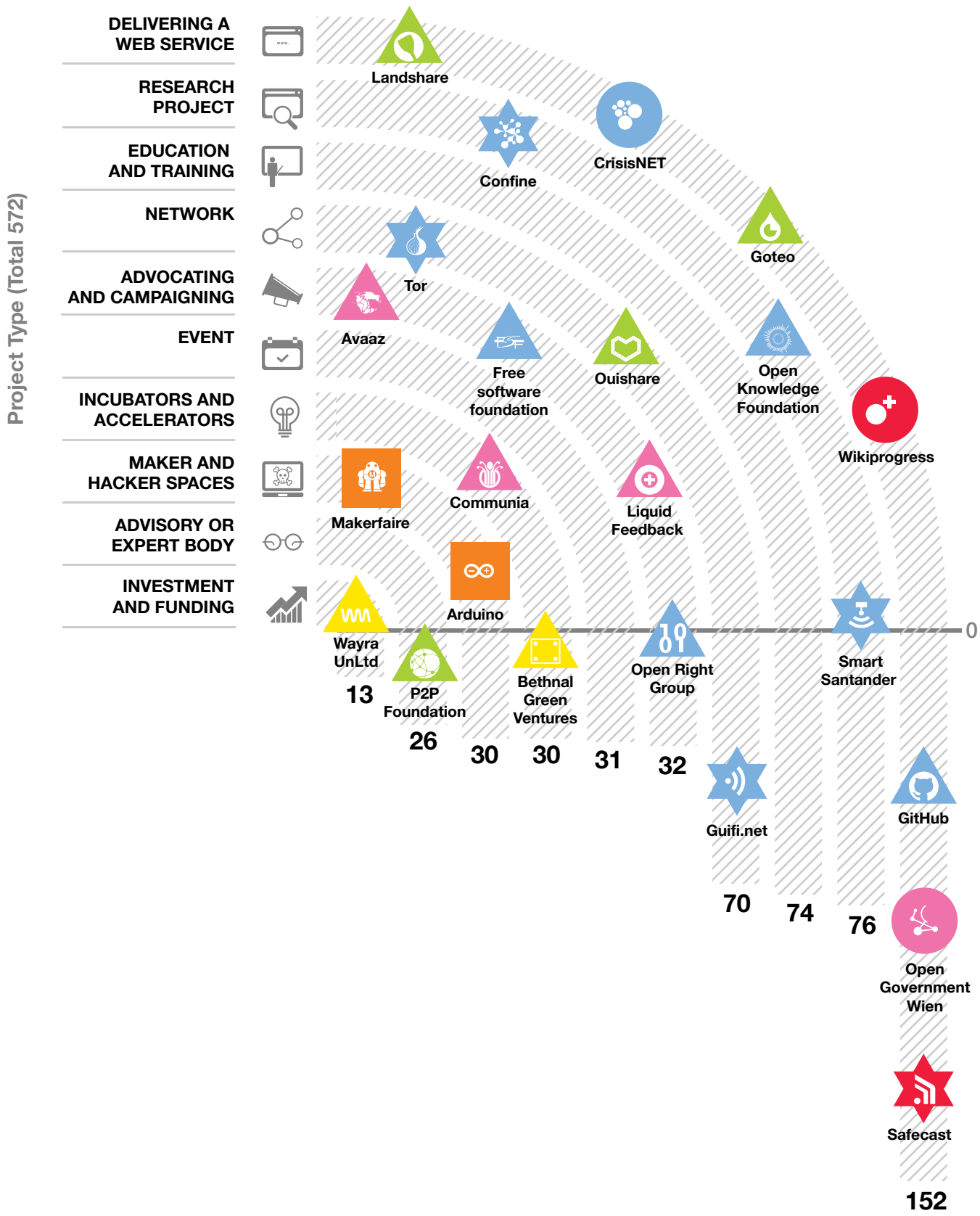
- Health and Wellbeing
- Finance and Economy
- Energy and Environment
- Participation and Democracy
- Smart public services
- Science and technology
- Education and skills
- Culture and Arts
- Work and Employment



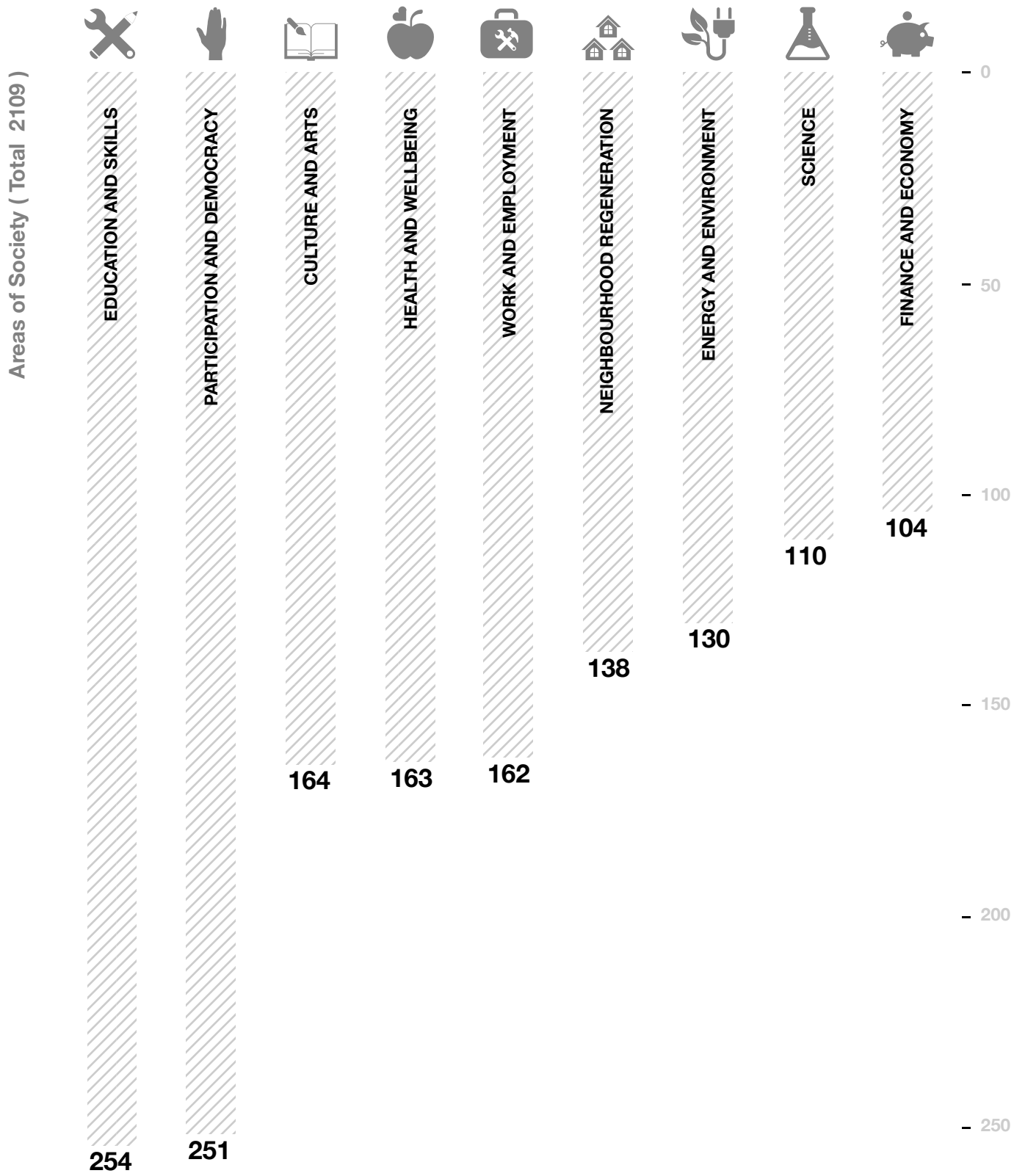


1. Arduino
2. Avaaz
3. Avoin Ministeriö
4. Bethnal Green Ventures
5. CitySDK
6. ClearlySo Angels
7. Communia
8. Commons 4 Europe
9. Confine
10. CrisisNET
11. Desis Network
12. Everyaware
13. Fablab
14. Fairphone
15. Freicoin
16. Free software foundation
17. GitHub
18. Goteo
19. Guifi.net
20. Healthbox London
21. Landshare
22. Liquid Feedback
23. Makerfaire
24. MySociety
25. Open Corporates
26. Open Garden
27. Open Government Wien
28. Open Knowledge Foundation
29. Open Right Group
30. Open Spending
31. Ouishare
32. P2P Foundation
33. Patients Like Me
34. Peerby
35. Provenance
36. Raspberry Pi
37. Safecast
38. Smart Citizen Kit
39. Smart Santander
40. The Accelerator
41. Tor
42. Ushahidi
43. Wikiprogress
44. Wayra UnLtd
45. Wikirate
46. Your Priorities
47. Zooniverse

The different methods by which these organisations are supporting DSI



The areas of society these DSI organisations impact



3

EXPLORING DSI NETWORK EFFECT

3.1

What communities of social innovation exist in Europe?

3. 2

Which organisations currently bridge the various communities?

3. 3

What are the conditions for scaling DSI?

One of the primary problems facing the mapping of an open-ended field such as DSI is how to direct the multiple diverse streams of data from interviews to social media into a central repository capable of giving a 'big picture' of European DSI that can provide strategic recommendations for the EC.

Using the network data, stored as W3C Linked Data at http://data.digitalsocial.eu, in combination with our hybrid iterative strategy of case study interviews, workshops and events relevant to these communities, we have identified DSI actors as part of a larger social network and have mapped this network in a way that has not been possible before.

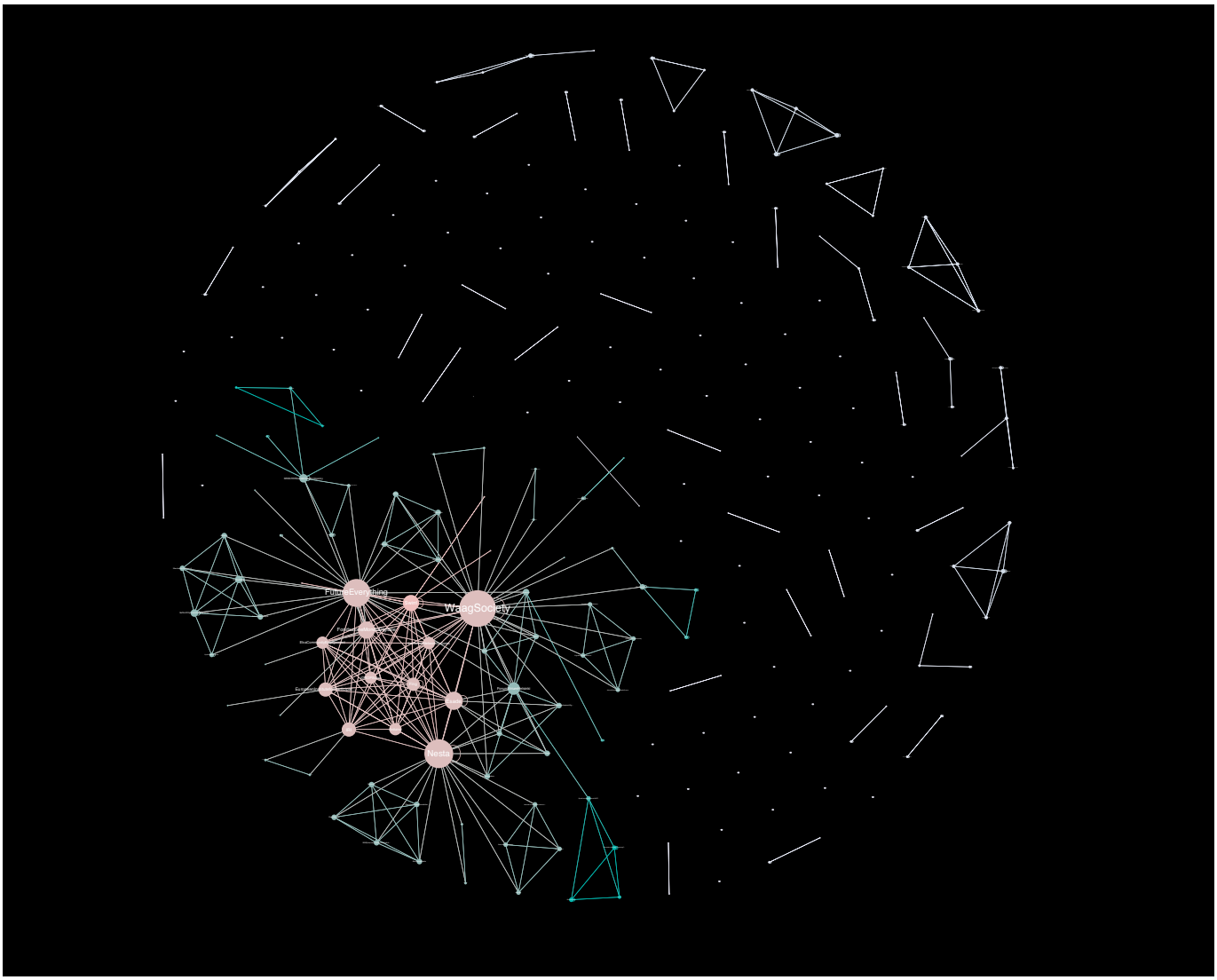
Social networks are formally defined as set of nodes (or network members) that are tied by one or more types of relations (Wasserman and Faust, 1994). In the case of the DSI social network collected in this study, the nodes in a graph are organisations, and the edges represent joint projects.

The results of this analysis have informed the recommendations on a policy and instrument level that are needed for the EC to knit the map of DSI actors into a coherent single integrated EC DSI network, and thus achieve **the 'critical mass' necessary to harness the collective intelligence of DSI organisations** to solve large-scale European social problems.

In the DSI network dataset, there are a total of 1000 organisations with a total of 630 shared projects, as of January 2015. This dataset is likely to fairly represent the empirical phenomena at hand with two caveats

1) It has a bias towards English speakers as the survey was not translated into other European languages
2) As outreach was directed by the partners it is likely to reflect their social networks in more depth than disconnected social networks. However, it is a large sample and thus worth exploring in detail. The graph of the networks is given in Figure 11 (which shows the complete network, including disconnected communities), with a closer look at the connected centre in Figure at page 54.

Crowd-mapped DSI organizations as a network



3.1 WHAT COMMUNITIES OF SOCIAL INNOVATION EXIST IN EUROPE?

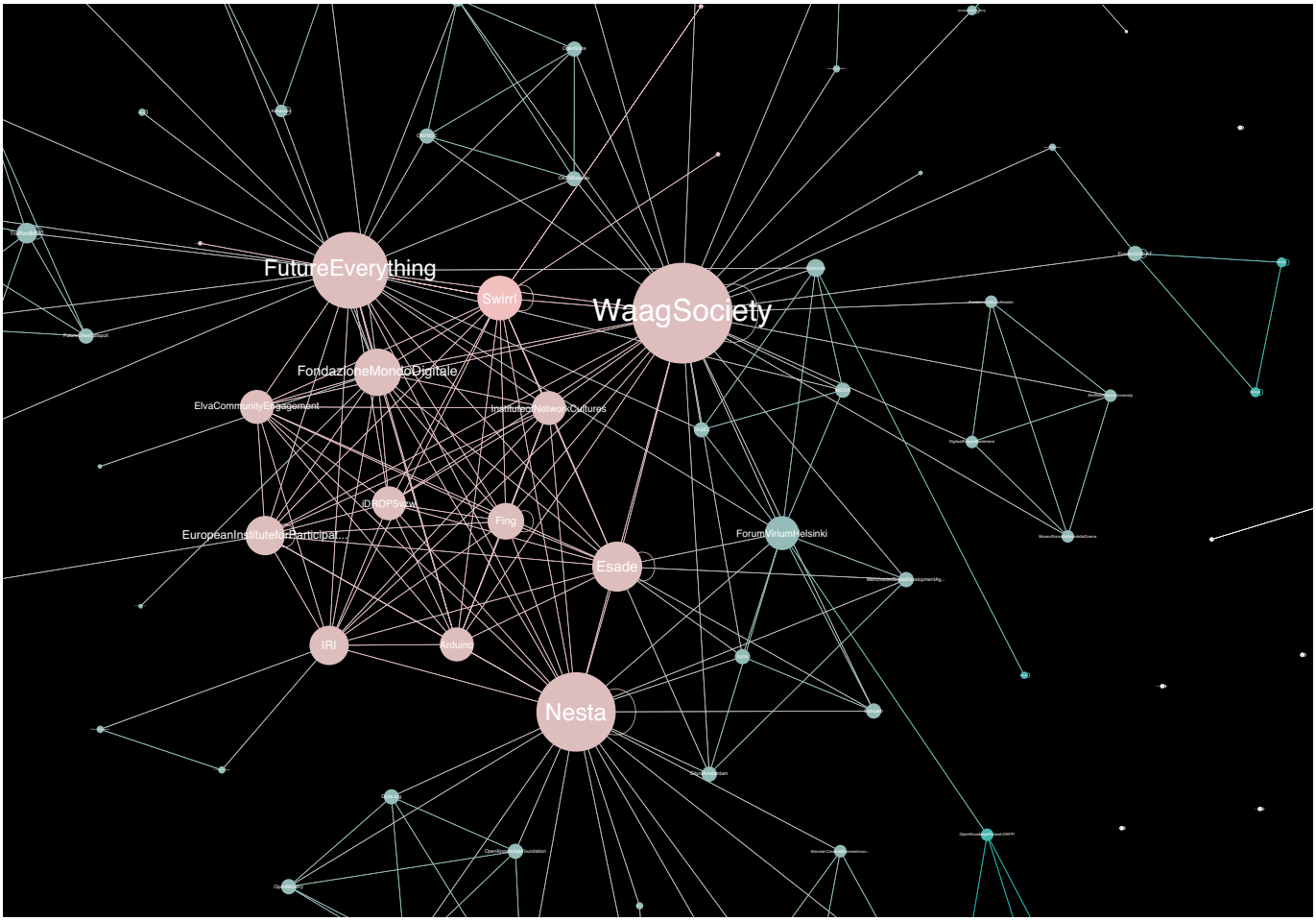
Is social innovation done by a few large actors? Or evenly distributed between various actors? Or is it done by a few large actors in concert with a large mass of smaller groups? The answer is social innovation in Europe is currently done by a few large actors in concert with a large mass of smaller organisations, but the majority of social innovation actors in Europe are disconnected from these networks. We map every organisation's *degree,* which is, for a given node (organisation), the number of connections (links) it has with other nodes (organisations). There are 243 organisations with connections to other organisations (26 per cent). The average number of connections between organisation is fairly small, only three.

Looking closely at the map, there are approximately 115 distinct *disconnected communities* of social innovation. Although there is one large pan-European network, there are also many smaller communities that do not have connections to the larger cross-European digital social innovation "super-community."

Attempting to detect communities in the figure below, a few large communities stand out from each other (Blondel 2008). These interconnected communities only count for 28 per cent of the total amount of connected DSI activities. The largest community (10.29 per cent) is focussed around open hardware and open networks and includes organisations such as iMinds, Fairphone, the City of Amsterdam, and Fab Lab Barcelona. Its most interconnected member is the Waag Society, and there is a large focus on awareness networks and new ways of making. The collaborative economy and open knowledge is the specialty of the second largest – but also more scattered – community (7.41 per cent), consisting of Esade, the IRI, European Institute for Participatory Media and the Institute for Network Cultures.

A third large community is grouped around Nesta (5.35 per cent) and is focussed on funding, acceleration and open democracy, although it has a very diverse technology focus, containing groups such as Open Ministry, Nominet and Mozilla. Open data for open access is the last dense community (4.95 per cent), with a centre on FutureEverything, but also containing open knowledge and its local chapters – as well as city councils working on open data, such as Salford in the UK. Interestingly, although the open hardware network is the smallest overall, it is the most highly interconnected and intermixed with open networks. Open knowledge is the most popular technological focus of DSI, but it also the most spread out and disconnected. Other communities, such as those around open data, are developing connected communities. Nonetheless, the vast majority of communities are not interconnected.

Zoom-in on centre of DSI Network



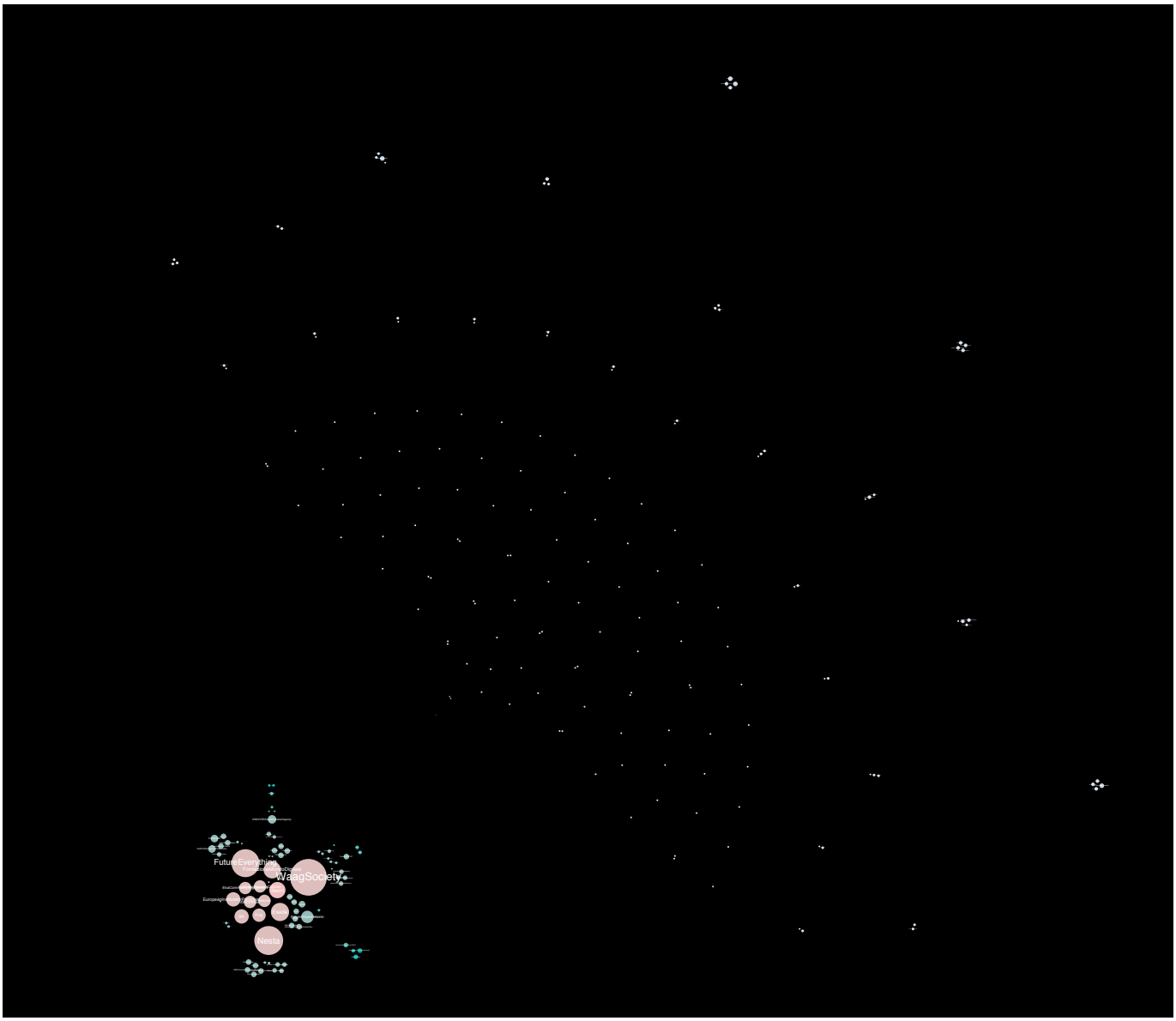
3.2 WHICH ORGANISATIONS CURRENTLY BRIDGE THE VARIOUS COMMUNITIES?

How can we determine which organisations act as crucial "bridges" between different kinds of networks and areas in DSI? Using **betweenness centrality** (Brandes, 2001), central organisations are: Waag Society, Nesta, Future Everything, Fondiazione Mondo Digitale, Kreater Social Innovation Agency, Forum Virium Helsinki, Swirrl, Open Knowledge Finland, IRI, BettterPlaceLab, Alfamicro, Amsterdam Smart City, European Institute for Participatory Media and ESADE. Each bridging of these organisations brings over 70 organisations.

Who connects the diverse communities, such as those of open data, open knowledge, open hardware and open networks? Even if an organisation is not central and so has only a few links, it may be these few important links that connect otherwise disconnected communities. With eigenvector centrality, we see that a number of new organisations are crucial in bridging diverse communities outside of the original list of central organisations which bubble up to the top: Institute of Network Cultures, iDROPSzw, Elva Community Engagement, Arduino, and Fing.

To encourage cross-hybridisation of different kinds of social innovation, special effort should be made by the European Commission to strengthen these digital crucial connectors between diverse DSI communities. Interdisciplinary European projects that force diverse communities to work together would strengthen the overall resilience of DSI in Europe by combining open hardware, open data, open knowledge and open networks.

Automatically-discovered communities in DSI network

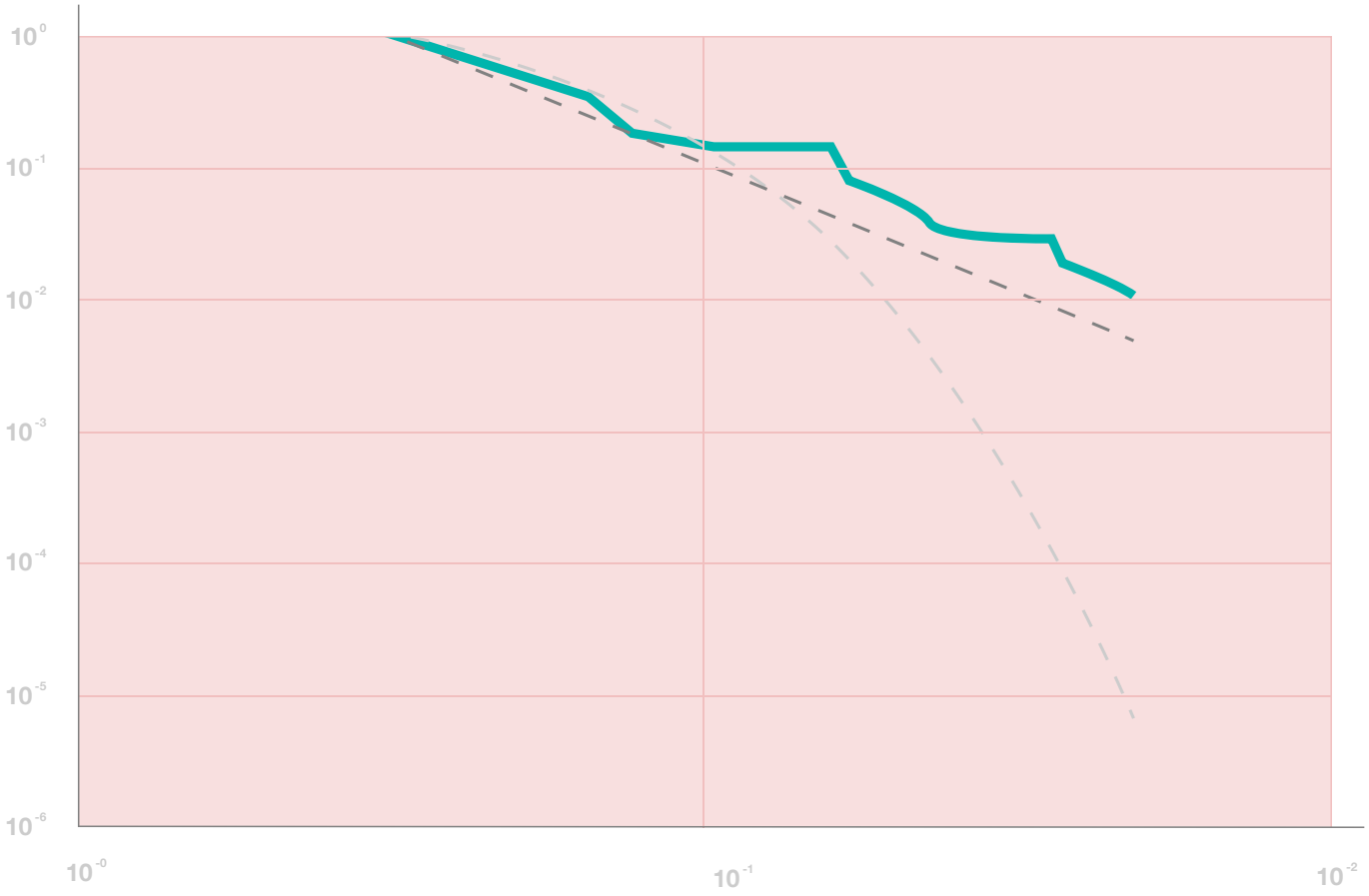


3.3 WHAT ARE THE CONDITIONS FOR SCALING DSI?

Successful actors in DSI have managed to leverage large networks using the Internet in order to accomplish innovation at scale by the network effect. We can define scale in terms of 'scale-free', namely that the distribution of DSI should undergo the *phase shift* typical of complex systems from a disconnected network to the 'scale free' network is often seen in organically developing eco-systems and is thought to be a sign of efficiency and resilience (Boisot and McKelvey, 2011). Encouragingly, we are seeing what appears to be an emerging power-law, the key sign of a 'scale-free' network, in digital social innovation in the data in Figure 4, at least for organisations with more than 3 connections. When tested rigorously, a power-law was indeed a strongly better fit *($p < 0.01$)* than an alternative distribution such as the exponential distribution that has only a few big winners such as the United States (Clauset et al., 2009).

The reason digital social innovation has not yet scaled is because the 'long tail' of smaller European DSI Networks is still heavily disconnected, with 687 organisations out of 930 (74 per cent) that have **no** links to other organisations. Many of these organisations are also in countries without much support, such as those in Eastern Europe. Looking at the data, if we want a single scaling European DSI network, an additional magnitude more of links (approximately 350 links) is needed to gather all the disconnected organisations to a single European network and encourage new communities where there are currently none. This is probably too many connections to be made via traditional European projects, but via a recommendation system a future version of the Digital Social Innovation website could introduce innovators to both other local innovators and innovators sharing similar interests across Europe to 'bootstrap' these connections. By connecting the currently isolated innovators, we should be able to achieve the necessary *phase shift* so that the scaling power of the heavily interconnected innovators is replicated across Europe by currently isolated innovators and communities.

Comparing the power law distribution (dark grey) to exponential distribution (light grey against the real actual network data (turquoise).



4

REINVENTING INNOVATION POLICY

4.1 INNOVATION POLICY AT A EUROPEAN LEVEL

Innovation and innovation policy are not new to the European Union. Delivering on the Europe 2020 objectives of smart and inclusive growth depends on research and innovation as key drivers of social and economic development and environmental sustainability. The European Commission has announced an ambitious **Digital Single Market Package** that will create the conditions for a vibrant digital economy and society by complementing the telecommunications regulatory environment, modernising copyright rules, simplifying rules for consumers making online and digital purchases, enhancing cybe -security and mainstreaming digitalisation.

The Digital Agenda for Europe[20], **Innovation Union**[21], and **Horizon 2020**[22] present an integrated approach to help the EU economy become more competitive, based on sustainable and inclusive growth fuelled by energy and resource efficiency. GDP slw-down since mid-2011, environmental disasters, climate change, an ageing population and growing unemployment will require innovative solutions that challenge traditional ways of doing things.

To provide a synthetic overview, we categorise two broad approaches for the EC programmes and initiatives to foster ICT-driven innovation.

In the context of the future of DSI in Europe we suggest that an integrative approach is needed. This means that a combination of some to- down actions and botto- up approaches could result in successful digital social innovation policy.

Grassroots Innovation in Europe: adapted from Sestini, F

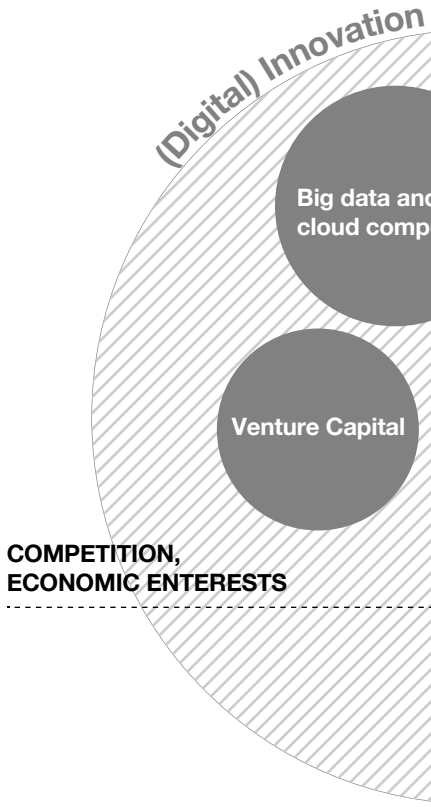
Top-down and systemic approaches

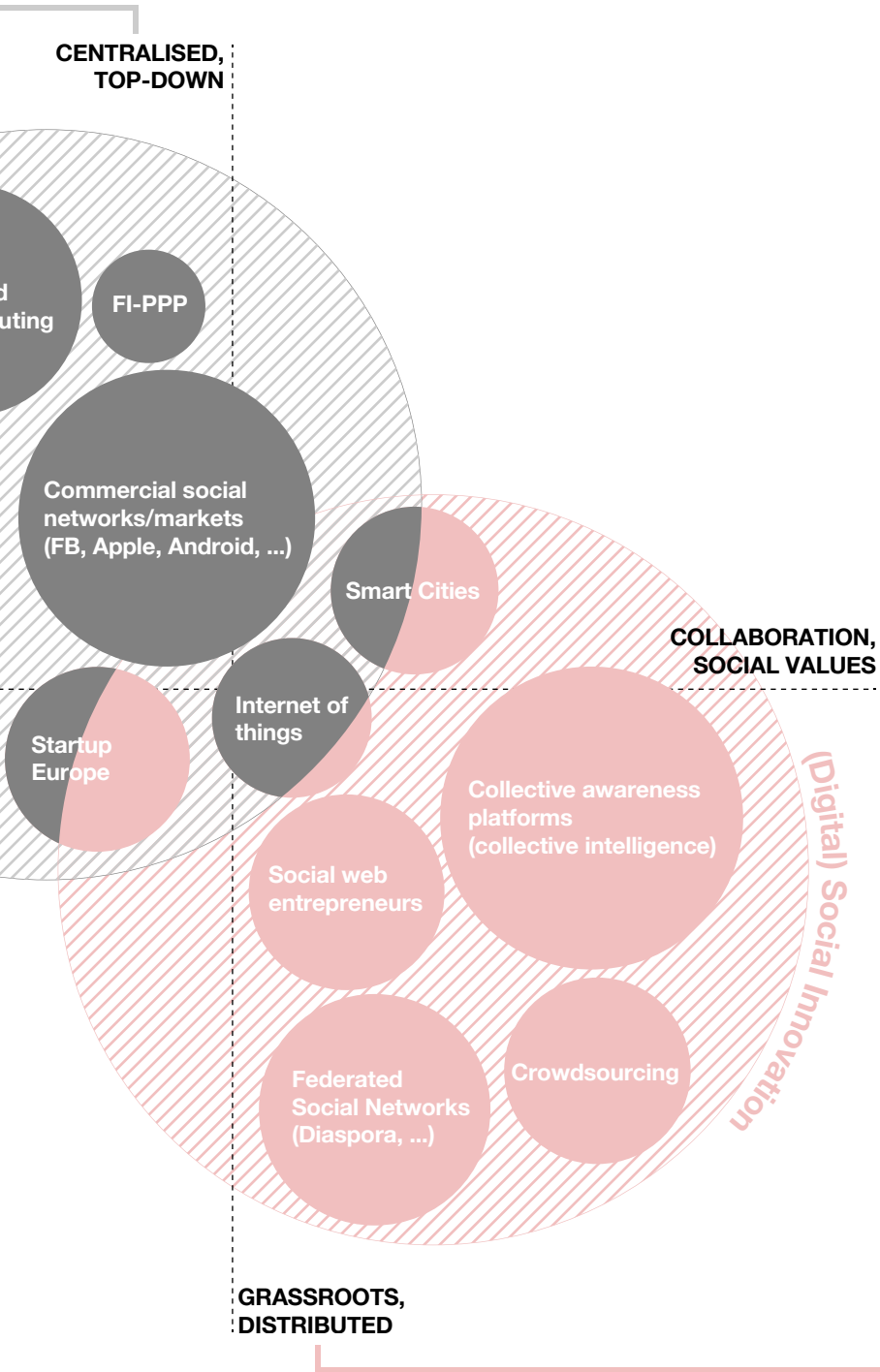
The most relevant initiatives are the **European Innovation Partnerships, Smart Cities, the Future Internet Public-Private Partnership Programme (FI-PPP), and the European Cloud Computing Strategy**. Their main goals are to promote and standardise pan-European technology platforms, as well as the integration of the relevant policy, legal, political and regulatory frameworks. As outlined in the Digital Agenda for Europe, these are prerequisites for the creation of a **European online Digital Single Market (DSM).**

The development of the Future Internet is mainly addressed through a number of technical projects, such as the **FI PPP**[23] and the **5G PPP**[24]. There are also a number of projects in the areas of **eInclusion, eHealth, participatory planning**, and **eGovernment**.

A **EU Big Data strategy** is becoming a priority for the competitiveness of European industries. In this framework the EC is promising to launch a multi-million euro **Public Private Partnership on big data** with industry. The focus is business driven, with little attention to societal challenges or to the inclusion of civil society and bottom-up approaches. However, the call for the creation of an **open data incubator** within Horizon 2020 aims to help SMEs set up supply chains, and to get access to cloud computing and legal advice. Further support, investment advice and funding oppertunities for SMEs and young companies are also available through the **Startup Europe programme**.

Other activities are happening in the **Internet of Things (IoT)** focus area, where the **IERC- Internet of Things European Research Cluster**[25] coordinates a variety of IoT R&I projects.





Bottom up and grassroots approaches

A counterpoint to the top-down strategy is the bottom-up, human-centred approach that is characterised by emergent forms of community intelligence. Relevant bottom-up initiatives are the **Collective Awareness Platform for Sustainability and Social Innovation (CAPS**), Web entrepreneurs, young entrepreneurs in the field of active and healthy ageing, digital champions, innovation camps and so on.

In particular CAPS facilitates SI processes and democratic decision-making through distributed platforms that foster collective intelligence and leverage the potential for crowdsourcing, citizen science, open democracy, and the collaborative economy. These platforms based on open technology can gather and integrate information in order to allow participation and citizens' feedback, as well as integrating peer information and sensor data to improve collective wellbeing.

Furthermore, there are initiatives in the area of open access, such as **Global System Science**, providing scientific evidence to support civil society to collectively engage in societal actions and policy-making. Another relevant initiative is **Digital Science**, which has synergies with **Art & ICT**, and promotes a conscious dialogue between technology, the Arts and societal issues to expand our understanding of technology in today's societies.

Finally, new initiatives launched in **Horizon 2020 on Human-centric Digital Age** and **Responsible Research and Innovation**, aim to promote societal engagement, gender equality in research and innovation content, open access, science education and ethics across all research initiatives.

4.2 OPEN AND PARTICIPATORY POLICY MAKING

Innovation should no longer be the result of top-down push technology strategies but of a more holistic and horizontal way of working. A shift from closed innovation inside the boundaries of institutions to **open and participatory innovation** is required.

Open means that innovation does not only belong to the industry sector but should also include other and different actors such as developers, entrepreneurs, social activist, and governments at different levels. **Open public policy** represents an iterative problem solving process in which inflows of knowledge from external actors as well as participatory decision-making processes equip policymakers with a generative capacity for developing novel policy solutions.

Participatory means that the policy environment contrasts with more traditional innovation policy frameworks, where there is a strong focus on the market perspective and competitiveness. Though digital networks can give rise to new forms of collective intelligence and can increase democratic participation into policy debates, the actual influence they exert on policy decisions remains unclear. The reality of policymaking can often be laborious, lengthy and involve lots of compromises along the way. But participatory policymaking should begin with engagement with those who are likely to be affected by the end policies.

Thus, in formulating new policies ideas for Digital Social Innovation, we adopted a participatory methodology trialled by **Digital Futures**, a DG Connect new approach to poliy making supported by the **Futurium online platform**[26].

Digital Futures is not about predicting the future or about pre-empting future policy decisions. It is a participatory visioning project aimied to co-develop long term visions (futures) and policy ideas to go beyond the Digital Agenda and Europe 2020, looking at three main pillars of the framework: visions (forecasting and back casting,; policies (actions and pillar); and agents (stakeholders in a broad sense, including implementers and decision makers).

The Futurium platform is based on the metaphor of emergent collective intelligence, and combines the informal nature of social networks with a methodological approach of foresights to engage stakeholders in the poliy making process. Besides the standard tools available in most social networks, Futurium participatory tools offer several features to support collective foresight, such as scenario building, collective debate and voting for policies.

Following the methodology elaborated by Digital Futures, a participatory policy workshop was held in Brussels at DG Connect on February 3rd 2014 (seebBeta bottom-up policy workshoptToolkit was used for the methodoloed). This experimental approach encouraged poliy-makers to go beyond the standard approach of deploying consultation documents towards a more user-centred approach to poliy-making that is participative in the generation of potential ideas. The workshop brought together over 70 DSI practitioners, researchers, experts, and poliy makers from different European countries, as it was very important for the DSI research project to facilitate this kind of experimentation.

As the main outcome of the workshop, **9 DSI policy areas** were identified and over **30 DSI policy ideas** emerged. Ideas were clustered together according to common themes, and the Table below shows the breadth of thinking. These areas of policy were further worked on during the day, with European Commission officials providing their responses to the ideas that emerged.

In the spirit of Digital Social Innovation after the workshop the debate continued online using the **Your Priorities platform**[27] to debate the ideas and to prioritise the ones that could be implemented at EU level. The key element of the platform is a simple but powerful collective debate system. Each point can only be 500 characters and people can mark points as helpful or not helpful resulting in a list of the best points for and against. Both sides of the argument are equally represented in the user interface and this is highly effective in facilitating consensus and in the inclusion of minority arguments.

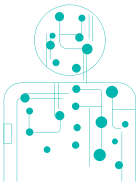
DSI policy ideas generation: Crowdsourced Idea

COPYRIGHTS AND OPEN ACCESS

1. Open Standards for social, identity and payment data

Many US companies have patents on identity, social and payment data. There is a need to require the European Public Sector and EC funded projects to not fall into this trap and provide open data sets, in particular on social identity and payment. Public data sets will remove barriers for social innovators who often rely too much on proprietary data.

DIGITAL HUMAN RIGHTS



2. EU public Digital ID with citizen control

Create a European standardised public digital ID for all citizens with guidelines and rules to ensure privacy, rights, and fundamental freedoms in the digital environment. Big Data and cloud companies but also States have a lot of control over an individual's online identity. By creating a standardised public Europe-wide digital ID would ensure individuals greater autonomy and control over their online identity.

FUNDING MODELS AND INSTRUMENTS

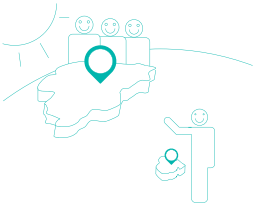
3. Time unding and crowdsourcing

People can use their time as asset and use mutual credit systems and alternative money in order to help projects go life. Time, trust and reputation are currencies that can be easily created and shared to maximise collective value within a social credit system.

4. Align EU R&I funding with EU Regional Funds to support the EU Strategy for DSI / CAPS

Streamline use of funds within a Europeans strategy to help scaling DSI/CAPS initiatives and provide a holistic framework to support them.

CITIZENS ENGAGEMENT AND FEEDBACK



5. Democratic and distributed social network

Distributes and federated social networks based on open source code and open standards to promote open democracy, collective debate, deliberation and voting. I would call it Yups. com: Yups for the positive votes and Oops for the negative ones.

SECTOR SPECIFIC REGULATION /DEREGULATION

6. Net Neutrality and banning software patents

Banning software patents and defending Network Neutrality will keep bottom-up innovation feasible and affordable. Software packages that are patented can be expensive, and less accessible to potential individual innovators. Also the Internet needs to continue to be a neutral space where creativity can continue to flourish.

7. Gender Equality in DSI

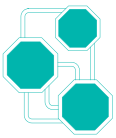
Promote gender equality and empowerment of women through ICT in DSI by tackling things such as criteria for funding, visibility ect. DSI disproportionately male dominated. Less diversity can hinder innovation, and women bring new perspectives while improving access to information, education and work opportunities for women.

ECOSYSTEMS AND INNOVATION LABS

8. Establish a European Innovation Lab Network

A EU Innovation Lab network can to support, facilitate and scale more DSI projects. It can combat the lack of legitimacy and coordination of DSI initiatives within the EU by creating a space fostered by the EU Commission to support and promote DSI.

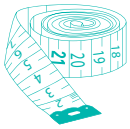
ENABLING INFRASTRUCTURES



9. Funding a Public-Private-People Partnership (PPPP) on distributed architectures

The EU should promote to create an open decentralised digital ecosystem including open data distributed repositories, distributed cloud, distributed search, decentralised social networking, public identity management, and encrypted email service. The Internet ecosystem today is highly centralised The current Internet is dominated by a handful of mainly US companies that control all the layers of the ecosystem (app store, cloud, machine learning, devices), and are imposing their rules of the game. Europe needs to invest in future infrastructures that reflect the European values, support SMEs and civic innovators and deliver public good. Distributed, privacy-aware enabling infrastructures can also re-establish trust.

IMPACT AND MEASUREMENT



10. Implement social value and social impact standards for policy evaluation

Implementing a common evidence framework based on social impact could change the way technology policy happens and it could pressure the EU to adopt beyond GDP measures.

4.3 SEVEN STAGES OF INNOVATION

As already established, Digital Social Innovation takes place in the context of a more collaborative, horizontal and cooperative environment. Although every real innovation is a complex story of loops and jumps, there are various stages that most innovations pass through.

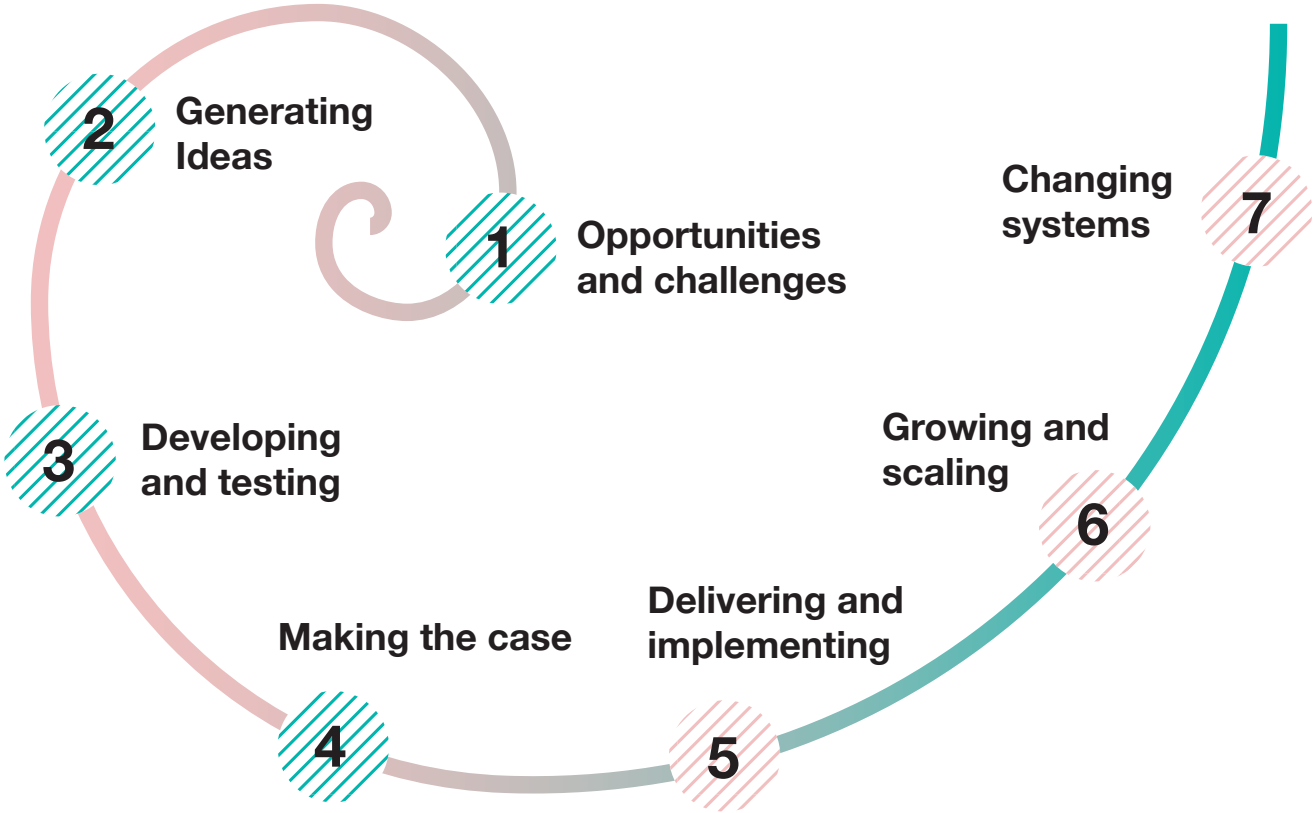
We use the **'Social Innovation Spiral'**, first developed by The Young Foundation in The Open Book of Social Innovation (2010), and then developed further by Nesta, as a methodology to guide the policy analysis and to identity the policy tools and instruments needed in the different innovation stages. The framework outlines seven stages of innovation that are not always sequential (some innovations jump straight into practice or even scale) and there are feedback loops between them. They can also be thought of as overlapping spaces, with distinct cultures and skills. The stages provide a useful framework for thinking about the different kinds of policy, tools, and support that DSI innovators need in order to scale and sustain. It is then possible to map the policy tools described in the next chapter to the different innovation stages, enabling DSI to grow and scale.

The seven stages are:

Opportunities and challenges:
These include all the initiating factors – for instance a crisis, new evidence, and inspiration.–, which highlight the need for change. This might involve diagnosing the root causes of a problem, or identifying the opportunities that a new change could bring about.

Generating ideas:
Most of the ideas you come up with at first won't work. But it's only through the process of constant idea creation that you arrive at something that is radical and transformative. Use creative methods like

The seven stages of innovation



design to increase the number of solution options from a wide range of sources.

Developing and testing:
New ideas are always helped by robust criticism. It is through trial and error that ideas are iterated and strengthened. This can be done by simply trying things out, or through more rigorous prototyping and randomised controlled trials.

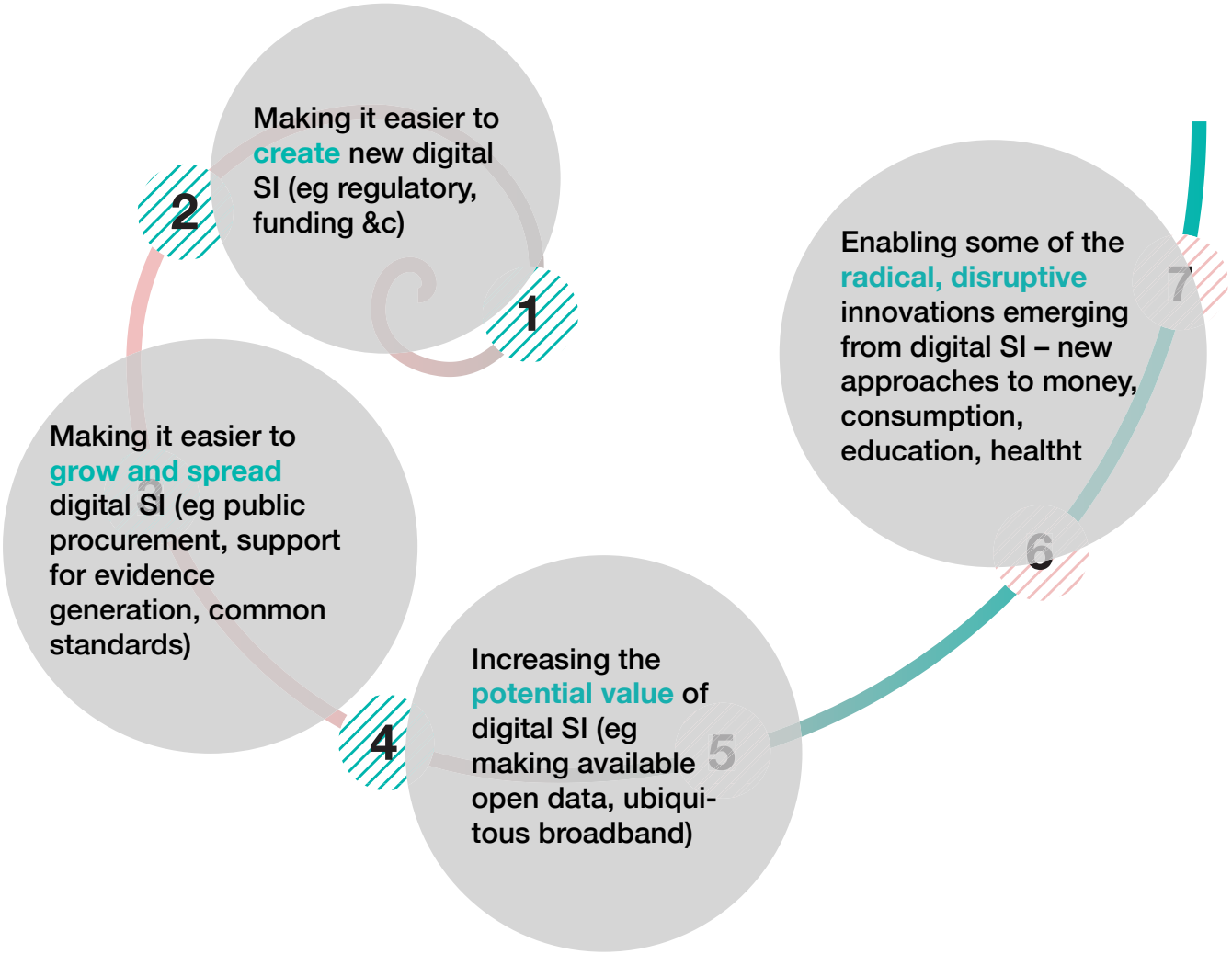
Making the case:
Before you try to implement your idea, you need to prove that it can work and is better than what is already there. Build up firm evidence to back it up and then share it honestly.

Delivering and implementing:
This is when the solution becomes everyday practice. It includes identifying what is working wel, and what isnot, as well as securing income streams that enable the lon- term financial sustainability to carry the innovation forward.

Growing and scaling:
In this stage there are a range of strategies for growing and spreading an innovation - from organisational growth, to licensing and franchising. Emulation and inspiration also play a critical role in spreading an idea or practice in a more organic and adaptive manner.

Changing systems:
Systemic innovation is where maximum social impact can be created. It usually involves changes in the public and private sector over long periods of time, and the interaction of many elements and new ways of thinking.

Policy Goals



4.4 THE BETA "BOTTOM-UP" POLICY WORKSHOP TOOLKIT:

As outcome of the DSI policy work shop, we have designed a Bottom-up Policy Toolkit for practicioners and policy makers to run participatory policy experiments that can produce innovative policy ideas and solutions:

Step 1: Get a wide range of people in the room.

The workshop should include practitioners, industry representation, academics and policymakers.

Step 2: Start with live case studies from practitioners

- people who run services and who know what the problems/challenges/ opportunities are. Make sure they represent a sample of the type of practice you are developing policy for and that they focus their presentations on what is important for people in the room. As an example, we asked each of our case studies to each prepare a five minute presentation covering the following:

Project background, including key facts (such as when they were founded, turnover, number of users, size of organisation, employees etc)

What they were trying to achieve with their service, including any evidence they have of impact

Opportunities and challenges

What really helped them get their project of the ground and helped them to scale up their work

What the biggest barriers were that they faced and how to address them (through policy? Funding?)

If they could make three changes to EU national or local policy and funding mechanisms to better support projects like theirs, what would they be?

It is important that you leave at least half of the time for participants to ask questions from the presenters.

Step 3: Frame the development process.

Highlight that there are a range of different policy tools to draw on (Laws, regulation, money, standards, skills) and give some sector-specific examples of policies that created a favourable impact. Point out that they don't all have to be big ideas or need to be expensive to implement, and acknowledge the often serendipitous innovation that emerges. (e.g. DARPA led to the creation of the internet, the R&D funding at CERN led to the invention of the Web) Encourage people to think about:

Who could implement it (European Commission, national governments, municipal etc.)?

Who will benefit? What are the barriers? Who are the enemies of the idea?

Does it need money?

What work needs to be done to flesh it out?

You may also want to promote the importance of evidence-based policy-making as a continual process of understanding what works (and what doesn't). Finally, it's important to acknowledge that policy may not be able to solve some problems. For example, often huge amounts of value can be created by industry bodies working to develop better standards or terms of trade that don't need governments to get involved at all.

Step 4: Identify the problems/ opportunities.

We asked everyone in the room to individually complete this template to quickly generate ideas:

Step5: Cluster the ideas together.

For a room full of 50+ people, this needs about an hour in length. We recommend that the workshop facilitator does this over a lunch break. With a diverse group of people in the room, you are naturally going to get a very diverse mix of ideas. Cluster them by the main problems they are trying to address. If you get more ideas than you have working groups, you can ask participants to 'dot vote' on ideas and choose the most popular themes for the working groups.

Step 6: Get people into smaller groups to discuss the clustered ideas and further develop the best one or two.

This should take approximately 45- 60 minutes. Appoint a facilitator to keep the conversation focused and a rapporteur to report back at the end. We reckon 5 is the minimum number of people needed. More than 12 and you'll struggle to let everyone have their say.

Step 7: Plenary. Ask people to report back to the re-convened workshop.

Prime some attendees to give a response to the ideas presented. We asked actual policymakers to give their responses to ideas and we also asked the presenters to give their feedback. Finally, test out with the people who presented case studies in the morning to check the ideas are useful.

Step 8: Summarise the day and issue a call to action.

Encourage people to take their ideas forward. We're using Your Priorities as a platform to promote the ideas to others. You might want people to pledge some action. We asked attendees to write their pledge for how they'll develop their thinking on digital social innovation and told them we'll email their pledge back to them after six months (this keeps people on their toes and allows us to re-engage with them after that time).

Step 9: End on a high.

Thank everyone of course. All through the process, re- member the golden rule of. running workshops – find engaging presenters with useful information for their audience, lots of participation, encourage networking, focus on action and good coffee.

5

POLICY TOOLS AND ACTION

5.1

Economic instruments

5.2

Regulation and Legal frameworks

5.3

Research and Innovation support

5.4

Dissemination & learning

5.5

Evaluation

In order to implement future DSI policy goals and strategies, several tools and instruments have to be deployed.

It is important to state that **most policy influencing DSI will be at national, regional and local level.Iit will also be sector specific – i.e around health, money, and education**. However, the European Commission has also very relevant competences, and some regulatory and policy issues are cross-sectoral and should be harmonised and coordinated at EU level

Policy Tools

1 ECONOMIC INSTRUMENTS

2 REGULATION

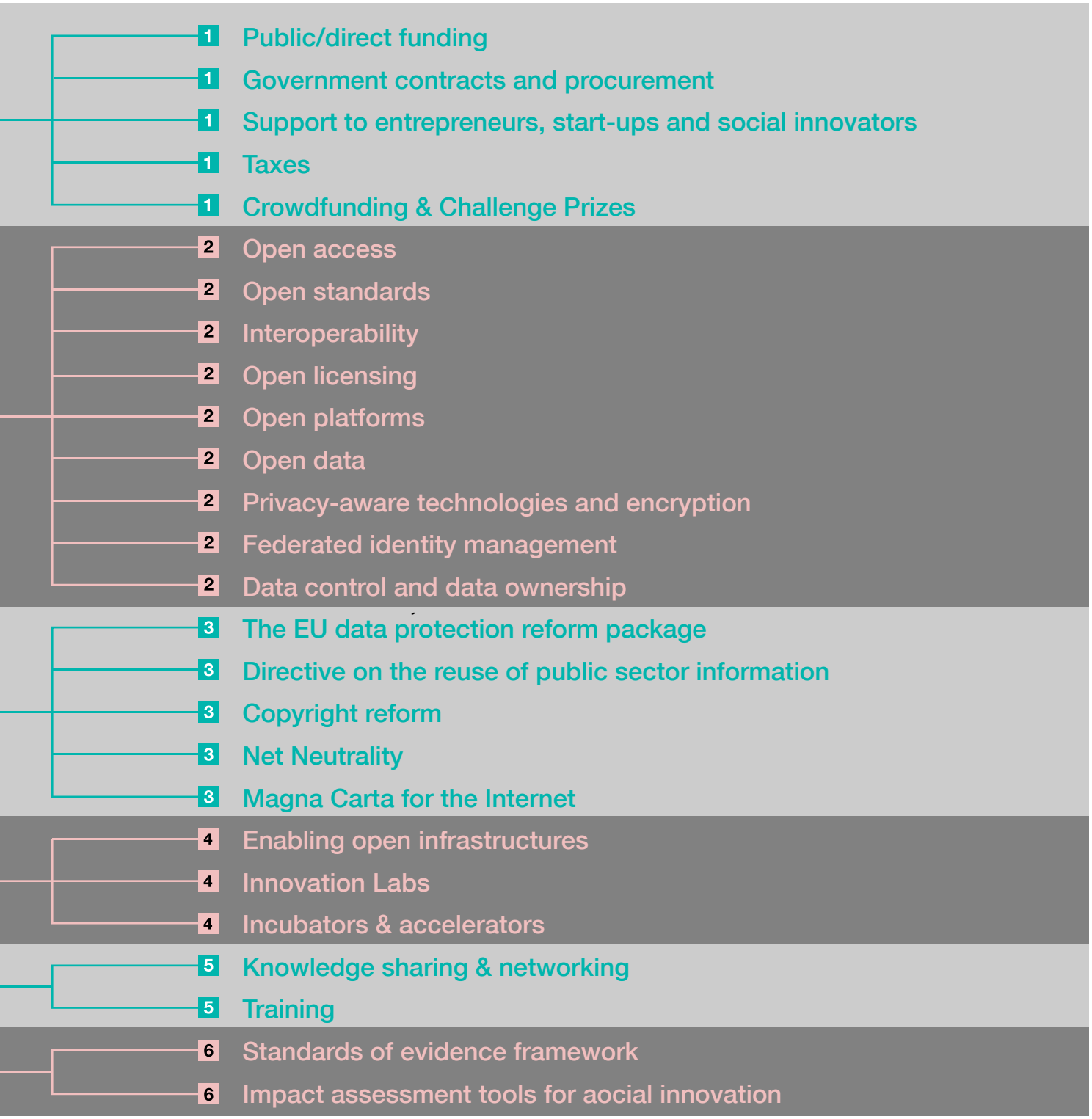
3 LEGAL FRAMEWORKS

4 RESEARCH AND INNOVATION SUPPORT

5 DISSEMINATION & LEARNING

6 EVALUATION

There is a common sentiment that **a strong public intervention at EU level is needed** to properly support, coordinate, and harmonise these areas whih, have so far been left to isolated developers, activists and hackers. **Recognising DSI's strong social value**, besides its strategic contribution to repositioning Europe worldwide, and promoting a coordinated approach to its development, would allow a whole **new generation of digital social innovation to start in Europe**.



5.1 ECONOMIC INSTRUMENTS

Economic instruments include public funding (direct funding for projects, subsidies etc.), as well as public incentives such as tax treatment of activities. Seed funding and crowdfunding are also two important instruments.

Although previous analysis and policy actions[28] focus on the role of VC or business angels, what we have observed is that in the very early stage of a sector's development, it has been mainly public funds that have prompted innovation.

The US Federal Government spends 2.6 per cent of a much larger per capita GDP on research compared to only 1.3 per cent on average in the EU. Early-stage funding for innovation is also more heavily supported by government investment and subsidies in the USA than the EU. Approximately eight times as much public as private business investment goes into early stage technology development in the USA. In the EU investment in research and technological development is more market-based – and demonstrably less effective (FINNOV European Policy Brief).

Another additional public intervention is the establishment of public incentives regarding tax treatment of activities. According to OECD, there are four main tax incentives directly linked to research and development: volume-based R&D tax credits; incremental R&D tax credits; hybrid volume and incremental credit; and finally R&D tax allowance.

PUBLIC/DIRECT FUNDING

Many governments have now created funds open to bidding for innovative projects in society, sometimes emphasising new ideas, sometimes emphasising formal experiments (like France's Fonds d'Expérimentation pour la Jeunesse) and sometimes emphasising scaling. Good examples are the R&D EC programmes, SBRI funds in the US, SITRA in Finland, and Vinnova in Sweden, or the UK's Big Society Capital fund and India's Inclusive Investment Fund. They combine investments in new hardware and software with experiments to discover better ways of delivering healthcare or reducing carbon emissions.

Public funds and actions for social innovation

President Obama set up an **office for social innovation in the White House**, with a fund for supporting NGOs. **In Seoul, the Mayor has designed programmes for the sharing economy and citizen engagement. Colombia set up a centre for social innovation** within its government, focused on action to alleviate extreme poverty, while **Alberta in Canada committed to a $1 billion social innovation endowment**.

Participatory budgeting

As a way to enhance citizen participation in the way public finance operates there are important **Partcipatory Budgeting initiatives being** experimented with by local City Councils. For instance In Paris between now and 2020, residents will decide how €426 million is spent, which corresponds to five per cent of Paris' municipal budget. Participatory budgeting has been successfully employed also in other European countries such as Estonia and Iceland[29], as well as around the world – for instance in more than 100 Brazilian cities[30] and in New York City[31] .

GOVERNMENT CONTRACTS AND PROCUREMENT

Government contracts and procurement should include new actors and new formats to enable government products and services to be open sourced. This means introducing elements of open innovation into the procurement process, involving purchasing departments in the sourcing process in order to ensure that technology (i.e. free and open source software) can be obtained at a lower cost with a better quality from reliable suppliers, and that open standards and interoperability are implemented. In effect, open source software should be easy to acquire from government at all levels.

Open source procurement

As an example, in 2004, the UK government launched (and reviewed in 2009 and 2010) its policy on ICT[32] where special attention was paid to **open source procurement**. In this respect, a toolkit was used to ensure that there is a level playing field for open source and that some of the myths associated with open source are dispelled. Participating in open procurement calls should be made easy.

Commissioning tools could also be set up to see if the deployment of the DSI strategy across Europe is meeting the needs of their target beneficiaries (entrepreneurs, business, developers, citizens and other communities). A priority rank of outcomes could be established to see if the delivered products and services by the EU are achieving their goals and if providers are able to deliver their outcomes.

Public procurement of innovative solutions

In January 2014, the European Parliament adopted new public procurement directives and these are some examples of the main changes[33]: increased flexibility and simplification on the procedures to follow, negotiations and time limits; clearer conditions on how to establish collaborative or joint procurement; and the creation of innovation partnerships. A review of procedures in public procurement is needed in order to include actors from grassroots communities.

SUPPORT TO SOCIAL ENTREPRENEURS & START-UPS

Supporting programmes for grassroots communities of innovators (such as CAPS) and start-ups should be considered in the future DSI policy. There are many supporting programmes around the world. Good working instruments can be **PPPs (public-private partnerships)** or **European innovation partnerships for DSI**, as well as using the **SME instrument** in order to help small and medium-sized enterprises. DSI should also create new specific instruments for social entrepreneurship.

Development and entrepreneurship programmes

In public institutions there are examples such as the **New York City Economic Development Agency** and in particular its **entrepreneur programme**[34]. Very similar to this, is the example of **Barcelona Activa**, which is the local agency for employment and economic growth for the area of Barcelona[35].

Some other examples come from private organisations. One of the most well-known is the Google-supported programme Google for Entrepreneurs[36] that in 2011 created a campus where innovation and start-ups can meet and share a creative space. Currently there are campuses and partnerships across 125 countries.

Impact HUB

The **Impact Hub of Vienna**[37] is a network of several cities across the world which, according to their websites, "inspire, connect and enable individuals and institutions around the world to sustainably impact society". Results from 2012, shows that more than 400 ventures were started among its members.

TAXES

One of the most obvious measures is to **crackdown on tax abuses** by technology companies. Big non-EU technology companies directly benefitted from taxpayer-funded technologies to develop their market innovations, but they have strategically underfunded the tax purse that helped lead to their success. If the big network companies do not pay their taxes it disadvantages European SMEs and social organisations.
The European Commission has committed to deliver an **Action Plan on efforts to combat tax evasion and tax fraud** in 2015. This would include measures at EU level in order to move to a system in which the country where profits are generated is also the country of taxation. This would include automatic exchange of information on tax rulings and the stabilising of corporate tax bases.

Tax incentives for R&D and innovation

In terms of SMEs and DSI initiatives, there are existing **tax breaks** linked to traditional R&D policies. The OECD is a good source on the different types of tax breaks that are most often used across Europe[38]. Any specific incentives to support innovation should apply not only to digital firms but also to non-digitial firms.

CROWDFUNDING, SEED FUNDING & CHALLENGE PRIZES

Crowdfunding should be included in thinking about the future of DSI. The European Commission should start promoting more crowdfunding tools, involving the community in choosing the best projects to be funded, as part of their R&D programmes.

Crowdfunding allows people to have the opportunity to support what they consider to be an attractive idea and to help someone else's dream to become a reality, while simultaneously getting benefits from the new product, eciprocity being one element of crowdfunding.

A report published by Nesta and University of Cambridge in November 2014 forecasts the **growth of alternative finance** (including peer-to-peer business lending, peer-to-peer consumer lending, equity crowdfunding, community shares, pension-led funding and invoice trading). In 2012, more than $2.7 billion was raised through crowdfunding worldwide – helping to fund more than one million new projects.

The main crowdfunding platforms are **Kickstarter** and **Goteo** but there are also plenty of other platforms that are gathered in the directory of crowdfunding platforms **CrowdingIn**[39], operated by Nesta (in the UK).

Crowdfunding platforms

In Spain, the first platform to be launched in 2010 was **Lánzanos**. **Verkami**, which in esperanto means "creation lovers". Here, artists, designers, entrepreneurs, cultural promoters and creators can present their project and be funded within the period of 40 days with the help and involvement of the public.

Crowdfunder.co.uk in the UK has raised £2.4 million of funding for projects since it launched. The platform specialises in supporting community enterprises, creative startups and charities. Another example is **Spacehive**, which focuses on public space and community projects in the UK.

The platform **Citizinvestor** is an American portal where public projects – such as new bins in the city, or high bike racks, or playground installations – are funded by citizens themselves.

Seed funding is a very early-stage investment, meant to support the business until it can generate cash of its own, or until it is ready for further investments. Seed money options include friends and family funding, angel funding and crowdfunding. Seed funding is mainly aimed at start-ups and ventures.

There are other elements such as **prizes, competitions, events, knowledge sharing and dissemination** that should also be included in the mechanisms for DSI policy.

The Nesta Centre for Challenge Prizes has run prizes in everything from energy to waste, data to education. In 2014 Nesta revived the 300 year old **Longitude Prize** and

involved the public in choosing which of six big global challenges deserved to be the focus for a new £10 million prize fund[41]

Challenges&Prizes

The Open Data Challenge Series[42] is a collaboration between Nesta and the Open Data Institute and has been very successful, attracting developers and social entrepreneurs to develop innovative solutions to social challenges using open data.

The **European Social Innovation Challenge**[44] was launched by the European Commission in 2013 in memory of Diogo Vasconcelos, to encourage new social innovations from all over Europe. The competition invited Europeans to come up with new solutions to reduce unemployment and minimise its corrosive effects on the economy and society. The three winning projects were awarded financial support of €30,000

5.2 REGULATION AND LEGAL FRAMEWORKS

The second package of tools encompasses **different aspects of regulation** that need to be reviewed or adapted in order to provide an environment conducive to openness and collaboration, while preserving citizens' rights and data protection. One of the first steps of DSI policy implementation should be to **integrate new legal approaches to open access, open standards and copyright reforms**. Future DSI policy could also initiate a process where we are able to rethink notions of privacy, trust and collective value creation for the public good in order to **strengthen the public domain and the creation of knowledge commons**[45].

An important general issue is to conceive transparency/open data and privacy/data protection as complementary issues and not as opposites. In fact, the right to data protection and privacy, as given in both legal frameworks (such as data protection) and technologies (such as encryption) should apply to individual citizens. Conversely, institutions – and in particular public institutions and work done with public money – should be open and transparent.

There are more specific regulatory instruments that could be key in enabling the growth of DSI across Europe:

OPEN ACCESS

Access to knowledge is a founding principle of any democratic society. Regarding open access to scientific results the EC is promoting a comprehensive open access policy[46], so that results of publicly-funded research across the EU Framework Programme for Research and Innovation can be disseminated more broadly, for the benefit of researchers, industry and citizens. Academic papers, usually funded by public money need to become open access by default to increase scientific knowledge across Europe. Scientists should be encouraged to openly publish not only papers but also datasets, so experiments can be replicable.

OPEN STANDARDS

tThe Digital Agenda emphasises the need to adopt **open standards and interoperable solutions** to fully exploit the development of existing and emerging technologies. Open standards should be at the core of the technical infrastructure. Open standards should have an adequate legal and governance backing, such as the **Royalty-Free Patent Agreement** of the W3C[47]. Open standards are essential to deploy interoperability between data, devices, services and networks.
Standards will enable new business models for co-operation between multiple stakeholders such as companies, public authorities and citizens to develop meaningful technologies. Therefore, greater citizen involvement in standards should be supported (for instance the W3C has proposed a Webizen programme: https://www.w3.org/wiki/Webizen) and citizens should be able to initiate new standards, not just large companies or states. Furthermore, citizen-based work on standards should be supported by public funding and all public-funded software should use open standards. For a definition of open standards, see **OpenStand Principles**[48]

OPEN LICENSING

Public sector information should be made available under an open knowledge license or placed into the public domain, so that innovators can build data mashups on top of a distributed data infrastructure (technological neutrality) without fear of unfair licensing issues.

Open standard licences, for example Creative Commons (CC) licences could allow the re-use of PSI without the need to develop and update custom-made licences at national or sub-national level. CC0 public domain dedication is an effective legal tool that allows the waiving copyright and database rights on PSI, it ensures full flexibility for re-users and reduces the complications associated with handling numerous licences, with possibly conflicting provisions (Keller 2014). In the rare cases where the CC0 public domain dedication cannot be used, public sector bodies are encouraged to use open standard licences appropriate to a member state's own national intellectual property and contract law and that comply with the recommended licensing provisions.

Example of Legal Framework: Copyright reform

In the area of copyright, the European Commission recently published its '**Report on the responses to the Public Consultation on the Review of the EU Copyright Rules**'. This report summarises the responses (over 11,000) that the Commission received in response to the copyright consultation held between December 2013 and March 2014. The results show conflicting positions between citizens and institutional users on one side and corporate rights holders on the other. Copyright can only work when it is perceived as fair by all stakeholders, seeking the right balance between the interests of creators (to control their work and to be able to make a living from their creativity) and the interests of society (access to information and culture, freedom of expression) (Keller, 2014)[49].

INTEROPERABILITY[50]

Interoperability should be implemented so that devices and services produced and delivered by different companies can communicate with one another. The Internet is the best example of the power of interoperability. Its open architecture has given billions of people around the world access to information, the possibility to add (web) content and services themselves, access to devices and modular applications that talk to one another. Today mobile devices with always-on Internet connectivity are becoming widespread.

OPEN PLATFORMS

Users of the Internet ecosystem include the independent application and service providers who have the right to use the future Internet infrastructure (including both data in a raw and processed form, as well as access to computing resources). Any privileged access provided to the owner/managers of the infrastructure would alter free competition. All functionality must be exposed by way of open APIs[51] that expose data using open standards. User data and metadata should be represented in open formats such as XML[52] and RDF[53] (which includes Linked Data[54] and SPARQL end-points[55]). **Opening up access to an application's source code** exposes that code to a relatively large number of developers, subjecting it to rigorous critical inquiry of a pool of reviewers larger than the one proprietary developers have available to them internally.

Example of Legal Framework: Net Neutrality

The preservation of **Net Neutrality**[56] is a crucial to define and make public how network operators manage traffic volumes and restrict applications usage. Network neutrality means that Internet service providers and governments should treat data traffic equally. Net neutrality protects freedom of expression and freedom of information online, reasserts the principle of fair competition and guarantees that users may freely choose between services online. The European Parliament adopted amendments to enshrine net neutrality in EU law at the beginning of April 2014. Currently the telecoms single market proposal has being reviewed by the Council (Member States) of the EU.

OPEN DATA

People are not passive consumers of the data, but actively engaged in producing it. The primary advantage of open data is that it prevents the concentration power by leveraging asymmetries of information and differentials of access. Open access to data would enable developers to create applications and services built on freely acquired data, as long as they respect provisions in the license. Private data should also have its privacy dimension encoded using open standards and the correct licensing, as well as clear requirements for how to access this data and determine its ownership, both by vendors and end-users. This should include the right to remove data by its creators.

Example of Legal Framework: Directive on the reuse of public sector

When the European Commission published its **directive on the reuse of public sector information (PSI)** in 2003 many member states, including France, the United Kingdom, Germany, the Netherlands and Spain began to promote and implement open data policies. The directive provided an EU-wide framework for governments, at all levels, to begin opening data. The European Commission estimates the economic value of the PSI market at approximately €40 billion per annum. The 2013 revision of the European Commission Directive on the re-use of public sector information will further enable the opening of public sector data in a harmonised and more transparent way.

Although changes in the European legal framework in the field of transparency and open data have already been implemented (i.e. the **directive on the re-use of public sector information in 2013** or several directives on the transparency of markets and trade) there is still a need to adapt to openness and innovation. Therefore, future DSI policy should consider creating a committee or working group to go over the existing directives and propose and formulate suggestions for a new legal framework for social innovation in the digital era.

FEDERATED IDENTITY MANAGEMENT

User data is moving more and more into the 'Cloud' and people are getting their music, videos and applications digitally. The aggregated data extracted from the analysis of our identities (what companies define as "social graphs") and behavioural patterns of the user, is continuously mined and analysed with the main objective of maximising value extraction (e.g. for marketing, economic competition and surveillance).

In this context, the infrastructure should preserve the right of data-portability[57], and **prevent lock-in**, therefore allowing for innovation in the wider economy based on the Future Internet. Users must be able to come (no barriers to entry) and go (no barriers to exit) regardless of who they are (no discrimination) and what systems they use. Thus, the platform should also deploy not only open-standards but also standardised identity management, fully respecting the users' privacy and ownership of the data.

Federated Social Web

An important effort towards a federated identity system is the W3C **Federated Social Web Working Group**[58] to develop standards to make it easier to build and integrate social applications. These standards will give citizens greater control over their own social data, allowing them to share their data selectively across various systems. The federated web standards will also be implemented within the EC-funded D-CENT Project[59] that is piloting federated social applications for participatory democracy.

PRIVACY-AWARE TECHNOLOGIES AND ENCRYPTION

"Do-not-track" technologies should be implemented in order to give users control over their social data and sensitive information, to make it easier for businesses to innovate on top of the infrastructure. There is a need for privacy-aware technologies based on trust and ethics, that can be filled by developing **technical solutions that are privacy enhancing 'by design'**. Technically, encouraging the use of HTTPS[60], the use of virtual private networks[61], adequate cryptographic public-key based infrastructure, strong authentication, as well as providing end-to-end encryption[62] should all be on the agenda. In particular, more support is needed for encryption and anonymity technologies, such as attribute-based credentials built by **ABC4TRUST**[63].

DATA CONTROL AND DATA OWNERSHIP

A broader investigation on the implications of the current personal data market and the role of data brokers[64] will be crucial for understanding the future of bottom-up digital economies. **New forms of data control and data collective ownership** by citizens should be encouraged. For instance, in the UK, the government backed **Midata** programme is encouraging companies to bring data back to public control, while the US has introduced **green, yellow and blue buttons** to simplify the option of taking back your data (in energy, education and the Veterans Administration respectively).

Personal data stores

There are also new available solutions, such as Mydex , Qiy, Citizenme[65] and many others that are part of an emerging sector of **Open Personal Data Stores**[66], **Privacy Dashboards, and Trust frameworks** to manage identity, that have emerged out of a new vision of identity management and trust that is advocating for a **new Deal on Data**[67] to balance the power between big companies, government and people over their personal information.

Example of Legal Framework: The EU data protection reform package

The Data protection reform is currently being discussed by Member States The aim is to to build a single and comprehensive data protection framework to develop tools and initiatives to enhance citizen awareness, and to ensure that businesses receive guidance on data anonymisation and pseudonymisation. This should prevent any unauthorised collection, processing and tracking of personal information and profiling, including citizens' preferences, medical and health records and so on. Companies should be compelled to be transparent about how they collect users' personal data, and the real value they extract from trading personal information. Citizens should be able to claim their digital rights, including the right to control how personal data is used, the right to avoid having information collected in one context and then used for an unrelated purpose, the right to have information held securely, and the right to know who is accountable for the use or misuse of an individual's personal data. Firms might begin to reduce the length of period over which information is retained and adopt **certification schemes guaranteeing a high standard of privacy protection**.

Example of Legal Framework: A Magna Carta for the Internet

Tim Berners Lee, the inventor of the Web is advocating for a sort of **Magna Carta for the Internet** to estabilish basic rights and freedoms, to keep the Internet open, without surveillance and censorship, and to halt power abuses from Governments and corporations. The Magna Carta for the Internet goes along with recent UN General Assembly (UNGA) resolution on *The Right to Privacy in the Digital Age*.[68]. A Magna Carta for all Web users could be directly crowd-sourced from the Web itself, engaging effectively in multi-stakeholder processes.

5.3 RESEARCH AND INNOVATION SUPPORT

INVESTMENT ON ENABLING INFRASTRUCTURES

One important objective is to provide infrastructural investments such as broadband deployments and pan-European digital services that underwrite robust, equal, society-wide access to connectivity. However, while most resources are going to top-up deployments from Telcos and systems integrators such as FIPP or 5G PPP, there is scope for more experimental approach that invest on alternative infrastructures that are decentralised and open in nature.

Distributed and open architectures

Distributed and open architectures are a key enabling factor for DSI to scale. If Europe wants to grow and scale an Innovation ecosystem for the social good, to drive long-term sustainable innovation-led growth, it needs investment in alternative architectures that favour new players and allow for bottom-up innovation. This includes the need for **distributed data repositories and management systems, distributed secure Clouds, distributed search, and federated social networking**.

It can also include the development of open source mobile phone alternatives such as FairPhone[69] on top of which a whole new open ecosystem of services and applications could flourish, based on open-source and open-hardware developments.

Community and bottom-up networking

Community and bottom-up networking is an emerging mode of the Future Internet, where communities of citizens can build, operate and own open IP-based networks, as complementary solutions to commercial access networks from either commercial telecom companies or by local public providers. As shown by the European project Confine and **BuB for Europe** (Bottom-up Broadband)[70] these networks are rapidly expanding in terms of the numbers of nodes and people involved.

INNOVATION LABS

In the context of future DSI policy, innovation labs present an opportunity to activate networks and to create collaborative work environments. In this context labs can be understood as spaces and units set up run and funded directly by government and driven by communities or public and private partnerships.

Government labs

Nesta and Bloomberg Philanthropy in their study[71] of government funded innovation teams and labs highlight how four different types of government funded labs can help drive innovation, through better support for, development and utilisation of amongst others, digital social innovation.

Creating solutions to solve problems

The Mayor's Office for New Urban Mechanics (MONUM), which was launched in 2010, at the start of Boston Mayor Menino's fifth term, is a good example of this. It was the result of the Mayor's growing interest in accelerating the pace of innovation within the city administration, and to enable busy City Hall staff members to run innovation projects, often done in collaboration with external entrepreneurs and internal government policy experts.

Engaging citizens and non-profits to find new ideas

These labs focus on opening up government to voices and ideas from outside the system, often adapting the open innovation and challenge-led approach more commonly seen in the private sector and making use of strong communications and engagement strategies. One example of this is the **Seoul Innovation Bureau**, which is tasked with turning Seoul in South Korea into an innovation-led Sharing City, by engaging citizens in the radical redesign of public services.

Transforming the processes, skills and culture of government

PS21 based in Singapore is a good example of this. Initiated and driven by the Head of the Singaporean Civil Service, PS21 has created systemic interventions such the Staff Suggestion Scheme that creates an opportunity for any public officer to directly submit ideas to improve public services. Once submitted, ideas for improvement are sent to a Central Steering Committee, which is chaired by a Permanent Secretary, where they are vetted and considered for implementation.

Achieving wider policy and systems change

Brining about transformation and looking beyond specific interventions to the wider policy context and complex systems that need to change, for example in healthcare, energy or education. **The innovation foundation Sitra in Finland**, which has has taken on large systemic challenges to Finnish society, such as creating devolved health care provision offers and growing the sustainable and renewable energy sector, is one example of this.

Social and private labs

In addition to those set up and run by government to drive innovation in products and services, citizen engagement and policy development, there are vast often highly connected communities of private, academic and civic labs which proivde space and support for social innovatiors to experiment with and develop digital social innovations.

Maker spaces, Hackerspaces, and co-working spaces

Maker spaces (such as Fablabs), *real-life testing and experimentation environments where users and producers can co-create innovations (including Living Labs),* **Hackerspaces** and hackathons (such as Chaos Communication Camp), and **co-working spaces** are a few examples.
In addition to exploring the role of labs run by government, DSI policy should seek to create stronger relationships between these communities and public policy, and promote their role in bringing users, developers, and entrepreneurs together to create new digital products, new public services or learning programmes.

The creation of **a European network that would encompass regional innovation labs** (both public and private), would bring coherence to the mission of innovation labs and would expand their use.

INCUBATORS & ACCELERATORS

Mechanisms that foster social entrepreneurship such as **incubators, accelerators or other intermediary platforms** are necessary to provide resources in different phases of the development of DSI. They represent a novel contribution to advancing social entrepreneurship around the world, helping young companies, and particularly high-tech start-ups to grow and thrive. The number of accelerator programmes has grown rapidly in the US over the past years, and more recently, the trend is being replicated in Europe. For instance, the **Nesta report "Good incubation"**[72] charts the rise of social venture incubation, with a focus on what can be learned by this sector from other programmes around the world. Investment for this kind of innovation support programmes can come from public funds but could also be through public private partnerships or crowdfunding.

TRANSITION project

A good example to foster a **European networks of incubators** is the European Commission funded **TRANSITION project**. It is coordinated by the European Business & Innovation Centre Network (EBN), and is a 30-month project that supports the scaling-up of social innovations across Europe by developing a network of incubators, which brings together established partners within the fields of social innovation (SI) and innovation-based incubation (IBI).

5.4 DISSEMINATION & LEARNING

KNOWLEDGE SHARING & NETWORKING

Firstly, **tools for general dissemination** should be included. In the context of deploying the DSI strategy, the organisation of events is critical. This should include general events where the new policy framework is explained, including its goals and strategy. These should be targeted to European policy makers, state members in charge of innovation in their countries, local governments and the DSI community itself (labs, developers, entrepreneurs, start-ups networks, engaged citizens, etc.). In addition, in order to engage the DSI community, but also to promote the rise of creative and innovative ideas, **competitions and challenges or jams** would be very helpful mechanisms to deploy.

Secondly, beyond general events, **the DSI strategy requires a communication strategy**. This should include the use of social networking platforms, independent media and other news applications. For instance, the elaboration of a newsletter or creating a DSI strategy blog would be a helpful instrument to spread the message from the European Commission and to provide updated information about policy deployment.

DSI networking and crowdfunding platform

A DSI networking platform that crowdmaps initiatives, identifies partners and collaborators with the needed expertise, identifies funding opportunities, and promotes new economic instruments (such as challenges, and prizes) should be the promoted, as the next stage in the evolution of http://digitalsocial.eu. The setting-up of the collaborative map for this project has shown the state of the development of the field. This map should be maintained with some improvements and updates, possibly **linking crowdmapping to crowdfunding and other bottom-up incentives mechanisms such as Prizes and Challenges.**

Thirdly, **knowledge sharing is key**. Best practices have to be collected and shared in order to learn from them. Moreover, dissemination programmes related to DSI policy should also develop tasks related to "evangelisation" of the benefits of DSI. One task would be persuading Parliaments, assemblies, and municipalities to adopt open tools, to be transparent, participative, and open to citizens.

TRAINING

Training will also be essential, especially in bridging the digital skills gap, but also in empowering the DSI community.

Fabacademy

Specific training could be set-up but the DSI community itself, as is done today by Fablabs with the **Fabacademy**, by Hacklabs and Makerspaces with free software and open hardware training, or by the Open Data Institute (ODI) and Open Knowledge Foundation on open data, and by organisations such as Tactical tech or Open Rights Group on privacy and digital rights.

5.5 EVALUATION

Just as it is the case with social innovation, digital social innovations need to demonstrate their impact to make the case for spreading, scaling and attracting funding opportunities. As DSI evolves policymakers need to understand the extent to which the policies they are putting in place to support DSI are effective.

Most reports about innovation refer to GDP and financial return as one of the main indicators used to measure impact. However, as described throughout this paper, DSI seek to address a wider set of societal challenges, from environmental pollution to chronic health conditions. Any approach to understanding and measuring the impact of DSI on both a macro level as well on a project-based level needs to **go *beyond GDP*** to establish what **non-financial benefits** DSI have or have not helped to achieve.

MEASURING AND UNDERSTANDING THE IMPACT OF DIGITAL SOCIAL INNOVATIONS

There is a growing body of knowledge on how to measure and understand the impact of social innovation policy, which DSI frameworks should also build on. The EC report **Strengthening Social Innovation in Europe**[73] reviews a number of indicators for measuring social and non-social innovation, including **the European Public Sector Innovation Scoreboard** and the **WARM Wellbeing and Assessment Model** to assess the social capital and wellbeing of local areas.

What is measured? Common standards of evidence and adoption

There is a need to harmonise sound metrics to assess the impact of DSI activities, including the role of ICT networks, number of people/communities involved and wider societal criteria such as social satisfaction, wellbeing, ecological footprint and social inclusion. A review of some of the existing methods and frameworks for measuring and understanding the impact of social innovation, as well as digital social innovation specifically, provides some guidance on how this can be done.

Beyond GDP initiative

The **Beyond GDP initiative**[74] and the **OECD Better Life Index**[75] can both be used as indicators for understanding the macro level impact of policies, as well as the impact of individual DSI projects (i.e. what are the health outcomes, impacts on social exclusion and civic engagement of the innovation).

The Triple Helix of Social Tech

The Triple Helix of Social Tech: Nomine Trust framework for measuring the social, user and financial value generated by digital social innovation organisations and their projects

The Triple Helix outlines how social tech ventures, and investors, should focus on three types of value – **Social Value, User Value and Financial Value –** when developing and scaling their project(s)[76]

	What is it	How it can be measured
Social Value:	The potential social change the venture intends to create i.e positive impact health, resilience and sustainability society. Social value is the extent to which this is realised.	• Qualitative responses to the idea - interviews or meetings/consultation with key stakeholders, such as domain experts and possible purchasers of the service to establish what social challenges need to be addressed and how the product or service could address them • Quantitative analysis of the idea, for example using surveys to test the idea with key parties, or analysing existing data sets to understand the extent of the social issue • Online responses to the proposed service from partners or potential customers.
User value:	In order to realise any of the potential social value, a social tech venture needs to demonstrate value to users, i.e it is a product or service that people want to pick up and use because it meets their individual needs.	• Qualitative interviews with key users of the product or service to test need and demand for the approach including the specific user problems the product or service would solve. • Observing potential users to see if the product works in their context • Quantitative responses to the idea, for example survey potential users to test whether needs established within qualitative interviews apply to a larger user group • Online responses to the proposed service from potential users, using analytics software to test demand.
Finan-cial Value:	There has to be a market for the venture to be sustainable and the venture has to be active in it. The generation of sustainable income is understood as financial value, which comes as the result of realising user or social value.	• Establishing an agency or provider who has the responsibility or interest in addressing the social need the product or service is attempting to address • Gathering financial indicators of the negative impacts of the established social need the product or service is looking to address • Establishing that there is a market for this, for example, has the policy context shifted to make this an area that is likely to be outsourced from public services? • Establishing potential routes to market

How the impact is measured

As emphasised in the framework developed by Nominet Trust there are a number of tools digital social innovations can apply to capture the impact of their work, from user observations to market testing and capturing indicators of financial savings.

Nesta Standards of Evidence framework

Looking specifically at different tools for measuring both financial and social impact, Nesta has developed the **Standards of Evidence** framework. It proposes different types of evidence and tools based on the development stage and maturity of the social innovation, beginning with the most basic evidence at level one to the most refined evidence at level five.

Level	Expectation	How the evidence can be generated
Level 1	You can give an account of impact. By this we mean providing a logical reason, or set of reasons, for why your products/service could have impact on one of our outcomes, and why that would be an improvement on the current situation.	You should be able to do this. yourself, and draw upon existing data and research from other sources.
Level 2	You are gathering data that shows some change amongst those using your product/ service	At this stage, data can begin to show effect but it will not evidence direct causality. You could consider such methods as: pre and post survey evaluation; cohort/panel study, regular interval surveying
Level 3	You can demonstrate that your product/service is causing the impact, by showing less impact amongst those who don't receive the product/ service.	We will consider robust methods using a control group (or another well justified method) that begin to isolate the impact of the product/ service. Random selection of participants strengthens your evidence at this level; you need to have a sufficiently large sample at hand (scale is important in this case).
Level 4	You are able to explain why and how your product/service is having the impact you have observed and evidenced so far. An independent evaluation validates the impact you observe/generate. The product/ service delivers impact at a reasonable cost, suggesting that it could be replicated and purchased in multiple processes. locations.	At this stage, we are looking for a robust independent evaluation that investigates and validates the nature of the impact. This might include endorsement via commercial standards, industry kitemarks etc. You will need documented standardisation of delivery and you will need data on costs of production and acceptable price point for your customers.
Level 5	You can show that your product/ service could be operated up by someone else, somewhere else and scaled–up, whilst continuing to have positive and direct impact on the outcome and remaining a financially viable proposition.	We expect to see use of methods like multiple replication evaluations future scenario analysis; fidelity evaluation.

The standards are used by the DSI accelerator Bethnal Green Ventures[77] and Nesta's Impact Investment team[78], which invests between £150,000 and £1 million in organisations whose digital social innovations are designed to address key societal challenges. Building on this, the standards can help social innovations or organisations working with social innovations to structure their evaluation strategy to continue move up the levels of evidence. The standards can also be adopted by government programmes, as was the case with **UK Cabinet Office Centre for Social Action Innovation Fund**, which uses the Standards of Evidence to assess social innovations that are considered for support.

IMPACT OF DIGITAL SOCIAL INNOVATION POLICY

Digital Social Innovation is a young field, and there are few examples of policies specifically designed to support DSI – and even fewer specific tools and frameworks for understanding the impact of these. However, there are some emerging examples of frameworks that could guide in the development of assessment tools for DSI.

The work done by **Wikiprogress** is exploring new digital tools for including people, in relation to what should be measured through the development of indicators, as well as how to undertake measurement[79].

Collective Awareness Platforms

In the context of **Collective Awareness Platform Initiatives**, **IA4SI (impact assessment for social innovation)** is a support action aiming at developing a common methodology able to evaluate the socio-political, economic and environmental impacts of collective platforms. This ongoing project will provide three online tools for self-assessment, enabling projects to understand and improve their impact.

In addition to the above, future indicators to measure impact of DSI policy could include specific metrics, which **focus on the key components of the *digital* element of digital social innovation**.

Webindex

The Global Open Data Index developed by the Open Knowledge Foundation[80] and the **Webindex** developed by the World Wide Web Foundation[81] illustrate examples of how this could be captured and measured. Another metric to focus on could be **the number of Creative Commons licenses** awarded within different fields, regions and countries, as measured by the non-profit Creative Commons in their annual **The State of the Commons report**[82].

LESSON FROM EXISTING INNOVATION POLICY FRAMEWORKS

A number of additional lessons can be learned from existing frameworks for measuring the impact of innovation policy. As described by the Manchester Institute of Innovation Research in their work on the **"Compendium of Evidence on Innovation Policy"**[83] measuring the impact of any innovation policy is very difficult. The main issue is developing an evaluation methodology, as the majority of evaluation approaches for R&D policies often focus on econometric analysis of the additionality of input and/or output.

Innovation policy frameworks examples

There are number of insights from instruments such as the **Innovation Union Scoreboard (IUS)** which was developed to provide a comparative assessment of the innovation performance of the EU Member States, the **OECD Science, Technology and Industry Outlook**[84] and **OECD Innovation Policy Platform (IPP)**[85], a joint OECD and World Bank initiative, which looks at key statistical sources for measuring input (such as firm level micro data, R&D statistics, labour force survey), which could evolve to measure the impact of DSI policy, for example by looking at open licensing schemes and Creative Commons alongside IPR.

These indicators now include innovative entrepreneurship and innovation in firms, universities and public research institutes, and could include DSI products and services generated, as well as new types of actors such as Fab Labs and makerspaces.

RECOMMENDATION FOR EVALUATION

Building on the above discussion, this table outlines the measures that a framework for assessing DSI should includ

Guidelines for assessing the impact of Digital Social Innovation Assessment must…
✓ Go beyond GDP growth i.e Focus on both the social as well as the financial value and outcomes generated by the digital social innovation
✓ Go beyond focusing on additionality of input/output
✓ Solve how to measure effectiveness in order to provide guide for policy makers
✓ Define what “impact” means: o Beyond increase of performance o Including not only short term but also long term dimension
✓ Include multiple causality of factors
✓ Take place according to stages: phased evaluation
✓ Avoid isolated evaluation
✓ Provide link between academic evaluation and evaluation reports (more professional, consultancy based, etc.)
✓ Explore DSI specific indicators such as Open Data access, digital skills and proliferation of open source projects or creative commons licenses.

6

CONCLUSIONS AND POLICY RECOMMENDATIONS

WHAT SHOULD POLICYMAKERS DO?

Broadly, there are four main ways policymakers and governments can support digital social innovation.

1. Invest in digital technologies for the social good: Make it easier to create new digital SI through specific regulatory and funding measures

This focus could be on four key areas of opportunity in DSI.

a. Collaborative economy

b. Digital social innovation in cities and public services

c. Open tools and distributed architectures

d. Citizen engagement and direct democracy

In general, European funding has heavily invested in core European institutions in terms of digital innovation, in particular the formerly nationalised telecommunications companies, as well as national research institutes and traditional universities. Building on existing schemes, such as innovation partnerships and PPPs with bigger telecommunications corporations, new schemes could be created to provide financial support for large-scale DSI experiments across Europe. This could involve making it easier for cities, regions, health authorities and universities to pilot large-scale DSI experiments around collaborative economy, direct democracy, distributed energy, civic health and bottom-up smart city solutions.

Many of the inventions that now form the basis of the digital economy and the emerging Internet of Things have their roots in strong public investment that funded general-purpose technologies and basic research. However, non-institutional actors (hackers, geeks, social innovators and activists) are key in this process since they are able to generate creativity, develop new experimental methods and engage large-scale communities.

It is precisely these kinds of non-institutional actors that do not have sufficient support in Europe now and that can take huge advantage of the building of a Europe-wide constituency, by interconnecting initiatives, sharing resources, removing barriers to enter existing markets and building synergies.

Within the single digital social market it should be easier for digital social innovations such as collaborative economy and crowd-funding platforms to manage and distribute assets (financial as well as non-financial) between citizens in different EU countries.

2. Make it easier to grow and spread DSI through public procurement support for evidence generation, common standards and integration with public services.

DSI has the opportunity to improve public services, cut costs and improve the environment. Easier procurement could be a route to scale and higher impact – this requires attention to the details of how procurement is organised (e.g. to make it easier for smaller organisations to win contracts), but also much more systematic orchestration of marketplaces bringing together providers and potential buyers. As an example, the Fukushima prefecture in Japan hosts a map of the Safecast data on its website, and in Reykjavik, Iceland, the city council takes on board and debates ideas from Your Priorities, a platform that hosts citizen ideas for how to improve the city.

In particular government procurement methods should seek to support DSI through:

1. Focusing on the financial as well as the social impact (such as health outcomes and wellbeing, for example) when procuring services. Particularly for DSI this could include valuing the network effect and digital engagement of users provided by procured services.

2. Make it easier for smaller DSI organisations or consortia of these to compete with telecommunications corporations to for public contracts.

3. Support the scaling of DSI, through reuse and repurposing of existing solutions, by encouraging (and where possible making it mandatory) that any publicly funded service or product is open sourced and/or licensed under Creative Commons.

4. Joint commissioning by public bodies of DSI.

3. Increase the potential value of DSI (e.g. making available distributed architectures, common frameworks and open standards, as well as supporting innovation spaces)

Overall, there is a need for a public, common framework for the design of DSI solutions and infrastructures underpinned by open protocols, open standards, regulatory mechanisms and collective governance models based on democratic and participatory processes.

In order for bottom-up innovation to scale and deliver social value, public, open, neutral, privacy-aware and distributed architectures should be in place. Interoperable, customised and modular services and applications based on open source, open access and open hardware can then be built on top of a public federated platform in a dynamic and flexible way, plugging into existing and future Internet infrastructures.

At regulatory level, **The Digital agenda emphasises the need to adopt *open standards and interoperable solutions*** to fully exploit the development of existing and emerging technologies. **These open standards** should not be optional; they should become public policy guidelines at the core of the technical infrastructure.

Technical solutions do not work by themselves, therefore legal and commercial solutions have to be based in technology and integrated with the appropriate policy framework.

As digital technology becomes more pervasive, **the issue of what public data is, and the question of who controls it, is becoming more important**. Thus **data portability, federated identity management and trust frameworks** should be encouraged. Defining sensible governance modalities for the data infrastructure and the DSI ecosystem will require a large collaboration between public and private.

Ultimately, just as in science and technology, innovation in society needs carefully crafted investment and support. **There is a need to maximise the social value generated by digital technologies** and to socialise returns in order to be able to invest in the next waves of social innovations and achieve longer-term systemic change.

In addition to this cities and governments could further increase the potential for DSI by investing in some of the spaces and developer communities from where DSI often emerges, such as **makerspaces, Fab Labs and hackerspaces**. Examples of cities already prioritising this are: the City of Shanghai, which has proposed to fund a hundred makerspaces throughout the city with six opened to date, to enable the city's capacity to make; and Barcelona, which is experimenting with becoming a Fab City, working more strategically with makerspaces in the city to develop solutions to urban challenges.

4. Enable some of the radical and disruptive innovations emerging from DSI – such as new approaches to money, consumption, democracy, education and health.

As in other sectors, some of the innovations in this field have very radical implications – for instance, for the future of money or education. Policymakers need to provide space for more radical ideas to be tested out in towns and cities across Europe, using knowledge about how systemic innovation can best be organised. In some cases substantial investment will be needed to support innovations through to sustainability – just as in business, where many of the most transformative innovations required many years of patient, large-scale investment before they delivered returns.

Alternative socio-economic models based on trust and their reputations are emerging. Different DSI activities are piloting new ways in which communities can be mobilised, managing access to shared (financial and non-financial) resources, collaborative workspaces and even developing alternative exchanges and payment systems.

Even if it is impossible to foresee the precise impact and quantify the multiplier effect of the mapped DSI activities, there is a need to harmonise sound metrics to assess the impact of DSI activities, including the role of ICT networks, number of people/communities involved and 'beyond GDP' criteria such as social satisfaction, wellbeing, ecological footprint and social inclusion.

5. Expand the European Digital Social Innovation network and invest in the development of skills and training

One of the biggest barriers to making the most of DSI, is the significant gap in the skills and capacity to experiment with and develop new digital social innovations. In addition, **citizens should fully participate** in the innovation process, applying collaborative and multidisciplinary methodologies and other innovation tools to facilitate their involvement. Citizen engagement will certainly maximise the societal impact of innovation and it would make sure that services deployed answer to concrete unmet local needs and demand.

In countries where DSI is relatively advanced, such as the Netherlands and the UK, the majority of DSI is developed by new organisations with fewer incumbents, such as established charities exploring this potential. In addition to this, our crowdmap of DSI happening across the EU shows that while there is relative high activity in in West and Southern Europe, Eastern Europe in particular is lagging behind. To address this, policymakers should:

1. Grow the www.digitalsocial.eu network to enable more opportunities for collaboration through the platform, such as the opportunity for organisations to jointly develop new projects and apply for funding through innovative mechanisms such as challenges, prizes and crowdfunding.

2. Increase early-stage seed funding programmes and other types of non-financial support that are vital in helping innovators experiment with and develop DSI projects. The incubator programme run by the UK's Open Data Institute and the DSI accelerator programme run by Bethnal Green Ventures have demonstrated potential in how models developed to support early-stage businesses can be adapted to support and grow DSI projects.

3. Support programmes that help people and organisations develop their skills to work on Digital Social Innovation, such as getting digital skills on the curriculum in schools and helping civil society organisations experiment with the development of digital solutions.

Help grow DSI capacity in Eastern Europe by facilitating collaboration between established DSI networks and organisations from the rest of the EU. Identify specific social challenges (such as health, employment, urban regeneration and care) facing countries in Eastern Europe and invest in pilots that explore how digital social solutions could address them.

APPENDIX

DSI ADVISORY GROUP (AG)

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Flore Berlingen	OuiShare, Co-Founder
Juha Huuskonen	Open Knowledge Foundation Finland
Javier Ruiz	Open Rights Group

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Endnotes

Why is Digital Social Innovation Important?

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Over the course of this project we have spoken to numerous experts in the Europe and internationally, some of them are researchers or commentators, others are practitioners working on digital social innovation. There are too many to name here, but we thank them all for sharing their successes, lessons and experiences.

Finally we would like to thank the more than 1000 organisations who have taken the time to join www.digitalsocial.eu and map their digital social innovation project, which has been key to our understanding of DSI in Europe.

As ever, all errors and omissions remain our own.

DIGITAL SOCIAL INNOVATION

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Digital Social Innovation

Interim Report Executive Summary

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DSI Interim Report Executive Summary

Digital Social Innovation (DSI) is an emerging field of study, with little existing knowledge on who the digital social innovators are, which organizations, and activities support them and how they use digital tools to change the world for the better.

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The development of open data infrastructures, knowledge co-creation platforms, wireless sensor networks, decentralized social networking, and open hardware, can potentially serve collective action and awareness. However, today it stills fail to deliver anticipated solutions to tackle large-scale problems, and the growth of digital services has resulted in an imbalance between the dramatic scale and reach of commercial Internet models and the relative weakness of alternatives, mainly filling marginal niches and unable to gather a critical mass of users and exploit the network effect.

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This report describes our work to date, having investigated more than 250 case studies of digital social innovation services, support organizations and activities. The report presents interim findings and conclusions and highlights next steps for the research project. The study shows that civil society organizations, non-profit NGOs, social movements, and civic innovators (developers, hackers, designers) are key stakeholders in support of innovation for social good. In the reserach we distinguish between the initiation of innovation via often non-institutional actors that are not taken into account in traditional innovation analysis, and the socialisation of innovation via institutional organisations and the public sector that support and enable them to scale. We also investigate how this process can lead Europe to embrace new innovation models and experimentation, while too often in the past civil society organizations were ignored or left behind in the big picture of a top-down technology-push or large top-down innovation programmes.

Emerging Findings

Crowd-Mapping DSI organizations and their activities

There are many cases of DSI being spread throughout society that we attempt to define and cluster in this report. Some of the best examples of DSI in Europe are transforming Governments, businesses and society.

We have developed a crowdmapping facility http://digitalsocial.eu/ based on open linkeddata to crowdmap the different types of DSI organisations, where they are based and how they are connected, including a prototype analysis of strong and weak links between organizations. In the DSI Network Data-Set, there are a total of 285 organisations with a total of 178 activities as of 13 December 2013. The emergent network represents DSI organisations and their social relationships mapped in the form of graph that is a collection of nodes and edges between them.

We highlighted 5 areas that capture key dimensions of the phenomenon under investigation: (i) New ways of making including the Makers movement and open hardware projects like Arduino that is recoluzionising open design and manufacturing; (ii) Participatory mechanisms and open democracy featuring new projects pioneering direct democracy and citizens paretcipation such as Open Ministry or Liquid Feedback that are transforming the traditional models of representative democracy; or Openspending. that encourages transparency and accountability, participatory web platforms such as Wikigender and Wikiprogress developed by the OECD that facilitate the linking of National statistics to actual individual living conditions; organisations like MySociety and the Open Knowledge Foundation in the UK that are developing services like FixMyStreet allowing citizen to report city problems and CKAN, the biggest open source data platform in Europe that is underpinning a new bottom up ecosystem for digital public services; (iii)The sharing economy that includes crypto digital curencies like Freecoin and many sharing economy platforms such as Peerby and Goteo creating new forms of crowdfunding methods, exchanges and new economic models; (iv) Awareness networks enabling sustainable behaviours and lifestyles such as the Smart Citizen Kit – an initiative that empowers citizens to improve urban life through capturing and analysing real-time environmental data, and Safecast – a project that enables citizens to capture and share measurement on radiation levels; (v) Open access and information Commons including cities like Vienna and Santander pioneering new practices in Open Data and open sensor networks; and mesh networks projects such as Guifi.net , projects such as Confine, Commotion, and Tor that are using bottom up privacy-preserving decentralised infrastructure for the open Internet constituted by open standards, open data, free and open software, and open hardware. Other projects are exploring the potential of federated social networking, such as D-CENT and Diaspora, and the promotion and diffusion of knowledge systems in the Public Domain, such as Communia.

Most, if not all, of the above examples of civil society digital social innovation take place via the Internet or are highly enabled by new technology trends such as open networks, open hardware and open data infrastructures. The selected organizations have been classified into four types:

- Different typology of organisations (e.g. Government and public sector organisations, businesses, academia and research organisations, social enterprises, charities and foundations; and grassroots communities);
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Experimental policy tools and actions to enable DSI to scale in Europe

The big challenges for the EU are how to make it easier for small scale radical innovations involving digital technology to emerge and evolve, but perhaps more important how to create the conditions for the really powerful ones to get to scale – which will nearly always involve disrupting existing structures and institutions. The aim of this research is to clarify the goals of policy; the tools available for both the Commission and others across Europe; and to frame a more detailed discussion on how these could be implemented within the frameowrk of the Digital Agenda for Europe and under the Horizons 2020 Work Programme, and in particular, but not limited to, the Collective Awareness Call.

The elements below have been identified in our research as key enablers to reach sustainability of DSI initiatives:

- Building communities based on the right mix of motivation and incentives, such as need, passion, and acquisition of reputation
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The value of this DSI experiments is still difficult to quantify using traditional indicators of success and impact, such as GDP, profitability and competitiveness. New sustainable business models and socio-economic mechanisms based on collective and public benefit are starting to clearly emerge. Once the network of digital social innovation actors in Europe is mapped and its dynamics understood, it will inform future EC initiatives, research and policy to foster open and inclusive innovation for social good in Europe. Once complete, the evidences gathered in this study will enable this project to recommend how best to combine research, strategy, and policy recommendations for DSI with the context of the DAE and Horizons 2020.

Digital Social Innovation

Interim report

Contract no. 30-CE-0531673/00-86

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DIGITAL SOCIAL INNOVATION

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D4 Second Interim Study Report (rev. edition)

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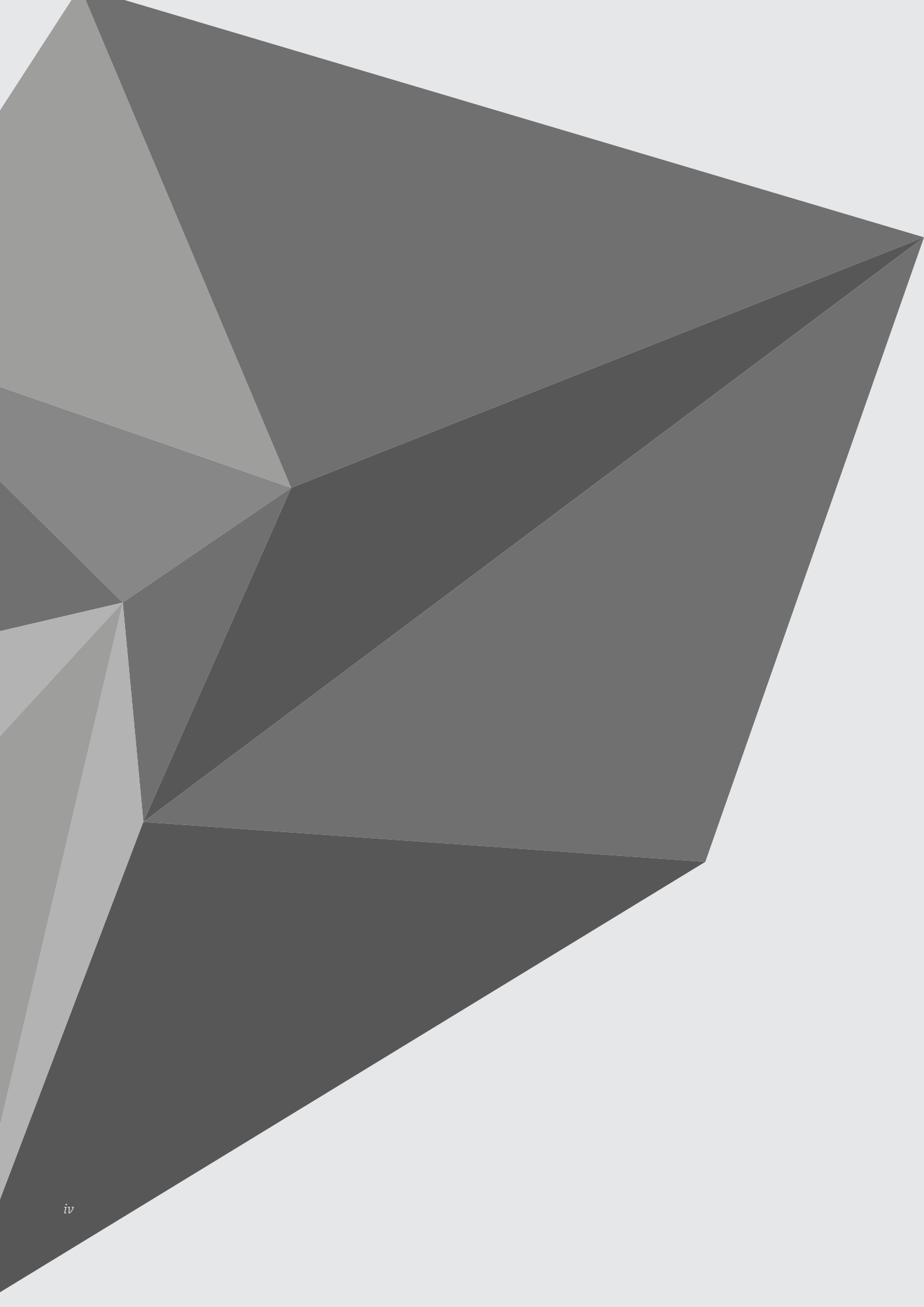


Introduction

The Internet is approximately 40 years old, and its capacity for generating societal and economic value is relatively well understood. But, despite the founding ethos of technologies like the World Wide Web being aligned to social good, the last 20 years or so have seen the commercialisation of the Internet take precedence. Online innovation developed specifically to effect major positive social change remains, arguably, in its infancy, with relatively few services reaching global scale. Consequently, Digital Social Innovation (DSI) is an emerging field of study, with little existing knowledge on who the digital social innovators are, which organisations and activities support them and how they use digital tools to change the world for the better.

This research project aims to identify, map and engage communities that are constructing the emerging Digital Social Innovation field and provides policy recommendations for concrete policy actions to foster, support, and scale DSI in Europe. We believe this research comes at a crucial time – a range of new technologies are being developed just as there is growing interest by citizens across Europe in solving social and economic challenges.

This report describes our work to date, having investigated more than 250 case studies of digital social innovation services, support organisations and activities. It presents interim findings and conclusions and highlights next steps for the research project.

What is DSI?

In the context of this research we define Digital Social Innovation (DSI) as

'a type of social and collaborative innovation in which innovators, users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale that was unimaginable before the rise of the Internet'.

With the rapid growth in practice there has been a similar increase in ways of analysing and understanding social innovation enabled by collaborative digital technologies. However, definitions are certainly contested and cannot capture the entire dimensions of the phenomena under investigation which are complex, diverse, and emergent. Social innovation is here considered in relation to the initiatives that are based on "meaningful discontinuities" in the way involved participants behave and interact collaboratively leveraging the power of collective intelligence through open digital technologies. This means that changes can be seen as a step towards social and environmental sustainability. And where the "involved participants" are both, the «user/co-producers» and all the other participants to the initiative, taking into account the transformation of the role of the consumer into active users as co-creators and their deeper motivations to participate in the innovation process (see Fig.1).

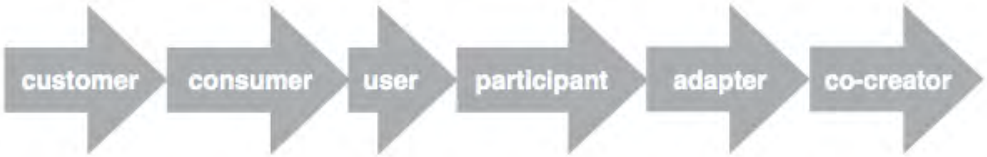


Figure 1: Fuad-Luke, 2009

Innovation is not anymore a linear step-by-step process in which R&D activities or technology push automatically lead to innovation and commercialisation of new products, but a complex, dynamic, and interdependent process of different stakeholders, including engaged communities. Innovation should be understood in broader terms as a new product (product innovation), a new method of production (process innovation), new organisational forms (organisational innovation), access to untapped resources, and new value systems that can transform societal norms and institutions. Social, political and economic processes driven by innovation are uncertain and open ended within an economy never in equilibrium, and cannot be predicted in advance. That's why the crucial role of innovators, entrepreneurs, and communities to create something novel out of existing research should be stressed.

Some innovations involve big discontinuities - 'radical' or 'disruptive' innovations, and others involve continuous small improvements - 'incremental' innovations (Freeman and Soete, 1997). The critical issue is how to encourage simultaneously both business model innovation and societal innovation. This means enabling business model innovation in real world settings (such as Living Labs, maker spaces or so called Smart Cities) and orchestrating the process with all innovation stakeholders. Mobilising civil society organisations, and innovators that are central to the way DSI happens and scale.

Why is the European Commission interested in Digital Social Innovation?

This research forms part of the European Commission's thinking around its Europe 2020 strategy and the European Digital Agenda and its ambition is to inform the development of better support, regulation and policy and also to help define potential funding programmes from 2014 onwards. In June 2010, the European Council adopted the strategy to turn the EU into a smart, sustainable, and inclusive economic powerhouse delivering high levels of employment, productivity, and social cohesion.

Europe 2020 strategy is broad and ambitious and it is likely that an "out-of-the-box" strategy reliant on harnessing DSI will be crucial in meeting the Europe 2020 goals. In particular, the natural home of a DSI strategy is within the Digital Agenda for Europe. This research relates to the European Digital Agenda in three ways:

Firstly, DSI might provide ways of working that speeds up R&D and productivity, combining sustainable innovation growth with cohesion and sustainable development.

Secondly, social and civic innovation can contribute to inclusiveness. Different groups of people, including disadvantaged groups, can participate in innovation processes, and give crucial inputs to tackle societal and local challenges. This will help to leverage citizens' talents to improve Europe's future.

Thirdly, DSI has a relation with the digital agenda, with respect to promoting R&D on the role of ICT based platforms enabling open digital ecosystems.

Once complete, the evidence gathered will enable this project to recommend how best to combine research, strategy, and policy recommendations for DSI in relation to the Digital Agenda for Europe and under the Horizons 2020 Work Programme, and in particular, but not limited to, the Collective Awareness Call.

Research Objectives

In this paper we outline our interim study findings on Digital Social Innovation that present the insights from the first 6 months of our research, including:

Defining DSI. An emerging understanding of what social innovation enabled by digital technologies is, including the types of technologies underpinning DSI services that combine novel technology trends such as distributed networks, knowledge co-production platforms, open data, open hardware, open content, and open source software.

Crowd-Mapping DSI organisations and their activities: The types of organisations working on DSI in Europe, where they are based and how they are connected, including a prototype analysis of strong and weak links between organisations.

Next steps, policy for DSI: Finally we present the next steps for the research, with a particular focus on how we will go from an understanding of practice and networks of DSI organisations to developing policy recommendations for DSI.

The main objective of the study is to assess the economic and societal potential and the specific impact and added value of the innovation enabled by the Future Internet, and focuses in particular on Digital Social Innovation. This research is identifying examples of Digital Social Innovations that are exploiting the network effect of the Internet and merging novel technology trends such as open data, crowd-mapping, open hardware, open distributed networking, and open knowledge creation to bring people together to solve social challenges, large and small.

Over a period of 18 months, the high-level objectives of the study can be summarised as follows (see Figure 2):

- Analyse policy, research and innovation activities through codified insights and non-codified actual practices to create a favourable framework and research agenda to foster DSI in Europe
- Mobilise a big variety of constituencies and support a community of innovators. In particular grassroots communities of civic innovators, web entrepreneurs, hackers, geeks, SMEs, open source and DIY makers, but also policy makers and decision makers at various levels.
- Broad engagement with the general public and citizens, to reach out and analyse social needs and integrate feedback coming from end-users
- Conduct experiments and prototyping in a new and emerging field to inform new ways of shaping policy and practice.

Figure 2: DSI Objectives

Overview of the Research project

Timeline

The project runs from April 2013 to October 2014.

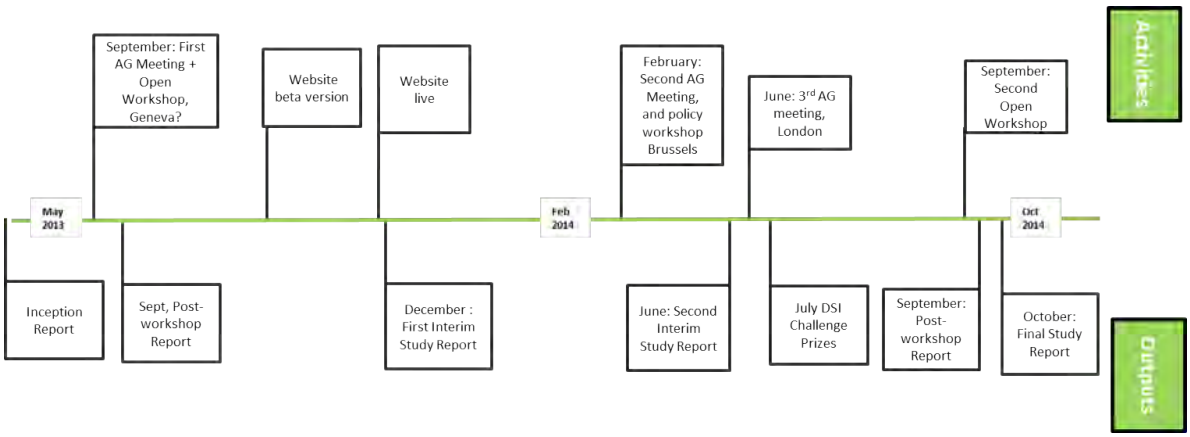


Figure 3: DSI Timeline

Delivering the research through 6 work packages

As outlined in the table below, the DSI research project is delivered through 6 work packages that are interlinked. We are now into month 6 of the research, which has been mainly focused on WP1 (identifying actors, building a typology and conducting 36 case studies) and WP2 (launching the crowd-mapping infrastructure and promoting the generative web-enabled survey). Key activities were also conducted as part of WP4, such as the launch of the project during the Open Knowledge Conference (OKCon) in Geneva 16th-18th September, presentations during the Smart City Fair in Barcelona on November 20th, and engagement work across social media and community channels to spread the survey and the crowd-mapping exercise.

Work package No	Work package title	Lead participant. short name	Start month
WP1	Identifying DSI organisations	Waag Society	M1
WP2	Mapping DSI organisations and activities	Nesta	M1
WP3	Assessing Strategies	ESADE	M6
WP4	Engaging Stakeholders	Nesta	M1
WP5	Experiment and Pioneer	Waag Society	M6
WP6	Policy Recommendations	ESADE/Nesta	M12

Table 1: List of Work Packages

A diagram of how the various work packages inter-relate is shown below:

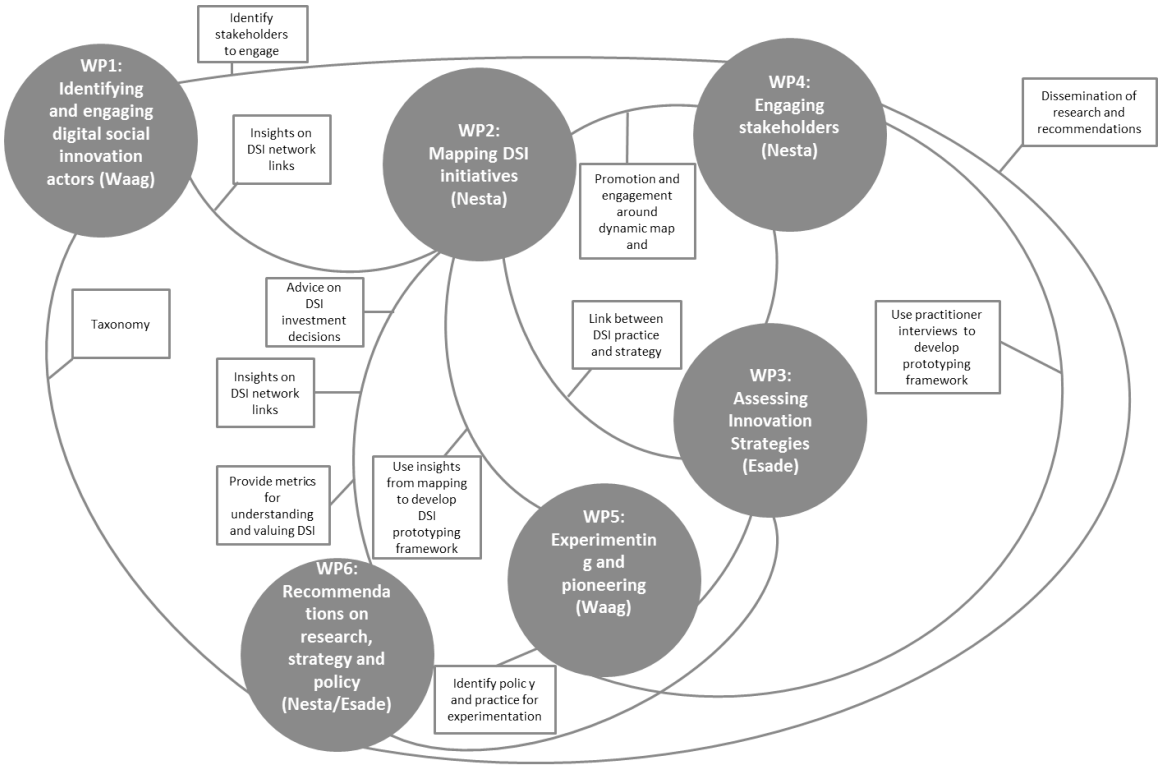


Figure 4: Work Package Diagram

This report forms the third deliverable, D3 in the table below:

Del. no.	Deliverable name	WP no.	Delivery date
D1	Inception Report	WP0	M1
D2	Dynamic Report on Mapping	WP2	M5-M17
D3	First Interim Study Report	WP3	M8
D4	Second Interim Study Report	WP1	M14
D5	Post-Workshop Report1	WP0	M5
D6	Post-Workshop Report2	WP0	M17
D7	Final Study Report	WP6	M18
D8	Online Public Consultation	WP2	M6-M17
D9	DSI Challenge Prizes design	WP5	M15
D10	DSI Innovation Camp	WP5	M16

Table 2: List of Deliverables

DSI Advisory Group (AG)

We have set up an external Advisory Group to challenge and support the research. The AG includes key practitioners, academics, policy makers and representatives from digital communities involved in widely-known DSI activities. This will ensure that first-hand and direct information on the impact the strategy is having, and ideas on what else might be needed, will be continuously fed into the monitoring and review process.

Currently, the AG consists of:

Rob van Kranenburg	Co-founder of Bricolabs/Founder of the Internet of Things Council/ Community Manager of SOCIOTAL
Charles Leadbeater	Nominet Trust
Roger Torrenti	CEO, Sigma Orionis
Mayo Fuster Morrell	Fellow of the Berkman Centre, Researcher, Institute of Govern and Public Policies (AUB)
Gohar Sargsyan	Adviser and founding member, OISPG; Consultant Logica
Daniel Kaplan	Founder and CEO, the Next-Generation Internet Foundation
Simona Levi	Founder, Forum for the Access to Culture and Knowledge
Markkula Markku	Committee of the Regions, Rapporteur Europe 2020
Philippee Aigrain	Founder and CEO Sopinspace, the Society for Public Information Spaces
Ezio Manzini	International Coordinator, DESIS, Design for Sustainability Network
Zoe Romano	Digital Strategy and Wearables, Arduino, Milan
Geert Lovink	Institute of Network Culture (INC)
Daniele Archibugi	National Research Council Italy
Flore Berlingen	OuiShare, Co-Founder
Juha Huuskonen	Open Knowledge Foundation Finland
Giovanna Galasso	PricewaterhouseCoopers
Maria Savona	SPRU University of Sussex
Peter Corbett	Advisory Board Code for America, US
Sasha Costanza-Choc	MIT Department of Comparative Media Studies, US
Felipe Fonseca	Founder of Meta Reciclagem, Brazil
Osama Manzar	Founder of Digital Empowerment Foundation

Chapter 1 – Project overview and theoretical framework

Background

This research aims to explore the potential of the network effect of the Internet (i.e. that the benefit of a network and its critical mass of users grows larger than its cost), emphasising the characteristics of Internet-enabled digital tools that can effectively empower citizens and civic innovators.

The challenge is to exploit the collaborative power of networks (networks of people, of knowledge, and connected things) to harness the collective intelligence of communities in order to tackle big social challenges. The theory is that at the same time that we have big global challenges, we are also able to address them via ICT, so that citizens can develop awareness, forming a distributed intelligence constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills to tackle societal problems.

Innovative solutions can tackle environmental issues, facilitate sustainable and collaborative consumption, enable better informed decision making, drive sustainability-aware lifestyles, create future skills and jobs, and new participative models for the economy, society and self-governance models.

A primary example of Digital Social Innovation is the Web itself. As it was based on open digital technologies that could be harnessed by any actor, the Web was able to reach a critical mass of connectivity and exploit the "network effect" described by the Metcalfe's Law, (i.e. that the value of the network is in proportion to the number of members squared). Thus to prove strong network effects the value of the network should increase for all members as the network grows. Many new technologies have positive network externalities, and they often follow Metcalfe's law, with the value of the network being in proportion to the number of members squared. The Internet and the Web are the technical underpinnings that represent a densely intertwined techno-social fabric of our societies, and that allow collective intelligence to flourish.

There is great potential to exploit digital network effects both in social innovation activity and in new services and approaches that generate social value. But much of this potential isn't yet being realised. Indeed, the "network effect" of the Internet may still be in its early technical phases and early implementation to maximise social good. The development of open data infrastructures, knowledge co-creation platforms, wireless sensor networks, and open hardware, can potentially serve collective action and awareness. However, today it still fails to deliver anticipated solutions to tackle large-scale problems. The early years of expansion of Internet-based services has generated a great economic wealth. However this growth has resulted in an imbalance between the dramatic scale and reach of commercial Internet models and the relative weakness of alternatives, mainly filling marginal niches and unable to gather a critical mass of users and exploit the network effect.

There are many cases of DSI being spread throughout society that we attempt to define and cluster in this report - such as the sharing economy as local exchange trading systems, time banks and digital currencies, collaborative services and awareness networks that incentivise the experimentations of new models in a variety of domains, such as systems of mobility that present alternatives to the use of individual cars (from car sharing and carpooling to bike sharing), and collaborative consumption (under a typology such as product service systems, redistribution markets and collaborative lifestyle platforms); new ways of making that are experimented in innovation hubs, such as Fablabs, Hackerspaces, Living Labs, UrbanLabs, the HUB; and collaborative events such as Barcamps, Hackmeetings, Open Knowledge Festivals and Makers Fairs.

In particular, the European Commission has been very active in facilitating the growth of Living Labs across Europe, linking them with the Internet of Things and Smart Cities activities. Most, if not all, of the above examples of civil society digital social innovation take place via the Internet or are highly enabled by the Internet. The intention of this research is to carry out an honest analysis of the field, integrating diverse and multidisciplinary approaches and practices, together with grounded theoretical frameworks that will help us to achieve a broader understanding of the DSI ecosystem and to address some of the obstacles that are hindering the scaling of DSI in Europe.

The overarching aim of this research is to address the main gap in the current research and implementation of digital innovation activities and connected policies. To do this the following areas are being investigated:

- The ways in which grassroots civic innovation might lead to systemic innovation – user-driven innovation can be seen as a way to better link disrupting and cumulative innovation to achieve systemic innovation. Continuous and systemic innovation takes more time and requires a holistic approach, including technology development, but also juridical, financial, and social frameworks. If we want to unlock wealth that resides in new sectors such as energy consumption, mobility, education, welfare and so on, we need to be able to solve "wicked" problems through innovation.
- How to accelerate innovations that better align the capacities of the Internet to social needs – The non-technological elements and the so-called soft innovation, such as social relationships, organisational forms, institutions, and social norms need to align with technological development.
- How to de-centralise power to citizens – Using technology to give power and control back to communities and users.
- How to transform individual and collective behaviours to shape a more sustainable society, by leveraging digital networks, which are capable of creating this level of situational awareness, in both, centralised and grassroots approaches. These platforms for collective awareness and action would be a key enabler to build resilience and trust in communities in the face of potential shocks, to connect industrialized big data with collective awareness, while taking into account privacy concerns. The objective would be to harness technology for making the fabric of society as a whole wiser, a genuine product of a more inclusive collective intelligence. Properly defining key terms such as collective intelligence has been one of the key theoretical focuses of this study.

What is the value of Digital Social Innovation in the context of Future Internet in Europe?

The attempt to define a successful DSI model for Europe is contextualised in the broader debate around European Innovation models and the Future of the Internet, since if Europe wants to implement a systemic Innovation model, to drive long-term sustainable innovation-led growth, it needs to bring citizens, users, and society on board linking industry competitiveness with excellence in science and research and societal challenges that need to be solved. ICT and the Internet are critical to help Europe sustain long-term economic growth and create new jobs.

A paradigm shift towards re-decentralisation and redistribution of power amongst the players in the innovation Ecosystem

While the original advent of the Internet and ubiquitous digital technologies led to a speculative bubble that ended in 2001, now the Internet seems to have more deep inroads into all parts of manufacturing and consumption. However, the Internet by itself seems to unable to drive innovation out of the crisis of 2008 and to fully help citizens to address major societal challenges.

We are undergoing a big transformation that will involve society and the economy, driven by the fast evolution of ICT. More than 5 billion additional people will connect to the Internet globally in the next 10 years. To fully exploit the potential provided by Internet services a high-speed Internet access is required for all the citizens. If we observe the evolution of the Internet, principles, such as network neutrality, equitable service, and peer-to-peer architecture were crucial to build a universal, open and distributed infrastructure (avoiding points of centralisation by design) that allowed the emergence of creativity, bottom-up innova-

tion and honest competition. Also the World Wide Web became successful because the Web was built on a set of royalty-free open standards decided through an inclusive and transparent process that, via standards bodies such as the IETF and W3C, continues to this day. Open standards have fostered the innovation by allowing the Web to be implemented by anyone over different underlying systems, avoiding proprietary systems and vendor lock-in.

The emerging cloud model, (proprietary social networks, big data providers, the Internet of Things implementation), are currently following a different model that allows us convenience but at the expense of security, privacy and openness: the protocols are proprietary, the systems are centralised (and in particular in terms of property and decisional processes), and interoperability is not a requirement. Portability issues risk preventing new and small companies from building innovative applications, as apps need access to social data held on third-party sites. The lack of standards forces developers to create multiple versions of the same social application for different closed platforms, and hampers bottom-up disruptive innovation to happen.

One challenge for Europe is how it might acquire a competitive advantage in digital innovation by developing open innovation ecosystems, rather than winner-take-all marketplaces whose dominant players set the terms of innovation and competition.

Analysing all the possible Future Internet scenarios (Oxford Internet Institute 2010), we see two opposing innovation models that could emerge (see Figure 5):

- Creation and consolidation of new monopolies: Platform Lock-ins and battle amongst proprietary vertically integrated digital ecosystems: A major risk for the Future Internet is the realisation of the "Big Brother" scenario, showing that big industrial players (mainly US based) will reinforce their dominant position by implementing platform lock-in strategies, enforcing extensions of copyright and patents, appropriating users data, and discriminating network traffic. By centralising computing, data storage and service provision (via the Cloud), and by striking strategic alliances between the largest Over-The-Top (OTT)and largest network operators, there is a risk that the innovation ecosystem will become more closed, favouring incumbents and, in general, dominant players, thereby in time constraining user-driven innovations, particularly ones that don't involve monetary payment. This currently seems the most probable scenario, since we are seeing a consolidation of existing powers and incumbents at every layer of the Internet ecosystem.
- Open ecosystems to foster grassroots digital social innovation and entrepreneurship: The alternative is to accelerate innovations that align the capacities of the Internet better to social needs, and that decentralise power to citizens and communities. Indeed, the "network effect" of the Internet may still be in its early phases as well. The development of open data infrastructures and citizens-controlled wireless sensor networks, and the long-awaited deployment of the semantic web, can potentially serve collective action and awareness. The Web is today increasingly more enmeshed with our daily lives, forming a universally distributed intelligence constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills and tools for "collective intelligence". Distributed and citizen-centric innovation plays a central role in the development of the Future Internet. Honest competition based on open standards, protocols and formats are essential to deploy interoperability between data, devices, services and networks. Avoiding anti-competitive dynamics and lock-in engages all actors in the value chain and allow for replicable, scalable and sustainable solutions.

The DSI research will explore the full potential of the second scenario – named as the Power to the People scenario (and illustrated below).

Digital social innovation plays a central role in the development of the Future Internet. One of the motivations underpinning this research is the need to investigate the key role that civil society organisations and grassroots communities play to enable bottom-up social innovation that leverage the power of the Internet. Here we distinguish between the initiation of innovation via often non-institutional actors that are not taken into account in traditional innovation analysis, and the socialisation of innovation via institutional organisations that support and enable them to scale, investigating how this process can lead Europe to embrace new innovation models and experimentation.

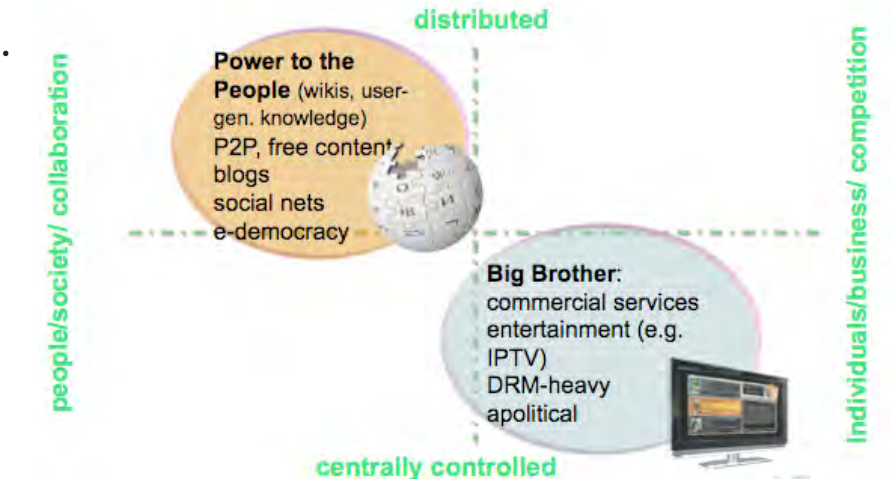


Figure 5: Adapted from "Towards a Future Internet", the Oxford Internet Study 2010 in Sestini, F. presentation Collective Awareness Platforms for sustainability and social innovation

A Theoretical framework of Collective Intelligence to Unleash the Innovation capabilities of European DSI organisations

The rapid evolution of digital technologies and networks has made the ability to orchestrate knowledge, and to manage creative interactions a central issue of economic policy. Harnessing collective intelligence will be a crucial determinant of success for businesses, for governments, and for all users in an age of 'combinatorial' innovation.

Collective intelligence may be defined as:

'A kind of ability to solve problems in distributed fashion so that the entire system is self-maintaining in the face of often unpredictable problems.'

The proposed hypothesis is that collective intelligence is an integrated distributed cognitive system that involves both other humans and technology.

It has been argued that understanding more about how collective intelligence happens, and devising and implementing effective tools for fostering it should be a major project for Europe in the next decade. At the same time that we have huge global challenges, we are also able to harness collective intelligence via ICT to solve global-scale problems. The tools of collective intelligence include new technologies for sharing data and knowledge, such as crowdsourcing platforms, and novel research metrics. They include analytical tools that allow vast amounts of complex data, often from different sources, to be mined and understood. Innovations, such as those which draw on the expertise of data scientists around the world to develop algorithms to solve large-scale problems, would have been impossible a decade ago.

The main question is whether digital social innovation can provide fundamentally new forms of power that are capable of tackling large-scale social, and even global crises, while empowering citizens and allowing democratic participation. In detail then, it is critical to develop a comprehensive theoretical framework that draws on a variety of disciplines, capable of comprehending the transformations of the digital world on individuals, and societies.

A superficial theorising of collective intelligence simply posits some kind of aggregate in contrast with the individual: the individual versus their larger world, the individual against the crowd, the individual against the totality of existence. However, it would be better to think of an individual not as a static pre-given phenomenon, but that at any given moment an individual is a moment of a process, a process called individuation. Thus, reproduction and self-maintenance of people's life does not necessarily have to be replication of the exact same system, but can be the creation of a new system that is based on the previous one. We can then affirm that the individual is going through a process of individuation that incorporates their wider technical and social milieu (trans-individuation). To maintain its process of individuation the individual increasingly incorporates technical components and other co-individuation processes from other individuals, then the individual is no longer a static, closed system, but an open and dynamic system capable of assimilating and decoupling from various technical components and other individuals as goes through long-circuits of trans-individuation (Simondon, 1989; Stiegler 2005). The wider implication of this process in the digital era includes other humans and digital data accessed via the Internet.

Digital Social Innovation can deploy collective intelligence by connecting multiple individuals and groups via technology, and so can innovatively produce new organisations and even new types of behaviours, and actions. In this way, the Internet offers unprecedented opportunities for collective intelligence via its increasing ubiquity and its massive amounts of data available for collective transformation into knowledge. Looking forward, collective intelligence is necessary for social innovation to tackle the problems facing a society in today's complex and interconnected world. Even grasping problems such as the financial crisis, democracy, and climate change require a new digitally-extended collective intelligence whose basis is both in collectively tackling problems via platforms based on crowd-sourcing and new phenomenologies based on data visualisation. This type of innovation was unimaginable before the rise of Internet-enabled platforms.

In this way, simply labeling images with the "ESP game" of Von Ahn is digital innovation, but it is not socially innovative as it does not aim to change society, but simply makes it easier for Google to index and search through images (von Ahn and Dabbish 2005). However, if we can imagine a new process of crowd-sourcing to tackle of crisis of climate change, a process where people collectively identified their own high-carbon intensive behavior via data-collection and visualisation, and then collectively brainstormed and then implemented the changes necessary to reduce their carbon emissions, this would be a process of digital social innovation that enables collective intelligence. Today new forms of social innovation – social innovation which is always technical and in this era must be Internet-enabled digital social innovation – are needed to create new arrangements between the social and the technical that create new forms of value that are not limited to economic value, but that result in large-scale social impact, whilst not destroying people's capacities or being destructive to the planet as a whole. Yet what forms of digital social innovation are emerging, what their characteristics and needs are, how they can scale, and what the role of Europe is in this context, are the over-arching questions that this research is trying to answer.

Chapter 2 – Research Methods and Settings

Framing the Research Questions

Our research starting point proposes that democratized ICT and open digital infrastructures, data, knowledge and hardware not only provide tools for people to collaborate in virtual space but also facilitate the formation and diffusion of novel collaborative solutions offline in the "real world". In this process, social networks of the engaged communities are reinforced. This research will investigate in what conditions the network effect of Internet collective platforms strengthen the social networks of offline communities and amplify their collective intelligence. It will also address how to develop bottom-up research frameworks and systems of collective intelligence that help citizens to share knowledge, transform social practices and shape future alternatives.

There are key research questions that need to be explored during the course of the research project:

At a technological level, this research wants to better understand what technology trends and what innovative combination of the trends identified contribute to the diffusion, adoption, and scaling of DSI activities.

At a regulatory level this study will assess the legal and regulatory elements (standards, portability, interoperability, privacy, neutrality) required to enable individuals to effectively trust the digital infrastructures they use and to control the flow, access, and use of their data and contents. This research will look into the type of regulations that can strengthen enabling frameworks for free and unrestricted access and reuse of knowledge, contents, software, and data, such as enhancing public domain and making digital contents and information more accessible and re-usable by all citizens.

At a socio-economic level the study will assess new business models and socio-economic mechanisms 'beyond GDP', based on the valorisation of social data and common information resources for collective use and public benefit beyond monetisation (e.g. towards building knowledge commons for Europe through DSI).

At governance and policy level: This research will explore the strategies, research actions, and policies that can be developed to amplify the diffusion and impact of DSI activities across Europe and beyond and to ensure that policy fostering DSI is based on scientific evidence of what works and what doesn't and that effective actions are replicated and scaled up. However, at present there is relatively little rigorous evidence on the true impact these activities and actions. This research will assess the general effectiveness and trustworthiness of the infrastructure, institutions, regulatory frameworks, policy measures and actions that are the outcome of the above interconnected three aspects and that will lead to the creation of the right enabling environment for DSI to flourish.

Research Methodology

To examine the emergence of digital social innovation (DSI) in Europe, we have used a multi-disciplinary research approach to theoretically ground this emerging area, and a mixed method approach including field-based case studies of DSI organisations and projects, together with quantitative analysis underpinned by open data gathered though a generative European-wide survey. This mixed methodology was selected because of the exploratory nature of the study. The nascent field of DSI seems to be very promising for initiating and nourishing a new type of innovation, with unexplored characteristics and new types of protagonists. Case studies are observations of real life events, whose goal is to understand current and complex social phenomena in real life settings, gathering tick data and asking the "how" and "why" questions (Yin 1994). This report presents emerging findings from the case study research and the quantitative survey and crowd-mapping exercise.

In terms of the case studies, the composition of the sample was informed by the theoretical sampling procedure, following a grounded theory approach (Glaser and Strauss, 1967; Strauss and Corbin 1998), moving back and forth from the relevant literature, archived materials, practitioners' insights, empirical observations, and emergent findings. Multiple sources of evidence were employed, as well as applying triangulation to compare and corroborate evidence.

To date, the research has identified more than 250 examples of DSI. We have taken a more in-depth look at 35 (see appendix 1) of what we think are the most representative and inspiring DSI organisations, projects, services and events, from our long-list of more than 100 examples. The selection includes organisations, networks, events and projects, which are generally acknowledged to have pioneered the development of DSI, contributing to the shape what has now become an important field of practice. It covers the different themes around technological trends and innovations for social good that we uncovered through the analysis of the long-list.

Based on insights from practice and theory we define DSI as:

'a type of social and collaborative innovation in which innovators, users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale that was unimaginable before the rise of the Internet.'

What is important to note about the above definition is that the focus of this study is strictly on those digital social innovations that enable new types of collaborations and exploit the network effect. By using this definition, we exclude social innovations enabled by digital technologies where there is no collaborative element.

Using this definition we have been able to develop 5 criteria that organisations and the DSI activities they are involved in have to meet to be considered for this study:

- Has a social impact. The cases should pioneer new mechanisms for social innovation whose expected return goes beyond GDP measures and traditional success indicators.
- Adopts new technology trends in a novel way. The selected cases should adopt/use or experiment with innovative combinations of the selected technology trends (open data, open source and open hardware developments), leveraging social networks (or distributed social networking, sensor networks and the Internet of Things, and knowledge co-creation networks).
- Aims at empowering citizens, for individual and collective awareness, relying on collaboration and or aggregation between users and/or their data.
- Demonstrates of a clear network effect – i.e. it becomes more powerful when more people use it.
- Driven by grassroots or "bottom-up" communities of users.
- Organisations and activities selected were then scored in this long-list against the technology trends and the social domains they were affecting, such as health, economy, energy governance, education, and public services. In this way we made sure that we selected a good variety of services that use multiple innovative combinations of technology trends affecting different domains and according to the novelty of the technological combinations and the social impact that they have been able to reach (see appendix 2). This was used to short list 35 case studies that represent best practice in this field.

This first case study selection is intended to raise questions for further research on the topic of DSI and the appropriate strategies and policies to foster the DSI field in Europe.

The selected case studies have been classified into four types:

- a different typology of organisations (e.g. Government and public sector organisations, businesses, academia and research organisations, social enterprises, charities and foundations; and grassroots communities);
- the way these actors are supporting DSI (e.g. such as undertaking research, delivering a service etc.);
- the main technological trends the organisations and their activities fit under (open data, open networks, open knowledge, open hardware); and
- the area of society the organisations and their activities operate and seek an impact in (Health, well-being and inclusion, Sustainable socio-economic models, Energy and environment, Participatory open government, Smart public services, Pioneering science, culture & education).

Cases were then clustered into the following macro DSI areas that capture key dimensions of the phenomenon under investigation:

- New ways of making
- Participatory mechanisms and open democracy
- Awareness networks: nudging and incentivising behaviours and lifestyles
- Open access and information Commons

The DSI organisations from the selected cases were interviewed and, adopting a "snowballing approach" (Miles & Huberman, 1984, p. 28), were asked to suggest other organisations or key people in the field that could help us deepen our understanding of the DSI field and its emergence. Secondary sources were used to understand the position and significance of the organisations whilst other key players, such as DSI experts, practitioners or key policy makers were also identified, and interviewed. We conducted in-depth, semi-structured interviews following a common protocol, which was adapted to the specific position and background of the interviewees. A number of informal interactions were conducted with the entrepreneurs/practice leads, their employees, and relevant DSI communities. The appendix shows the case studies and their classification criteria, as well as a Matrix that crosses technology trends and societal domains (See Appendix 2).

Crowd-mapping DSI Organisations and Networks

The dynamic crowd-mapping tool shows where the organisations are based, where DSI activities are strong or weak, what type of projects and activities organisations are working on in different parts of Europe, and, last but not least, where the strong and weak networks between organisations working on DSI are located. All data captured about organisations and organisational relationships is made available as an open data set on the website for users to download and investigate, just as any custom code developed in the course of developing the Website, Database and Dynamic Visualisations will be shared back with the relevant open source communities.

Open data about the mapping of organisations include:

- Geographic map featuring filters that can be manipulated to reveal information trends or patterns
- Dynamic network/relationship map of key organisations that can be manipulated to reveal patterns in relationships
- A series of interactive, embeddable data visualisations to demonstrate key features of DSI in Europe

Data collection

To enable the mapping of organisations and their activities we considered three different methods with which we could capture the relevant organisational data.

- Generative Survey
- Inclusion of already existing datasets
- Scraping

In the context of this study, network analysis was applied to better understand networks of DSI innovators. The methodology was based on key network drivers identified in the innovation studies, economics, and sociology literatures, and will be validated in the selected cases through interviews and the online survey, with DSI networks spanning a range of innovation-related activities that are part of the DSI map.

Through an early assessment of the three options it became clear that capturing data through a survey would be the preferred option, as the other two options would not result in good data. Existing datasets such as the Social Innovation Exchange (SIX) membership database, had issues with typologies, structure and coverage and were, therefore, not incorporated into the map. Similar challenges arose around the possibility of scraping data, in addition to a number of technical, validation and provenance issues surrounding scraped data. Since this field of practice is relatively unexplored, there is a lack of relevant existing data to help in the mapping process. The dynamic mapping tool will, however, have the functionality to integrate existing or scraped data should this become relevant for future iterations of the mapping.

Mapping networks through a Generative Survey (ENDNODE)

The data captured and its structure determines the mapping capabilities of the website. Therefore the survey has been designed so that it captures the relevant data needed to understand the different types of DSI organisations and their activities. It also includes a generative function, which is needed in order to capture relational (network) data.

The survey has been broken down in to three sections:

- Capturing organisational data
- Capturing data about projects and activities
- Capturing data about networks and relations between organisations.

First phase: The first section 'Put Yourself on the Map' asks organisations a short series of questions to self-identify as a DSI organisation, and provide information on geographical location, size and type of organisation (e.g. government and public sector, business, academia and research, social enterprise, charity or foundation, or grassroots organisation or community network). The data on organisational attributes will generate a dot on the geographical map.

Second phase: With the basic organisational information identified, respondents were automatically invited to the second section of the survey called 'Build Your Graph'. In this part of the survey, attributes about DSI activities that organisations are involved in will be collected, together with technology trends and methods they are using and the societal domains they are impacting. Networks between organisations and relational data will be determined through mapping the DSI activities that the different organisations collaborate on.

Third phase: This will consist in the bottom-up creation of a DSI social community that can actively participate and shape the DSI field. Over time, and after the end of this project, the mapping could evolve by adding social features and the generative survey has the potential to evolve into a dynamic DSI community mapping infrastructure and social networking tool. These can evolve organically together with the growth of the DSI innovators community.

Network relationships have not been comprehensively mapped in Digital Social Innovation across different domains in Europe before. Network maps may exist for individual initiatives but whether cross-domain organisational collaboration maps exist is unclear. The ENDNODE approach developed by Future Everything seeks to expose network relationships through the creation of an automated referral process that follows connections between organisations. The initial assumptions for the ENDNODE method is that organisational relationships are based on delivery and collaboration and these DSI organisations rarely exist in a vacuum. 'Super-node organisations' (those that appear to have a significant impact in the DSI space) have been initially identified. These were then asked to enter data regarding their organisation and to enter information regarding partners who have worked with them on projects. As soon as this is entered, ENDNODE automatically contacted these organisations and the whole process and went through a validation process that confirmed relational linkages.

Based on our understanding of the DSI community as the primary users of the system, we have designed the current version of the mapping to feel like it has been built 'by the community for the community'. We have built in the capacity for it to grow as a resource and increase its value over time. It is our vision that the map is central to all DSI activity in Europe, as a meeting place for like-minded people to come together to share ideas and experiences.

In the current system, the two stages of validation are: (1) organisations self-validate at the point of registration by confirming that they meet our criteria for DSI and; (2) organisations are validated by their connection to other organisations i.e. their collaborative activity. A digest email encourages users to complete any missing data in respect of this. Therefore, any organisation can exist on the map but to 'be DSI' they need to evidence their collaborative behaviour with other organisations. This open approach allows for the outliers to be present, as well as the central connectors. It stops cartels forming and allows for 'grassroots innovators' to be represented. In short, it helps the research project to map the unknown dimensions of DSI. Only in extreme cases– where the outlier organisation is deemed to be inappropriate to be represented on the map – is it deleted manually by the system administrator.

Overall, the website survey provides the foundation for the empirical results that are to be used in the rest of the project work packages. Care has therefore been taken to make the website as easy to use as possible with the aim for it to go viral across the European Digital Social Innovation community. Currently, there are over two hundred organisations that have registered with the website. However, to date, the survey is only available in English, which limits its potential reach. Thus, the next stage for the website will be to consider how to produce a multi-lingual version.

Data visualisation

To understand the DSI landscape in Europe, the mapping and visualisation takes three main forms:

- Location of DSI organisations, represented on a map
- Network relationships, represented on a map
- Info-graphics, that can be customised and downloaded, such as:
  - Filtering by type of tech trend
  - Filtering by type of domain
  - Filtering by network and/or geographical location

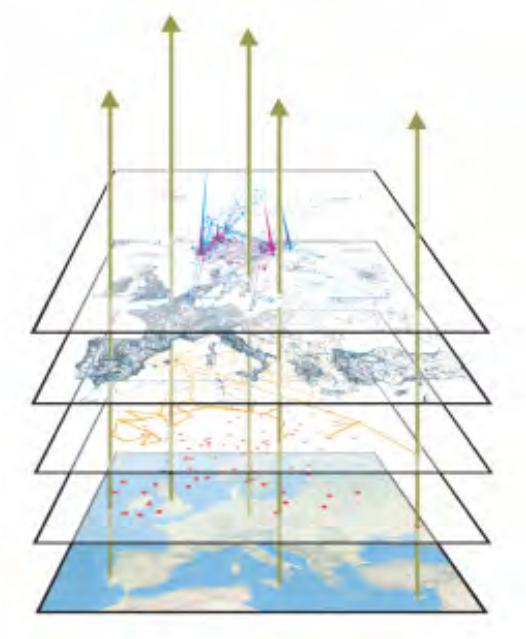


Figure 6

There will be a fourth category of visualisations made by people who download and work on the open survey data set. The mapping and visualisations are designed around the data that is acquired through the processes listed above. The proposed approach to mapping and visualisation exploits the flexibility of linked data. All data points will have their own URIs that will allow mapping to Open Street Map objects. Effectively, different types of data can be layered on top of these URIs to create a more robust and extensible database. The diagram above reflects this approach with an Open Street Map base layer with actor location data, network relationships, communication density and user generated data applied. Currently the website is focused on the geographic mapping of organisations. Over the next stage of the DSI report, various info-graphics that highlight important aspects of the data will be added.

Chapter 3 - Defining DSI – Interim Findings

An emerging typology of the DSI field: Clustering organisations and activities

Digital Social Innovation is a relatively new field of study, with little existing knowledge on who the digital social innovators are; what types of activities they are involved in and how they are using digital tools to achieve a social impact. Therefore, the first task for this study has been to take a "deep dive" into practice and look in more detail at the different types of organisations involved with DSI, and the activities these organisations are involved in.

This has enabled us to develop an emerging understanding of the characteristics of the organisations, what type of technology they are using in their work and what type of activities they are involved in (from research projects to delivering services or running incubators for early stage DSI start-ups). The overarching purpose of this chapter is to give an overview of the lessons on we have derived from the case studies and how we have used them to map the DSI field.

Looking across the organisations involved in supporting DSI, there are some key DSI characteristics that distinguish them from traditional innovative organisations, thus generating organisational innovation and transforming businesses: (i) Lowering entry barriers to innovation; (ii) Enabling collaborative working; (iii) Making community knowledge greater than individual knowledge; (iv) Solving trust and coordination barriers to collective action and (v) speed of feedback to generate effective solutions to complex problems.

To expand on the above characteristics:

- Firstly, when digital, networked platforms are applied to address social needs, it can increase the accessibility and replicability of the given solution or service by making it available to people across a wide range of social and economic backgrounds.
- Secondly, it can enhance communication between stakeholders and communities, thereby strengthening the social fabric and making a solution/service more resilient.
- Finally, advanced ICT, collective knowledge and innovative business models in open networked platforms can reduce the technological, bureaucratic, and economic burden of creating and supplying a solution. It is also possible to recognize some of the uncertainties with these new innovation models, such as the difficulties in detecting the most effective combinations of online and offline organisations and collaboration; the need to find the right degree of openness of groups and networks; and the need to balance creativity with sustainability.

The emerging field of digital social innovation is rich and varied – from new models of learning, access to knowledge and education, to new ways of improving the quality of the environment, to mass scale behavioural and political changes that empower communities and transition to a low carbon economy. The selected examples below illustrate some of the most interesting digital social innovations that impact diverse societal domains.

Some digital social innovations are incremental (they build on already existing solutions) and others are radical (they experiment with new models for thinking and doing). Innovations can be disruptive and generative – that is, they can disrupt patterns of production, consumption and distribution and generate further ideas and innovations (like the move to a low carbon economy or the creation of a more participatory democracy). Indeed, what is disruptive in these projects is the recombination of new digital tools, a practice of sharing and collaboration at a scale that was unimaginable before the rise of the Internet, and their ability to affect a diversity of domains across society.

We provide some examples emerging from our research on how DSI is starting to affect and change a variety of domains ranging from health and well-being, to democracy, sustainability and environment, and public service delivery.

Figure 7

The above map of DSI organisations, which is just starting to emerge from our preliminary stages of research, uses the beta data to show how the generative element of the survey has begun to create initial links across the organisations to reveal networks both within Europe and beyond – as signified by the lines that join the organisations. Through the beta phase 285 organisations have identified and highlighted 178 activities.

One big question we attempted to address in this research remains where in society these DSI activities are seeking a social impact and how they are doing this. As already explained, the DSI field does not have fixed boundaries; it cuts across all sectors (the public sector, private sector, third sector and movements) and cuts across domains as diverse as (1) health, well-being and inclusion; (2) innovative socio economic models (3) energy and environment; (3) participation and open governance, (4) science, culture and education; (5) public services.

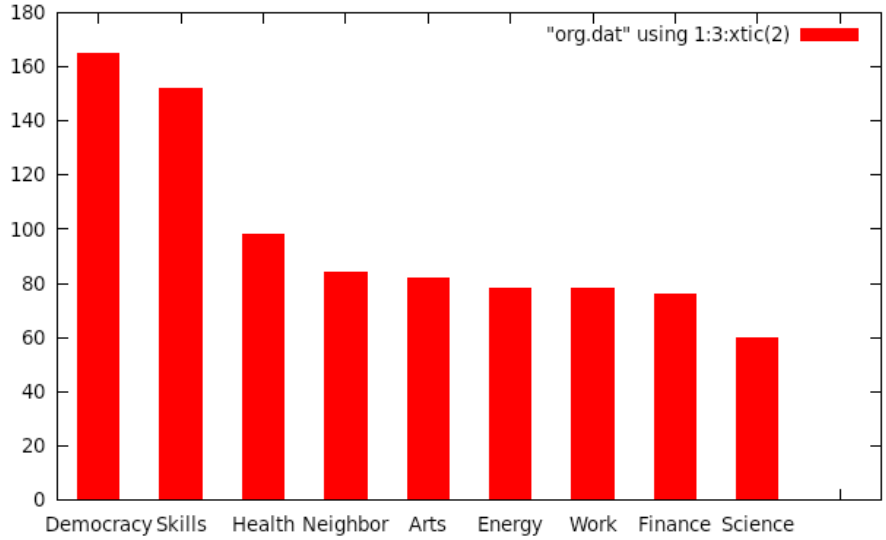


Figure 8: Domains of Activity

It is possible filter the DSI map by 'Domain of activity', which refers to the type of social impact the organisations are looking to make through their work. The category 'democracy and participation' showed the widest usage, whilst a very large number of self-identified categories were referred to. These are not fully listed in the table below, as 136 self-identified categories were used by organisations to define their work. Only the most popular are shown below to illustrate this.

Domain	Number of activities
Participation and democracy	165
Education and skills	152
Health and well-being	98
Neighbourhood regeneration	84
Culture and arts	82
Energy and environment	78
Work and employment	78
Finance and economy	76
Science& Technology	60

Table 3: Domains of Activity

The case studies identified to date can roughly be grouped within six broad domains. From the DSI research to date, a provisional thematic clustering of DSI organisations is emerging, grouping activities into 5 macro clusters that capture the way DSI activities affect and impact a variety of societal domain:

1. Sharing Economy

Access to open digital infrastructures and technology that enables collective action, mobilisation and self-organisation at a large scale, has led to the emergence of new collaborative socio-economic models that present novel characteristics, and enable people to share skills, knowledge, food, clothes, housing and so on. DSI is thus central to conducting experiments that innovate socio-economic models towards more sustainable and inclusive solutions. Communities and organisations of different types are today in desperate need of a fundamental transformation of social, economic, and cultural arrangements.

This phenomenon has been documented by organisations like the P2P Foundation that are undertaking research and organisations that are experimenting around the practice of sharing. Across the world the burgeoning field of collaborative consumption is using digital platforms to change how people share resources and exchange goods and services, which range from household equipment to hotel rooms, cars to catering. An example, which grew out of the desire to reduce consumerism and connect neighbours, is Peerby, which started in the Netherlands. Peerby enables you to borrow the things you need from people in your neighbourhood. It is now setting up branches in UK and USA.

In parallel thousands of alternative currency are in use – some focused on localities (e.g. the Brixton Pound in the UK or Chiemgauer in Germany); some on business to business transactions (e.g. in Nantes or Venezuela), some on particular sectors such as care (e.g. Fureai Kippu in Japan), and some as generic digital currencies (e.g. Bitcoin and Freecoin). In East Africa the development of M-PESA (a mobile financial payment system born out of social innovation) has become an avenue for nine million people to gain access to secured financial exchange services. This African success story has completely revolutionized the regional business terrain, at the same time empowering local people by providing an easy-to-use and readily available banking service that hitherto was impossible to access because of poor banking infrastructure and a strict regulatory framework. Other interesting initiatives such as Goteo are building services around the idea of the Commons, to enable communities to access and share resources to collaborate on social projects. Some of these have deliberately encouraged a changed awareness of how economies work – for example, valorising labour time equally, or linking currencies to data.

2. New ways of making

A vibrant ecosystem of makers is developing across Europe and globally. Low-cost home 3D manufacturing tools (3D printers, CNC machines), free CAD/CAM software like Blender, 123D or Sketchup and open source designs are now giving innovators better access to the enabling infrastructures, products, skills and capabilities they need to enhance collaborative making. "Reuse, Remix, Recycle" are becoming the keywords of the Open Hardware and Makers movement, which implies a combination of different design and technology methods, such as fast prototyping, open design, lean development, and DIY. The Open Hardware is the backbone of the sharing economy, since it shifts the attention away from consumption and resource exploitation, to the creation of new capacities to build the products that you consume according to a set of shared ethics and principles. The open hardware movement in particular is about how you share knowledge, skills and tools, and how you build communities around your open products. People working on Open Source Hardware are creating new organisations such as the Open Source Hardware Association, to open new research avenues and coordinate projects, open source cars such as Wikispeed, building farming tools, new fabrication machines like the RepRap and open objects. These products are open source and free; and you can use, copy and improve as much as you want with a worldwide community of peers helping you and sharing their own discoveries. A project like openp2pdesign is opening up design processes and tools to enable collaborative communities to undertake large scale projects that can lead to innovative results in open business, open government or open data. Projects like Open Source Ecology are promoting a bigger shift towards a more sustainable lifestyle and society. The Makers movement is thus showing how live experiments of collaboration and open culture can be applied to design, prototyping and production. Interesting trends are emerging at the intersection between open hardware, DIY culture, open source software and open data. Projects like Safecast or open source Geiger, the Smart Citizen Kit, and open wearables are showing interesting potential in combining innovative technology trends to generate unexpected outcomes. Technological driven developments such as sensor networks and open data connected with a sustainable user-centric design can support organisations and individuals in addressing challenges of the future.

3. Participatory mechanisms, feedback, and open democracy

Participatory democracy strives to create opportunities for all members of a population to make meaningful contributions to political decision-making, and seeks to broaden the range of people who have access to such opportunities. Since so much information must be gathered for the overall decision-making process to succeed, technology may provide important triggers leading to the type of empowerment needed for participatory models, especially those technological tools that enable community narratives and the accretion of knowledge.

Organisation and projects pioneering open democracy, large scale feedback, and citizen participation through crowdsourcing legislation such as Open Ministry or Liquid Feedback are transforming the traditional models of representative democracy. Openspending encourages transparency and accountability, participatory web platforms such as Wikigender and Wikiprogress developed by the OECD facilitate the linking of National statistics to actual individual living conditions; organisations like mySociety and the Open Knowledge Foundation in the UK and the Sunlight Foundation in the US are developing services like FixMyStreet allowing citizen to report city problems and CKAN, the biggest repository of open data in Europe that is underpinning a new bottom-up ecosystem for digital public services.

Digital technology can thus enable collective participation at a scale that was impossible before and is attracting a variety of citizens that are finding new ways to be engaged in decision-making processes. Some experiments such as Code for America, and Commons4EU are drawing on the capabilities within communities (e.g. civic innovators and hackers) to design and deliver public services that meet our societies' changing needs.

4. Awareness networks: nudging and incentivise behaviours and lifestyles

Some of the best examples of DSI in Europe are clearly impacting society in a deep way. For instance cities like Vienna and Santander are transforming governments, businesses and society by pioneering new practices in open data and open sensor networks that are changing the provision and delivery of public services; personal networks like Tyze are generating new care communities that are being integrating with traditional social care provision; and sharing economy platforms like Peerby are creating new forms of relationships and services. Inspired by the open-source movement, individuals, self-organising groups, and communities are beginning to aggregate the layers of data that increasingly permeate the urban environment in order to create a new generation of products and services, fostering behavioural change. For instance, platforms for collaboration have been used to solve environmental issues and incentivise sustainable behavioural changes, in the case of Safecast and BeAware, or to mobilise collective action and respond to community emergencies, as in the case of Crisiscommons and Ushahidi.

These platforms can gather and integrate information, in order to allow participatory urban planning and integrating peer information to improve social cohesion and collective well-being (e.g. Action for Happiness or challenge.gov). These platforms also use effective visualisation tools to better understand environmental, social, and economic indicators and to bring them to public attention and create large-scale awareness.

5. Open access and Digital Commons

Many activities in this area exploit the power of Open Data, Open APIs, and Citizens Science such as Open Data Challenge and Open Cities that provide citizens better public services, wile CitySDK is defining interoperable interfaces for city-scale applications. Other projects are exploring the potential of federated social networking, such as D-CENT and Diaspora, and the promotion and diffusion of knowledge systems in the Public Domain, such as Communia. These activities are favouring a shift towards open access, transparency and ultimately open Government, thus having an impact on the underlying norms and institutions that drive our society. Projects such as Confine, Commotion, and Tor are using bottom-up privacy-preserving decentralised infrastructure for the open Internet constituted by open standards, open data, free and open software, and open hardware. Finally, Github – the collaborative service for open software developers – is revolutionising the way code is built, shared and maintained by a variety of projects around the globe. Important development to re-decentralise the Net, leveraging P2P open technologies, are happening at many levels. For instance, distributed social networking projects such as Diaspora, Status.net or easy-to run servers like arkOS, which makes it easy to run your own secure cloud, and decentralised media publishing platforms such as mediagoblin are gaining new momentum. This Open Ecosystem approach has the potential to empower citizens and increase participation, while preserving the openness and accessibility of the Internet infrastructure.

Furthermore, there's no denying that the ability to access knowledge and bottom-up infrastructures has changed the state of education. It brings primary sources into every classroom and allows for more open and rapid communication between teachers and students. For instance, The Open University, based in the United Kingdom, and other models of distance learning have made education much more widely available. The same goes for the way scientific research is being done, with its culture being influenced through the ability to globally access and share knowledge, culture, information, and code and to undertake better collaboration within the research community. A good example of where developments in DSI could lead us is the project Primo, which is born out of collaboration between Arduino and designers in the Master of Advanced Studies in Interaction design at SUSPI in Lugano. It is composed by an Arduino board, a car, and a set of instruction-blocks all made out of wood. Primo aims to teach the high level abstraction of programming as a sequence of instructions to young children in schools, creating an appealing game.

These kinds of projects are able to combine open hardware technologies with new learning methods to experiment with new educational practices, enhanced by the way technology is appropriated and integrated within the learning environment.

<table>
<tr><th></th><th>Health, wellbeing and inclusion</th><th>Sustainable socio-economic models</th><th>Energy and environment</th><th>Participative open government</th><th>Pioneering science, culture & education</th><th>Smart public services</th></tr>
<tr><td>Open Networks</td><td>Confine</td><td>Open-garden.net</td><td rowspan="2">Everyaware</td><td rowspan="2">Commons 4EU</td><td rowspan="2">Tor project</td><td>Make Sense</td></tr>
<tr><td></td><td>Freecoin</td><td>Smart Santander</td></tr>
<tr><td rowspan="2">Open Data</td><td rowspan="2">Wiki-progress</td><td rowspan="2">Open Corporates</td><td>Ushahidi</td><td rowspan="2">OHM Festival</td><td>Cell slider</td><td>Vienna Open</td></tr>
<tr><td>Crisis-commons</td><td>CKAN</td><td>CitySDK</td></tr>
<tr><td rowspan="5">Open Knowledge</td><td rowspan="3">Patients-LikeMe</td><td>Goteo</td><td rowspan="4">Desis Network</td><td>Avaaz</td><td rowspan="3">Communia</td><td rowspan="2">P2P Foundation</td></tr>
<tr><td>GitHub</td><td>Liquid Feedback</td></tr>
<tr><td rowspan="3">Peerby</td><td rowspan="3">Open Ministry</td></tr>
<tr><td rowspan="3">Zooniverse (Cellslider)</td><td rowspan="3">Landshare</td><td rowspan="3">mySociety</td></tr>
<tr><td>Ouishare</td><td>Your Priorities</td><td rowspan="2">Open Knowledge Foundation</td></tr>
<tr><td>Provenance</td><td>Meiraha</td></tr>
<tr><td rowspan="2">Open Hardware</td><td rowspan="2">Safecast</td><td>Raspberry Pi</td><td rowspan="2">Fablab Amsterdam</td><td rowspan="2">IoT Council</td><td>Arduino</td><td rowspan="2">Smart Citizen Kit</td></tr>
<tr><td>Fairphone</td><td>Makerfaire</td></tr>
</table>

New ways of making
Participatory mechanisms
Sharing economy
Awareness networks
Open Access

Table 4

Who are the organisations involved in supporting or delivering DSI?

DSI is supported and delivered by organisations and communities from across society, from public sector bodies and universities to business and third sector organisations. Below we give a short description of the different types of organisations and the roles we see them playing in relation to DSI based on what we have learned from our case studies.

Type of organisation	How are they supporting DSI	Case study examples
Government and public sector organisations	Providing funding for experiments / R&D Providing non-financial resources (i.e. opening up public data sets) Delivering or partnering with DSI services	Open Vienna Meiraha CitySDK
SMEs and large businesses	Delivering services Providing funding for experiments / R&D (particular the case for large Telco organisations)	Patients like me Github
Academia and research institutions	Analysing trends and movements Providing new (fundamental) technologies and methodologies	DECIS network Arduino
Social enterprises, charities and foundations	Stimulate multi-disciplinary research and innovation Connecting top-down and bottom-up movements Amplifying weak signals Supporting grassroots movements	Avaaz Ushahidi CKAN
Grassroots movements	Engaging, facilitating and expanding communities Democratizing access to emerging technologies	Smart Citizen Kit TOR Chaos Computer Club

Table 5

The spread of organisation types across organisations on the map are represented in Table 6 and visualised in the Bar chart below (see Figure 9).

Organisation Type	Number of organisations
Charity, Social Enterprise or Foundation	68
Business	52
Grassroots Organisation or Community Group	41
Academia and Research	37
Government and Public Sector	15

Table 6

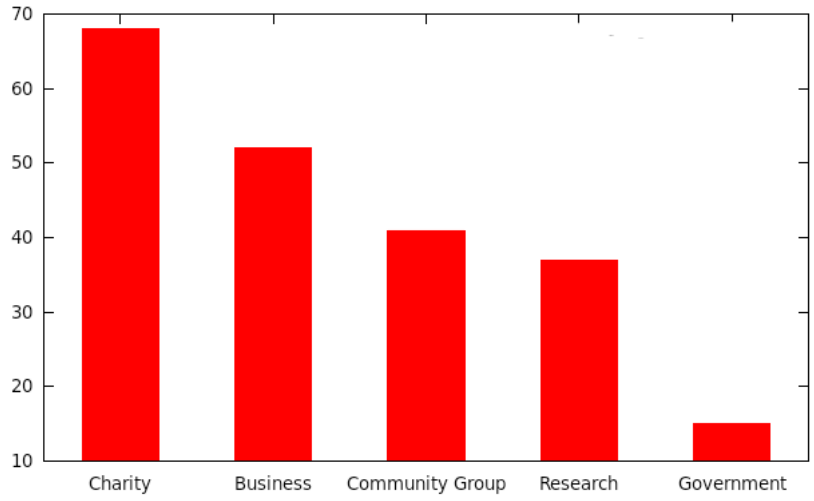


Figure 9

Government and public sector organisations

Our case studies illustrate how public sector organisations play a significant role in enabling DSI activity. The majority of this activity is linked to the policies and strategies that act as the foundation or barrier for much DSI, which we will look at in more detail in WP3. However, looking at our case studies public sector organisations can be seen as having three general roles in relation to directly supporting DSI:

- Firstly, digital social innovations play a significant role in how government and public organisations do their business, through running or funding the delivery of a service. The 400 local governments who work with My Society's FixMyStreet on engaging citizens in identifying local problems is one example of this.
- The work by Your Priorities in Iceland and Open Ministry in Finland on bringing DSI to the core of government by crowdsourcing legislation is another.
- Data and access to data is the fuel that drives much digital social innovation. Through opening up and sharing public data sets national and local government have enabled citizens and organisations to create public good services that were not previously in place. The work by the local government in Vienna on Open Government Data Vienna led to citizens developing a raft of innovations, such as the Fruitfly, a map of public fruit trees with free fruit across the city. The partnership between the not-for-profit Praxis and the Estonian Government on opening up and visualising government budget data, created more transparency around public spending.

SMEs

From small start-ups to larger companies, innovative companies play a big role in pioneering new practices delivering DSI services that enable users and developers to come together and collaborate in new ways. Examples of for-profit DSI business include US-based Patients Like Me, which delivers a peer support service driven by a community of users and the health data they create, and the organisation behind Github, the collaborative service for open software writers.

Academia and research institutions

Universities and other research-driven organisations such as think thanks, unsurprisingly play a big role in researching and developing DSI as a fast emerging field (this very study being a good example of this), and advising governments and the European Commission. The work by the EU DG Research funded social innovation research projects TEPSIE on the role of ICT in social innovation, the Institute of Networked Culture, and the Desis network are all examples of partnerships of research organisations. In addition to supporting research, it's interesting to note how a many of the case studies we are looking at in this project, were originally developed in a university setting. Arduino, the open hardware circuit board was, for example, originally developed by students at the Interaction Design Institute Ivrea (IDII) in Italy.

Social enterprises, charities and foundations

Some of the most well-known DSI services have been developed and delivered by not-for-profits, such as Avaaz's e-petitioning and campaigning network and Ushahidi's pioneering work on crowd-mapping. Open Knowledge foundations work on developing CKAN, one of the most widely used open-source data portal platforms is an example of a not-for-profit providing a service that enables more DSI to happen by making it easier for large institutions to open up their data. Adding to this, foundations such as the P2P foundation play a strong role in advocating for and developing standards and policies on DSI. Building on this many of the largest events focusing on DSI are organised by charities, such as Open Hack Make or the Open Knowledge Fest by Open Knowledge Foundation, PICNIC Festival by Waag Society, Ouishare by the Oui Share Foundation and a variety of digital social innovation events run by Nesta.

Finally larger foundations and charities often play an active role in hosting and running makerspaces and incubators focusing on supporting DSI. The work by Nesta in the UK on the tech for good incubator Bethnal Green Ventures and Waag Society in Amsterdam work on setting up and hosting one of Europe's first Fablabs are two examples of this.

Grassroots communities and movements

Non-institutional actors and grassroots organisations and civil society groups are key players in initiating and triggering digital social innovation. First of all, it is the activity of grassroots communities that in most cases add value to DSI services by using them, from mobilising votes for e-petitions to raising finance for a local cause through crowdfunding. Building on this, active grassroots communities also use the opportunities presented by digital technologies to hack and make new things.

Chaos Computer Club (CCC), Europe's largest network of Hackers, is the most prominent example of grassroots communities coming together to develop and provide information about technical and societal issues, such as surveillance, privacy, freedom of information, hacktivism, data security etc. The CCC is based in Germany and other German-speaking countries and currently has over 4,000 members. The CCC advocates more transparency in government, freedom of information, human rights and communication. Supporting the principles of the hacker ethic, the club also fights for free access to computers and technological infrastructure for everybody. The latest gathering of the CCC in 2012 in Hamburg, Germany, brought together 6,000 participants.

How are these organisations supporting DSI?

A look across the different activities that DSI organisations are involved in shows how they support work on, and engage with, DSI through eight different types of activities. We list all of these in Table 7 below.

Type of support or activity	Examples
Networking Events, Fairs, and Festivals	Open Hack Make festival Makerfaire
Running Incubators and accelerators	ODI start-up Programme Bethnal Green Ventures
Hosting and managing maker spaces and hacker spaces	Fablab Amsterdam (hosted by Waag Society)
Through research projects or research networks	Desis network Communia Commons4EU, City SDK
Delivering digital social services	Patients Like Me Github
Providing funding and social investment	Nominet Trust Nesta
Advocacy and advisory or expert bodies	IOT Council La Quadrature du net European Digital Rights (EDRI)

Table 7

In order to have a better understanding of the types of organisations that are in the DSI field, it is possible to capture data by filtered the DSI map by 'Activity type'. The full distribution across the 289 activities noted on the map is registered in the Table below:

Activity type	Number listed
Delivering a web service	73
Research project	49
Education and training	31
Network	29
Event	27
Incubators and Accelerators	26
Advisory or expert body	15
Advocating and campaigning	11
Maker and hacker spaces	11
Other	12

Table 8

If we analyse these data based on all 289 organisations, and looking at in the light of the case study work, we can outline some key characteristics of the type of activities that DSI players are carrying forward to support DSI. We will discuss each of them separately, and provide key examples:

Through collaborative events:

One of the main drivers for sharing lessons on latest practice for DSI and building new networks and collaborative partnership between organisations in the DSI community happens through DSI focused events. Many of these are led by large organisations, such as the Open Knowledge Conference organised by the Open Knowledge Foundation, and the PICNIC Festival organised by Waag Society. However, much activity is driven by grassroots networks, like Observe Hack Make (NL) – a five day outdoor international camping festival for hackers and makers, and the Chaos Communication Camp, an international meeting of hackers that takes place every four years, organized by the Chaos Computer Club (CCC) (GE), an informal association of hackers from across Europe.

The Chaos Computer Club (CCC) hosts the annual Chaos Communication Congress, the largest hacker congress in Europe. Every four years, the Chaos Communication Camp is the outdoor alternative for hackers worldwide. The CCC started a new yearly conference called SIGINT in 2009 in Germany. The CCC event has taken place regularly at the end of the year since 1984, with the current date and duration (December 27-30) established in 2005. Volunteers called Chaos Angels do a big part of the organisational and logistical work. An important element of the congress are the assemblies, semi-open spaces with clusters of tables and Internet connections for groups and individuals to collaborate and socialise in projects, workshops, hands-on talks, panels. These assembly spaces, introduced at the 2012 meeting, combine the hack center-project space and distributed group spaces of former years (https://en.wikipedia.org/wiki/Chaos_Communication_Congress).

Maker Fairs are very interesting expressions of this new form of networking events that emerged out of the big diffusion of the Makers Movement. During Maker Fairs many organisations and people that are part of the Makers movement gather to showcase their projects and look for future trends. For example, the biggest European Maker Fair was hosted in Rome last October 2013. As was reported by the co-organisers from Arduino, it was a fair with a particular format compared to the more popular commercial Art Fairs. Born in 2006 in the United States from the idea of Make Magazine, it has become over the years an event for families and fans who want to celebrate a DIY (do it yourself) approach in science, inventions, crafts and electronics.

The format is different from event to event because most of the exhibitors/makers that participate must submit a project a few months earlier and, if they are chosen on the basis of that, they will have a free stand. In a classic exhibition this works the other way around, with the organizers dividing the space in square meters which are then sold to exhibitors who have the need to carve out a more or less great visibility during the fair. The Maker Faire in Rome has hosted 230 makers, of which more than half are Italian and the rest are from all over Europe (Romano, 2013).

Through incubators and accelerators:

As has been the case with the support for innovative businesses, social innovations often need support in the early idea stages to refine their business models and grow their venture. To address this, a number of incubators and accelerators have emerged, who invest in 'tech for good' projects, typically in exchange for equity, at pre-seed or seed stage. Bethnal Green Ventures in the UK, who support early stage technology start-ups who are tackling a social or environmental problem with £15,000 and 3 months intensive support in return for 6% equity, is one example of this. The Open Data Institute's ODI start-up programme, which has supported organisations like Open Corporate and Provenance to grow their Open Data projects, is another. Although incubators and accelerators have been always around, their presence in aiming to address social challenges has been rather limited to date.

Traditional business accelerators offer advice and resources to fledgling firms to help them grow. In contrast, Civic Accelerators can match cities with start-ups, private firms, and non-profit organisations interested in partnering with government to provide better services, bring digital technology to cities, or change the way citizens interact with city hall. Civic accelerators can contribute to fostering DSI by bringing down barriers for innovators: in many cases, these are market barriers, such as overly restrictive planning rules that make it hard for businesses in clusters to expand, or for their workers to find affordable homes.

Running or hosting Makerspaces, Hackerspaces, Living Labs or Urban Labs: Organisations, from grassroots movements, think thanks and universities to big charities and public museums support the development of Digital Social Innovations by hosting small-scale workshop spaces often with digital tools and 3D printing facilities (often referred to as maker and hacker spaces), for digital fabrication and hacking data that entrepreneurs can access freely. There are now 96 known active hacker spaces worldwide, with 29 in the United States, according to Hackerspaces.org. Another 27 U.S. spaces are in the planning or building stage. There are many more Hacklabs around the world that are not branded as hacker spaces, but are community labs that incentivise the diffusion of free and p2p culture and open technology. Makerspaces and maker groups are new and rapidly evolving hotbeds of innovation, which have been facilitated by the latest in prototyping technology, whilst being rooted in traditional pillars of manufacturing: engineering, design, science, and art.

Co-working environments, such as innovation centres, accelerators, incubators, and hacker spaces, have begun to proliferate. The MIT founded a precursor in 2002 called Fab Lab, and since then Makerspaces have expanded from the electronics-centric hacker spaces to having a stronger emphasis on multi-disciplined groups that attract a diversity of professionals such as creators, artists, machinists, robotics engineers, bicycle makers, jewellery-makers, photographers, and fashion designers. Waag Society in Amsterdam is one of over 100 institutions world-wide hosting a Fablab (part of a global movement of Fablab makerspaces), which has been used to develop a number or digital social innovations, including the blueprint for a prototype of a 3d printed $50 Prosthesis that can be used in developing countries. An interesting example that shows the possible convergence between Makerspaces and Fablabs is WEFAB, a Maker space with a focus on open source, design, digital fabrication, and micro enterprises.

An example of increasing interest is the possibility of setting up Urban Labs within city contexts. Urban labs allow city administrations to use the city as a laboratory and to carry out tests and pilot projects on products and services for urban life, which are in the pre-market stage. This improves services to citizens and makes their city smarter, in terms of innovative and efficient infrastructure, the environment, quality of life, modern administration and engaged citizens. The benefits come to the local economy when companies try and test their services with citizens in a real life environment and thus improve their competitiveness. There are many other advantages as well when it comes to public administration fostering innovation processes and creating innovative spaces. When using urban labs as a tool for urban development city government can improve relationships with their citizens by supporting, and empowering citizens. By initiating collaborative projects the city can bring together relevant stakeholders: citizens, companies and scientific institutions. This process of cooperation that happens in Urban Labs can enable new ideas and innovations (Open Cities 2013).

By providing education & training:

A fundamental requirement for DSI is that innovators with an ambition to use technology for social good have the skillset to use and apply digital technologies. Collaborative networks of DSI organisations are able to able to foster these skills that often are not being provided by traditional education and training organisations. To cater to this need a number of projects have emerged, such as Apps for Good whose goal is to help 'students use new technologies to design and make products that can make a difference to their world', or the Open Data Institutes (UK) open data training sessions for charities. Real empowerment through access to knowledge and education happens when groups and individuals can acquire skills and gain access to resources and opportunities to develop knowledge, self-sufficiency, and achieve inclusion in decision-making processes. These are some of the main initiatives within the DSI field that are focusing on capacity-building & constructing informal learning networks:

- Fab Academy
- Institute for network culture
- Code Dojos
- Hacking culture as sharing skills and knowledge

Running research projects or research networks:

With a growth in DSI practice, there has been an increase in research activities and research networks aiming to further our understanding of DSI as a phenomenon. Communia, an EU wide thematic Network that focuses on strategic policy discussion of existing and emerging issues concerning the public domain in the digital environment is one example of this, as is the work by the social innovation research project TEPSIE on the role of ICT and social innovation. Building on long-term EU research projects like Commons4EU, networks of EU organisations (academic and non-academic) have partnered to collectively further explore the development of DSI practice through joint research and development. In the case of Commons4EU partners got together to explore the development of collaborative web projects and bottom-up broadband technologies. Other interesting examples of multidisciplinary research projects are the Network of Excellence on Internet Science (EINS) that aims to integrate multidisciplinary scientific understandings about Internet networks and their co-evolution with society, or the Knowledge and Innovation Communities (KICs) promoted by the European Institute of Innovation and technology that are coordinating research on ICT for society in different domains such as climate change; sustainable energy, and communication technology itself.

By delivering digital social services:

Naturally, the hive of DSI activity will be around actual services that enable new types of collaboration between citizens through the use of digital technologies.

As discussed previously, DSI services are being delivered by a variety of organisations from government and business, to foundations and grassroots organisations. However, it is important to distinguish between two different types of services. The DSI map is gathering examples of services from across Europe and globally that are using a variety of digital tools and building communities to maximise the impact of technology for social good:

Services that enable organisations to better cooperate and resource their activities: A range of services like Github and CKAN do not directly target citizens or seek citizen engagement in the service, instead they provide invaluable open tools that help entrepreneurs, and civic hackers who are developing digital social innovations.

Services that directly target and engage a large number of citizens and end users for a variety of causes: The majority of DSI services directly engage citizens and developers to improve their services, generate solutions, provide feedback, or solve specific problems.

By providing funding and investment:

Public sector bodies, large foundations and other philanthropic organisations, provide early stage funding for DSI services, or projects that are exploring new aspects of the potential in DSI. Examples of this include the Nominet Trust's (UK) work Digital Edge, a programme which funds ventures that demonstrate how technology can offer a viable alternative to existing ways of addressing the social challenges faced by young people. Other more established Foundations such as the Shuttelworth Foundation, the Open Society Institute or Knight Foundation in the US are pioneering ways to financially support digital initiatives and measure the social impact achieved. The programmes run by these organisations have inspired a new wave of social action funding. For instance a new programme named CHEST recently started and funded by the EC within the framework of CAPS (Collective Awareness Platforms for Social Innovation and Sustainability), will provide Seed funding for digital social innovation based on the network effect.

Through advocacy and advisory or expert bodies: A number of organisations affect DSI in Europe through acting as expert bodies on the development of policy and strategies and advocating and campaigning for standards for DSI. The World Wide Web Consortium (W3C), an international community that works on developing and advocating for Web standards, the P2P foundation that works on promoting peer to peer practices, and the IoT Council promoting an open Internet of Things vision are good examples of this. Expert bodies are essential for providing expertise, and coordinating inclusive processes of decision-making amongst key stakeholders.

Technological trends in Digital Social Innovation

Although there is a huge variety in the different types of DSI and the technologies these innovations use, a look across the different types of DSI we have examined to date shows four main technological 'trends'. This grouping is based on the classification towards creating a data-driven Ecology suggested by MIT (Bollier and Clippinger 2013):

Technological Trends in DSI		
Trend	**What is it?**	**Examples**
Open Networks	innovative combinations of network solutions and infrastructures, e.g. sensor networks, free interoperable network services, open Wifi, bottom-up-broadband, distributed social networks, p2p infrastructures	Tor Confine Guifi.net Smart Santander
Open Data	innovative ways to capture, use, analyse, and interpret open data coming from people and from the environment	Open Vienna City SDK
Open knowledge	co-production of new knowledge and crowd mobilisation based on open content, open source and open access	Goteo Communia
Open hardware	new ways of making and using open hardware solutions and moving towards and Open Source Internet of Things	Arduino Smart Citizen Kit SafeCast

Table 9

Through case study analysis we have sought to build up an understanding of to what extent these emerging technologies are being harnessed by digital social innovation. It is likely that we will begin to identify additional types of technology. Below we provide a more detailed description of how these trends can be defined, and the insights we are deriving from case studies about these. Whilst we describe these in independent sections, it is important to note that the activities of many of the most exciting digital social innovations can be grouped under two or more trends. Safecast, for example relied on Open Hardware to build the first Geiger counter sensor kit, on crowdfunding (open knowledge) to fund the development of kit, and on Open Data to share and analyse the data captured across all of the Geiger counters.

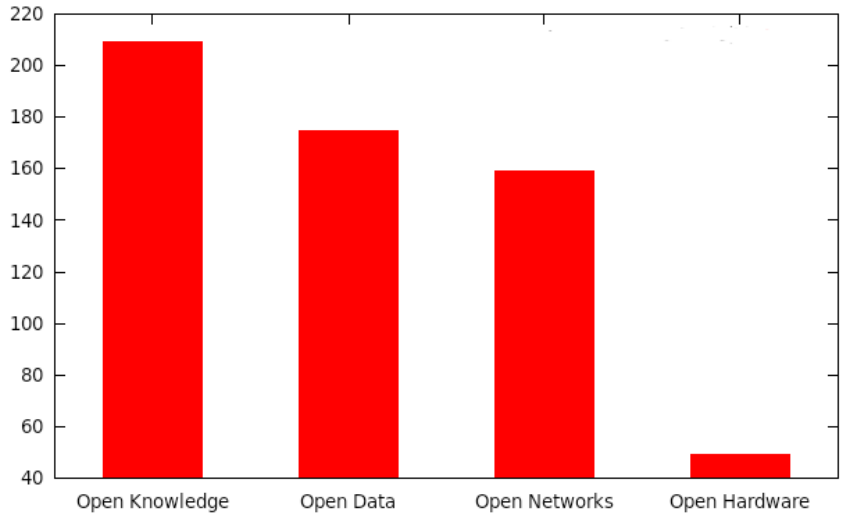


Figure 10

The chart above shows the 'Tech focus' of those on the DSI map to date. How all organisations on the map describe themselves in terms of tech trends is shown in the Table 10 below:

Tech trend	Number of activities under this trend
Open Knowledge	209
Open Data	175
Open Networks	159
Open Hardware	49

Table 10

Within these broader technology areas, we have been identifying a variety of more specific tech methods and digital services adopted by DSI activities such as social networking, social media, crowdsourcing, crowdfunding, big data, machine learning, 3D printing, online learning, e-petitions and so on.

Open networks

The ability to build bottom-up networking capabilities in every corner or the world and in people's everyday lives has become a key enabling factor for the spreading of the digital society. Here we describe some of the most interesting trends in the open network area, such as Wireless Sensor Networks, Community (bottom-up) networking, and privacy-aware open networks.

A Wireless Sensor Network (WSN) consists of spatially distributed wireless sensors to monitor physical conditions, such as temperature, sound, vibration, pressure, motion or pollutants, and to pass their data through the network to a single or replicated data-processing location. An Open Sensor Network (OSN) is a Wireless Sensor Network that manages Open information in an Open environment. An OSN stands for an interoperable sensor network, where many vendors or entities can connect their sensor solutions and those

sensors interact with other ones or with the centralised data system using standard communications. The Open Sensor Network connects the sensor with the data repository where the information is processed and stored, as it uses public data from different sensors and forwards the gathered information to the central point within a wireless environment.

Sensor networks are widely used in the fields of mobility, transport, environment, geography, meteorology and tourism. They are key infrastructures of a smart city by providing basic data on the usage of energy, pollution, geodata, traffic, geography & meteorological, tourism and so on. Possible future services based on OSN include mobile applications that support citizens using public transport by displaying real time information on arrival and departure or traffic information for car drivers. Another application area is the measurement of air pollution, temperature, and humidity, or light sensors that provide a large variety of sensor networks and they offer infinite possibilities for developing mobile applications (Apps), which would be fed by Open Data from the OSN.

A number of European cities have established sensors that detect traffic density and some initiatives to monitor the arrival of public transport. For instance, Smart Santander demonstrates the potential in creating large networks of sensors that capture activity from static sensors as well as citizens to create cities that better and more efficiently react to citizen needs. These sensors provide the opportunity to implement applications that help citizens to move around in cities. Most European cities work with sensors that monitor environmental conditions. Pollution, temperature, humidity and light sensors are installed that provide information that could be used to develop applications for citizens or to be added to other applications as mashups. All mobility and environmental sensor networks could be interconnected with the OSN platform in order to provide external parties a single point to consume this data.

Community networking (also known as bottom-up networking) is an emerging model for the Future Internet across Europe and beyond, where communities of citizens can build, operate and own open IP-based networks, a key infrastructure for individual and collective digital participation. While commercial access networks from either commercial telecom companies or by local governments tend to follow a well-known centralized network architecture and operation model, community-owned open local IP networks are an emerging model of infrastructures that is open, decentralised and can be collectively more resilient. Internet networks have become a key infrastructure for the development of the digital economy due to the "democratisation" of the access technologies, reducing the price and complexity in setting up wired or wireless links.

The work by Tor on creating a secure and privacy-aware service that bounce Internet users' and websites' traffic through "relays" run by thousands of volunteers around the world, making it extremely hard for anyone to identify the source of the information or the location of the user, is one example of open networks enabling citizens to protect their digital rights online. There is no such thing as perfect security and anonymity, but projects like Tor strive to make the network as secure and anonymous as possible, while clearly informing users of all of the strengths and weaknesses of the network. Such tools are powerful in the hands of individuals and communities, as shown by the use of "Wikileaks" to expose Government accountability and transparency by supporting journalists and other experts to access information and report key stories.

The Confine Test bed experimental facility supports experimentally driven research on Community- owned Open Local IP Networks. This integrated project (2011-2015) offers a test-bed for experimental research that integrates (in a federation) and extends three existing community networks: Guifi.net (Catalonia, Spain), FunkFeuer (Wien, Austria) and AWMN (Athens, Greece); each is in the range of 500 – 20,000 nodes, a greater number of links and even more end-users. These networks are extremely dynamic and diverse, and combine successfully different wireless and wired (optical) link technologies, fixed and ad-hoc routing schemes, and management schemes. They run multiple self-provisioned, experimental and commercial services and applications. A common entry point allows researchers to select a set of resources, and then deploy, run, monitor and experiment with services and protocols. This is done on real-world IP community networks that incorporate a wide variety of wired and wireless links, nodes, routing, applications and users. The test-bed is a resource for the research community to address the limits and obstacles regarding Internet specifications that are exposed by these edge networks.

The Guifi.net initiative is developing a free, open and neutral, mostly wireless telecommunication community network, that started in Catalonia in 2004, and as of January 2012 has more than 15,300 working nodes, most of them linked to a main network in Catalonia. Many other local networks are growing all around Spain. Guifi.net is connected to the Catalan Internet Exchange (CATNIX) as an Autonomous System (AS) via optical fibre with IPv4 and IPv6.

Open Data

The explosion of new types of data analytics and machine learning means that it is no longer only government or corporate forecasters who have the opportunity to access and analyse data. By making data open, governments and other large organisations and companies that hold or generate data about society have the opportunity to enable citizens to hold government to account for what it spends, the contracts it gives and the assets it holds.

When the European Commission published its Directive on the reuse of public sector information (PSI) in 2003 many member states, including France, the United Kingdom, Germany, Netherlands and Spain began to promote and implement open data policies. The directive provided an EU-wide framework for governments, at all levels, to begin opening data. The European Commission estimates the economic value of the PSI market at approximately €40 billion per annum. The 2013 revision of the European Commission Directive on the reuse of public sector information will further enable the opening of public sector data in a harmonised and more transparent way, and create the conditions for generating value, both economic and social, from this data.

Local authorities are playing a leading role in implementing open data policies and driving forward the open data movement. The social benefits of open government vary from citizen engagement to increased transparency and accountability, as well as enhanced interaction between governments, other institutions, and the public. Open data (both static or available in real time) favours the transformation of city authorities into ecosystem orchestrators that are able to shape and foster the innovation process, whilst engaging all key stakeholders and delivering public goods, maximising returns for all citizens. For instance, citizens are gaining greater insight into how their tax payments are being spent. Furthermore, citizens can create more knowledge in a distributed way, and organisations can have access to shared open infrastructures and technologies.

Beyond the social aspects, open data also supports public sector innovation by breaking the competitive advantage gained by proprietary access to data and data lock-in. Innovation is most likely to occur when data is available online in open, structured, computer-friendly formats for anyone to download, use, and analyse, as long as the privacy and data protection of all citizens is preserved and that communities are entitled to share the value and social benefits of public assets. Thus, open data, together with open and standardised APIs is crucial for innovation, as developers are able to access and use public data and mesh it with other sources of data produced by the crowd to build novel applications that have a social utility and produce public good.

For instance, with its Open Data in Vienna programme the city of Vienna has demonstrated the potential in opening up its data. The city opened its data records to the population, businesses and the scientific community. Released data ranges from statistics and geographic data on traffic and transport to economic figures. It then invited programmers and developers to make apps and web services based on the data, which to date have resulted in more than 60 applications for citizens. Other pioneering examples include the work by the Estonian Government and the not for profit Praxis on the Meiraha project, which focuses on opening up and visualising the Estonian budget. The Citizen Science project Globe at Night is yet another example of this, where citizens – through using the camera and geo tagging function on their smartphones – help the research project measure global levels of light pollution, thereby effectively coupling open data and citizen science. The movement for more and better open data has grown significantly over the last few years through projects funded by the European Commission, such as City SDK. This is a European consortium of partners helping cities to standardize their interfaces so that services can be integrated into the City's backend system and can be reused and adopted across Europe and beyond, whilst giving developers the tools they need to develop applications that scale.

Another important trend, boosting the diffusion of open data is the Mobile Internet and the increasing number of mobile devices. Smartphones, tablets, PDAs and other devices are becoming smaller, faster, smarter, more networked and personal. An unlocked Android phone with touch screen, Wifi and GPS that sold for $300 four years ago now costs $30, a price that is continuing to drop. As they proliferate, mobile devices are generating ever-larger streams of personal behavioural data that have many potentially valuable public, personal and commercial uses. Data-flows are also burgeoning as the Internet of Things integrates a vast universe of network aware sensors, actuators, video cameras, RFID-tagged objects and other devices that see, hear, move, and coordinate and "reason" with each other. And on the horizon: the automated, driverless car; the "smart house" with interconnected sensors and appliances; and the "smart city" that co-ordinates mobile cellular and GPS data to dynamically allocate resources and direct traffic.

Open knowledge

The contribution of open knowledge covers the variety of ways in which citizens can use online services and platforms for mass scale social collaboration. As more of people's daily lives have moved to socially networked platforms, the value of open collaboration has fast increased. Ordinary people today use blogs, wikis, social network and hundreds of other collaborative platforms to manage their daily lives, solve social challenges and business problem, and participate in e-campaigns, crowdfunding, crowd-mapping and crowdsourcing. Furthermore, the ability to access, use, and reuse without financial, legal, contractual, and technical restrictions (aligned with the Budapest open access initiative, released as creative commons or in the public domain) is key for knowledge co-creation networks to spread. Open access provides an economic and social return on investment through higher dissemination to citizens, taxpayers, and researchers from other countries and other disciplines, fostering interdisciplinary cross fertilisation and international impact.

For technology companies it became crucial to open their processes of product development, outside the company's boundaries in a process called Open Innovation. Aggregating users' ideas and integrating them within the innovation process has become a very popular method. Recent global developments have revealed increasing demands of citizens for their governments and administrations to become more participatory, transparent and accountable.

Various public institutions and organisations have acknowledged crowdsourcing as a tool to improve the relationship to their citizens by integrating them into political decision-making. By opening political processes to the peoples' opinions, administrations reflect the principles of transparency and participation. Crowdsourcing is the ability to gather ideas, contents and solutions from a large group of people, usually from dispersed online communities. Crowdsourcing is increasingly used by public authorities, as a method to solve the lack of trust in the policy institutions, under the growing pressure from their citizens to improve transparency, and access to government decisions. Crowdsourcing is also used in cities as a tool to improve on (partially) flawed datasets and can be built into innovation projects.

Addressing citizens and incorporating direct feedback in detecting ideas and solutions has evolved to be a widely accepted method in urban development. Online voting and challenge prizes are helpful instruments for solving problems of governments and administrations. Recent technological developments allow sourcing of citizens' ideas on digital platforms, facilitating participatory processes. Globally, cities now adopt globally systems like open 311 that provide a standardised and collaborative model to track civil issues and get fast responses from local Governments. Clearly, crowdsourcing processes also present challenges that are often related to managing 'the crowd', quality or limitations of ideas, public commitment from policy makers, or lack of investment. It is crucial for successful crowdsourcing to design the activity properly to prevent excessive demands and frustrations. In Europe, interesting crowdsourcing projects for Cities are emerging from the Open Cities project and Commons4EU. Your Priorities platform in Reykjavik is offering successful model experimenting with citizens in Iceland, integrating large-scale deliberation into democratic decision-making. The platform crowdsources opinions on city legislation, with the most popular ideas being debated by the city council. A different example of citizen feedback is Patients Like Me, which enables people living with a long-term health condition to contribute their personal experience and knowledge to a social network of peers living with similar conditions.

Open Hardware

Open source hardware consists of hardware whose blueprints are made publicly available so that anyone can study, modify, distribute, make, extend, and sell the design or hardware based on that design. The hardware's source, the design from which it is made, is available in the preferred format for making modifications to it. Ideally, open source hardware uses readily available components and materials, standard processes, open infrastructure, unrestricted content, and open-source design tools to maximize the ability of individuals to make and use hardware. Open source hardware gives people the freedom to control their technology while sharing knowledge and encouraging commerce through the open exchange of designs. The work by organisations like Raspberry Pi and Arduino illustrates the potential in open hardware.

Core to Arduino is a simple, ultra-low-cost circuit board, based on an open-source design, armed with a microprocessor, which can be programmed with simple, open-source software tools by the user. The idea is that anyone should be able to turn an Arduino into a simple electronic device. Building on these open hardware platforms, new services like the Smart Citizen Kit, an Arduino based sensor kit have the opportunity to provide even more sophisticated sensor network tools to citizens, and allow for the measurement of levels of air pollution, noise pollution or air humidity in the vicinity of a private home, school or office.

Another big trend related to open hardware is the evolution of the Internet of Things (IoT). People, places, and objects in a city can be instrumented with tracking and sensing devices that continuously stream and measure data about real-world activity. These data streams can be location reports from objects, people and cars, environmental measurements from sensors embedded in buildings or in the streets, and other sorts of feeds. Activity is then embedded in software and interpreted by algorithms through highly normative processes.

This smart infrastructure is also increasingly "getting to know people" by aggregating personal and social data in massive data centres with little privacy and security. The hypothesis of this model is that people will change their behaviours based on personal statistics. We know instead that the process for changing collective behaviours is very complex. In IoT with full traceability and transparency, the very notion of what or who is 'important' changes. We can summarise the various technology trends that are speeding up the diffusion of IoT as following:

- The increasing number of more and more powerful smart personal devices, which will facilitate the anywhere/anytime access to the Internet and to the services it will provide.
- The Internet of Things, which will guarantee access through the Internet to the physical world, to its devices and, most notably, to its services.
- The emerging of an Internet of People, i.e., a trend that includes Web 2.0, social networks, social computing, and that promotes Internet as a fundamental channel for allowing an increasingly active role of users (individuals, groups, communities) as providers of data, content, and services.
- Cloud computing as a virtualisation infrastructure that offers unique opportunities to reduce the costs of delivering services over the Internet, thus extending this possibility to much wider classes of actors.

What are we learning about the impact of digital technologies on Social Innovation?

Analysing network data: Exploring DSI Network effect

In order to analyse the relationship data from the mapping, we are adopting social network analysis to detect patterns of relations, arguing that causation is located in the social structure. Social networks are formally defined as a set of nodes (or network members) that are tied by one or more types of relations (Wasserman and Faust, 1994). By studying behaviours as embedded in social network structures, we will be able to explain macro and meso level patterns that show the dynamics in which DSI organisations and their initiatives create particular outcomes. Currently, as we are still collecting data, it would be premature to do a conclusive data-driven analysis. However, in this section we explain the methodology.

The emergent network represents DSI organisations and their social relationships mapped in the form of graph that is a collection of nodes and edges between them. In the case of the DSI social network that is emerging from the map, the nodes in a graph are communities, and the edges represent joint projects. Social network analysis will examine the structure and composition of DSI organisation ties in a given network and provide insights into its structural characteristics, such as the centrality of actors in the network (prestige); the number of individual connections (influence); the number of incoming connections (prominence); the least connections (outlier); actors that are communicating more often with each other (community); structure of the ties that exist in the network (density) and so on (Newman 2010).

One of the primary problems facing the mapping of an open-ended field such as DSI is how to direct the multiple diverse streams of data from interviews to social media into a central repository capable of giving a "big picture" of European DSI that can provide strategic recommendations for the EC. In combination with our hybrid iterative strategy of case study interviews, workshops, and events relevant to the communities, we believe we can identify and map these actors in a way that has hitherto not been possible.

Through our approach of mixing open data analytics with human-centric interviews/case-studies, we can better understand complex phenomena and socio-economic and environmental trends, thus advancing the mapping of the field and understanding how to create new and powerful structural links among existing groups and initiatives. This goes far beyond just making a quantitative and visual picture of a network, but provides qualitative explanations of the European DSI network structure functions, through insight into the otherwise hidden dynamics of DSI that can only be revealed by case-studies and interviews. Furthermore, this visualisation of the DSI network, embedded in our website, is interactive and aims at engaging the larger DSI community itself, and thus we can use this ever-expanding visualisation and network database as a tool for "crowd-sourcing" even more information about DSI in Europe, to prevent the network mapping from going out-of-date.

We will continue to strengthen these communities by using network-driven analysis to build crucial missing links in our open events, such as during the Open Knowledge Conference launch that directly engaged key communities. Finally, this analysis will then feed later work packages such as WP5 and WP6 in order to determine what recommendations on a policy and instrument level are needed for the EC to knit the map of DSI actors into a coherent single integrated EC DSI network, and thus achieve the "critical mass" necessary to harness the collective intelligence of DSI organisations to solve large-scale European social problems.

Network Analysis Methods

In general, the task of a first interim report in a project of this kind is to both determine the right questions to ask and if the data-set is currently able to answer those questions. The network of concepts that determines the kinds of questions is the theoretical framework.

The primary task of the interim report so far, has been to develop an adequate and rigorous conceptual framework. Only with such a framework can data and hypotheses be interpreted in a sensible manner without projecting pre-conceived, and often wrong, opinions onto the data-set. Phrasing both the null hypothesis and alternative hypotheses in terms of network theory must be done with care. There must then be enough data to adequately test the hypotheses, using mathematical techniques that can statistically quantify the level of confidence in the proof of the data for any given hypothesis.

In particular, this requires significance testing, as network-based data often assumes a non-Gaussian distribution such as a power-law. For non-Gaussian distributions such as power-laws, traditional t-tests against Gaussian distributions and even traditional statistics around averages and means are scientifically invalid. To take an intuitive example, in a world with one 3000 foot tall giant being compared against a normal population of a hundred people evenly distributed between 5 and 6 feet tall, the average would move up to 30 foot tall, despite only one person being a "giant" of 3000 feet and everyone else being between 5 and 6 feet tall.

In the DSI Network Data-Set, there are a total of 285 organisations with a total of 178 activities as of 13 December 2013. However, a snapshot of the data on the 1st of December indicated we have 243 organisations and 146 activities. While the first attempt to get primarily non-fluent English speakers involved in the survey did not work well, with only a few results, IRI's translation of the call for the survey (not the survey itself, as the website currently supports only English) into French and then launching that call to 120 actors involved in social innovation resulted in a net gain of 43 organisations added with 32 new activities. Although this response rate of 35 per cent is fairly impressive, we believe that many more actors in countries such as Italy, France, or Spain where fluency in English is not to be expected would respond if the survey itself was translated into those three languages.

1. What is the distribution of social innovation across Europe?

Is social innovation done by a few large actors (an exponential distribution)? Or a few large actors in concert with a large mass of smaller groups (a power-law distribution?) Or is social innovation more evenly distributed between various actors (Gaussian "normal" distribution)? We can compare the distributions of various communities empirically by using Monte Carlo methods divergence (using the Kolmogorov-Smirnov test for non-parametric distributions like power-laws) with likelihood ratios to determine if the evidence is weighted towards one kind of distribution or another. Power-laws are especially interesting due to the emergence of a few large organisations that serve as "central super-nodes", but the majority of work is done by a larger network of other organisations in the "long tail" that are connected via the super-nodes. This is the kind of distribution that arises via development and evolution in systems such as the World Wide Web and eco-systems.

This likelihood test then allows the power-law and other distributions (exponential, log-normal) with different underlying hypotheses to be tested against each other. For any two parametric models that embody a hypothesis over our empirical data, the model with the larger likelihood fit is the better model, and so embodies our confidence estimate in the correct hypothesis. Ratio of the two likelihoods (R) is positive if the hypothesis is more likely to be correct, and negative if it is incorrect (given a logarithm of the ratio). In this case, the likelihood ratio is given under two distributions fitted by the Kolmogorov-Smirnov test algorithm, and it is simply the likelihood of the first ratio over the second ratio when both likelihoods are given by maximum likelihood fitting of distributions representing hypotheses to the empirical data. In other words, the Likelihood ratio is $R = \ln (L (H \mid N) / L (H' \mid N))$. For hypotheses involving different datasets, different hypotheses (H') could be tested over different data-sets and compared (N' as opposed to N in the denominator).

How much data is necessary, (N) given we are assuming a non-Gaussian distribution, to do the network analysis? Using our current data from the survey, we can run the above algorithms on it to determine if the data is sufficient. The MATLAB code developed by Aaron Clauset at the Santa Fe Institute was used (http://tuvalu.santafe.edu/~aaronc/powerlaws/). The results were, at this stage, not significant for the fitting of the proposed non-parametric power-law. The harder question is the proper value of N. This can be estimated by simulating data distributions with a large enough N from two different distributions (in this case, a power-law versus a log-normal) that would then be matched against the Monte Carlo data and likelihood rations. Although this method is imperfect due to the assumption being made over the kinds of distributions, it should give us a rough estimate of what amount of data is necessary and what likelihood ratios match with $p<.1$. For our simulation, it required approximately N=300 for the power law to be ruled out, but N=30,000 for the power-law to be ruled in favour of a log-normal distribution. This shows that some alternative hypotheses are very easy to dispose of, but it is much harder to prove positive hypotheses about the details of distributions. This is because distributions such as the log-normal and exponential distribution are difficult to differentiate from power-laws due to the difficulty in proving the existence of the long tail with small data-samples.

2. What communities of social innovation exist in Europe?

Community detection algorithms can be used to find dense substructures (often called "communities") within a larger sparse network. A community exists when a network is partitioned in such a manner that nodes within a clique are more densely interconnected than those outside of the network. We will cut the network into a number of mutually exclusive sets of nodes. If the data-set is of reasonable size (less than 10,000 organisations) we will use the Newman algorithm to identify communities. We will also find especially dense networks, called "cliques" where every node is connected to every other node. Are these communities based geographically, linguistically, or perhaps topically? While we have let the organisations label themselves around pre-defined categories like "Open Data" and "Open Knowledge", we will also test our categories based on the way that the communities cluster themselves on the map and see how that correlates with various attributes, such as geo-location, labels, and number of employees. New clustering and categories will then emerge from the empirical data.

Within each community, there will be certain organisations that have a high centrality, the "movers and shakers" of social innovation. These organisations have a high amount of connections, which can be counted by simply counting their links to other organisations (degree centrality). We can also measure (in a way similar to PageRank) the eigenvector centrality, which counts not only connections, but also how connected those connections themselves are. In general, power-law distributions show such "small world" effects while normal distributions do not (see Figure 11)

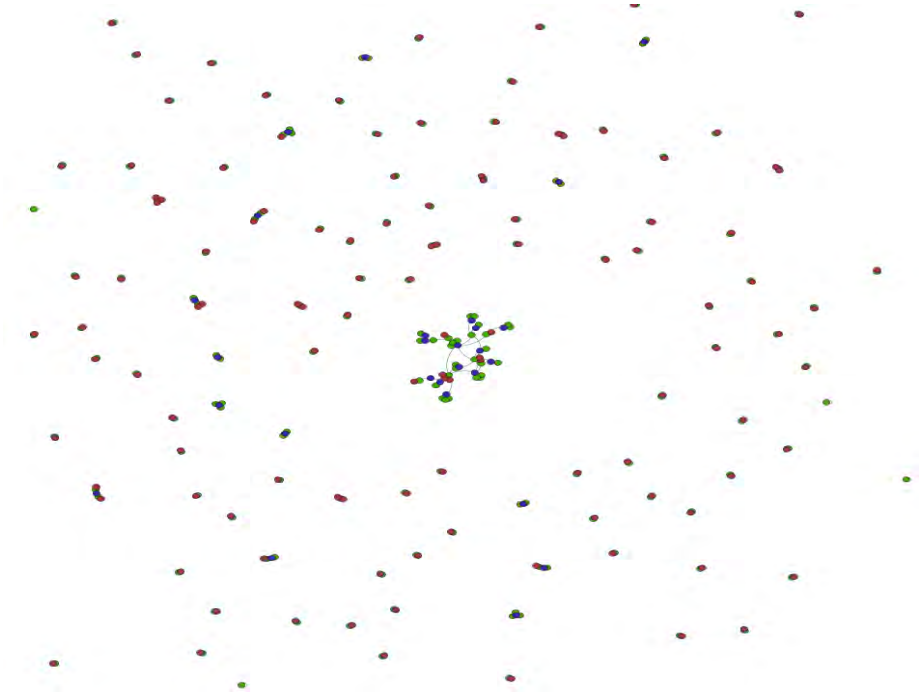


Figure 11

To summarise DSI relationships emerge and cluster as "distributed networks" that (1) have fluid memberships - that is detecting the extent to which access to the network for new members is 'closed' or 'fluid' (2) relationships between their members are not regulated contractually – they are more informal and open-ended, (3) mobilise resources and collective actions by switching and reprogramming networks with different stakeholders and based on different issues.

3. Which organisations currently bridge the various communities?

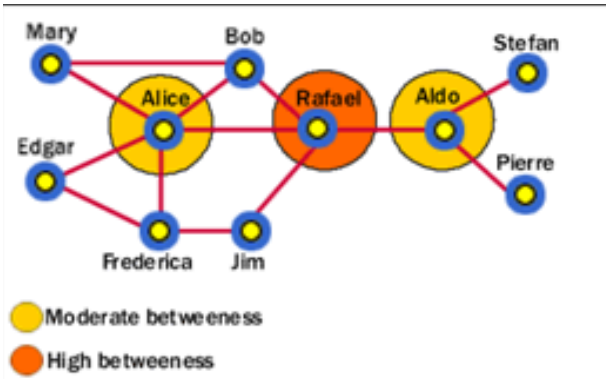


Figure 12

However, simply measuring centrality may fail to show which organisations act as crucial "bridges" between different kinds of networks (see Figure 12). While a few highly connected organisations are important, organisations that connect otherwise disparate communities are crucial. This can be measured by using "betweenness centrality", where the centrality of an organisation is measured by counting the number of times a node occurs as the shortest path between two other nodes. An organisation's reach could even be quantified as an energy minimization problem involving short random walks through the network starting from the organisation.

However, currently this analysis is difficult to do as we have revealed that there is either a problem with the scarcity of data or many European social innovation actors are unconnected to each other, as there is only on average 0.6 links per organisational activity. Also, in particular there are 89 organisations (nearly 37 per cent) that have no links to other organisations. Subtracting organisations with no links, we find an average number of links to be even less per activity, namely that there is approximately one link per organisation. This suggests that the network is composed primarily of dyads, i.e. networks of only two organisations. Yet this is clearly not the case. For example, some networks have more than one link: CitySDK has five participating organisations and Digital Social Innovation has eight participants. If we assume all organisational activities are fully inter-connected, then we have dense nodes of 54 and 25 links that highly contrast with the majority of dyads. This may be the beginning of a power-law, or it may just be a highly disconnected network – more data is needed to find out, since we are at the very early stage of engaging DSI communities.

4. What are the conditions for scaling DSI?

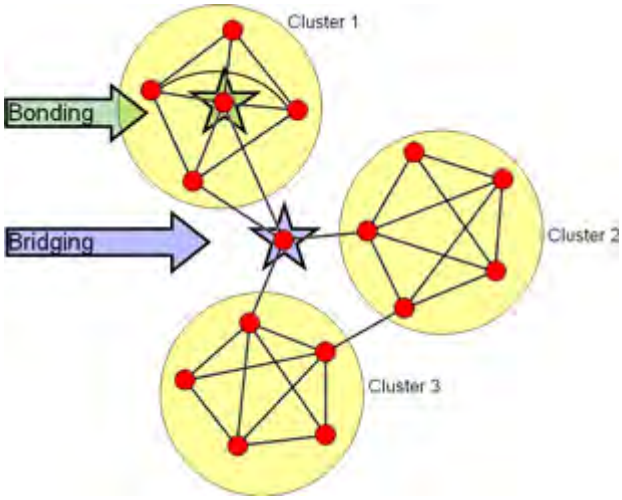


Figure 13

We can also reverse the algorithm and find communities that need a bridge to other communities (see Figure 13). We can then measure how influential a number of well-placed hypothetical connections could be by "bridging" the nodes of disconnected communities and measuring the impact on centrality measurements and re-partitioning the communities.

One use of this technique would be seeing if adding a new connection between organisations causes a "phase shift" in the level of self-organisation of the network of social innovation in Europe. This qualitative notion of a "phase shift" is normally captured by a network transforming from a non-power law to a power-law in popular parlance, where a power-law shows the emergence of a "giant component" of highly connected organisations and a "long tail" of less connected organisations. So, we could use the Kolmogorov-Smirnov method to estimate the parameters for the long-tail, and the likelihood ratios to show that a non-Gaussian distribution positively existed and that the normal, uniform, and random distributions were rejected. However, that would still make the point that a "phase shift" to a small group of highly connected components with large reach could be made via adding a few new connections, connections that could be brokered by the European Commission.

Next Steps for Network Analysis

What does this mean for our study? In general, before beginning rigorous network analysis (1) we must collect more data and that (2) our hypotheses will have to be quite broad and care must be taken to distinguish the various qualitative hypotheses in terms of clearly different quantitative distributions and forms of networks. This means for the second phase of the report we need approximately double the data we gathered in the first phase, if not more. Note that the problem becomes harder if we are comparing hypotheses involving (possible mutually exclusive) different kinds of subsets of the network data, such as comparing two different kinds of communities (such as "Italian" vs. "non-Italian" organisations or "open knowledge" vs. "open hardware" communities).

How Digital social innovation happens

The role of non-institutional actors and civic society in the diffusion of innovation

This study specifically aims at engaging civil society organisations, non-profit NGOs, social movements, and civic innovators (developers, hackers, designers) as key stakeholders in the support of innovation for social good and active citizenship in the EU. Too often in the past civil society organisations were left behind in top-down technology-push approaches (e.g. supply-side approach to Big Data & Big Brother).

Unlike traditional innovation actions, DSI and Collective Awareness Platforms are motivated by the vision of building an open and grassroots civic innovation Ecosystem in Europe to unleash the potential of collective intelligence. This takes into account how innovation can spread across the whole of society, as well as how small but significant innovation projects can scale up across Europe and lead to systemic change addressing societal challenges, such as building better health, education, mobility and ultimately improving democracy and re-designing socio-economic models. The value of DSI experiments is difficult to quantify using traditional indicators of success and impact, such as GDP, profitability and competitiveness. New sustainable business models and socio-economic mechanisms based on collective and public benefit are starting to clearly emerge. Once the network of digital social innovation actors in Europe is mapped and its dynamics understood, it will inform future EC initiatives, research and policy to foster open and inclusive innovation for social good in Europe.

The question that faces Europe is how to drive digital social innovation? In general, European funding has heavily invested in core European institutions in terms of digital innovation, in particular the formerly nationalised telecommunications companies as well as national research institutes and traditional universities. This is somewhat predictable, as these institutions, and social structures, have reproduced successfully over the generations, and so are not facing any kind of crisis over their long histories that pre-date the digital era. However, even now these institutions are facing crisis due to the ubiquity of the Internet, as the new digital innovations of capitalism – in particular, digital innovation as exemplified by Silicon Valley – threaten their current ability to make profits from their previous innovations. The digital natives are not just a generation, but there are also digitally native institutions, i.e. institutions that have arisen during the rise of the Internet itself.

This is precisely why telecommunications companies must reinvent themselves in the presence of new, digitally native companies such as Skype and Google. Likewise, national research institutes such as INRIA or CNRS are threatened by the research divisions of companies like Google, Yahoo, Microsoft – who now increasingly dominate premier academic conferences such as the World Wide Web Conference. The institutional infrastructure necessary for cutting-edge research no longer requires state investment, and in fact, private institutions have near-monopolies over social networks and search engine data, giving them nearly exclusive access to the data and algorithms needed for innovative digital research. Yet, perhaps surprising, even as these digitally native companies are reaching the state of what appears to be permanent platform oligopolies, these companies are still challenged by new digital actors such as Facebook and Twitter.

It is key to distinguish between invention and socialisation as part of the wider process of innovation in a technical system such as the Internet and the Web. The Internet and Web have intrinsic architectures defined by their open standards that offer themselves as a series of constraints such that 'the choice of possibilities in which invention consists is made in a particular space and particular time according to the play of these constants,' although ultimately innovation lies in the ability to give these choices technical flesh so that they can interact with the wider world; 'the rules of innovation are those of socialisation.' (Stiegler, 1998 p. 25-26).

So the new idea that solves some problem is the invention, and these new ideas can be created by anyone. In fact, this process of invention is often created by smaller companies and non-institutional actors. Then the process of socialisation, which requires transforming the invention into a working product or process, requires the ability to spread the idea throughout society, and so requires funding, product development, marketing, and strategy. It is precisely in the process of socialisation that large companies and institutions are the most successful. For digital social innovation to succeed, what is necessary is that funding and strategic aspects be delivered co-operatively by public institutions, and networks of grassroots innovators be connected into larger networks that can then provide the kinds of services around product development and marketing that would otherwise be out of reach of the inventors themselves.

We would argue that non-institutional actors – communities and individuals that lack the ability to socialise their own invention – are the source of much innovation. Fundamentally, inventions must be brought about by "thinking outside the box", by creating new solutions in a period of crisis. By virtue of not having the safety of institutional frameworks – by not "fitting in" – these non-institutional actors naturally "think outside the box" all the time and so are forced by the very circumstances of their form of life to produce innovation.

It is within new non-institutional actors motivated by ideals outside short-term profit and with an idea of greater social good that digital innovation usually arises. And by new virtuous partnership that can emerge between non-institutional actors and more institutionalised players.

Many of the inventions that now form the basis of the Web 2.0 economy and the emerging Internet of Things have their roots in non-institutional actors. Many of these non-institutional actors have been studied and engaged in this research, such as promoters of Hacklabs, Makerspaces, civil society organisations, or entrepreneurs starting sharing economy initiatives, and activists starting mass mobilisation initiatives and social movements for democracy and social justice. These emerging social actors, in order to pursue their own unique ideals that do not fit within a wider social milieu driven exclusively by only short-term economic profit, naturally and creatively socially innovate and create often immensely profitable structures.

However, before the advent of the Internet their social innovation was limited in its reach, but with the advent of the Internet suddenly these new digital social innovations had a rapid network growth. Take for example the "do-it-yourself" ethic, where the amateur is able to create content and share it in a peer-to-peer manner rather than via a top-down hierarchy controlled by experts or some other appointed group. In the United States, these talented non-institutional actors, who often begin their innovation for the greater social good, are able to spread their innovations throughout society due to the flexibility of venture capital in Silicon Valley, which gives them funding often despite their lack of formal university degrees or institutional affiliation to established companies.

It is precisely these kinds of non-institutional actors that do not have sufficient support in Europe now, and that can take huge advantage of the building of a Europe-wide constituency, by interconnecting initiatives, sharing resources, and building synergies. Bridging these new innovative networks with policy making at

local, and EU level is going to be a big challenge that this research will address in the next months of the research programme.

Network effects / types of collaboration enabled by DSI

As outlined in the introduction the focus of this research is digital social innovation where there is a collaborative element, or a network effect to the activity i.e. the service becomes more powerful when more people use it. It is however, important to distinguish between the very different types of networks and types of collaborations, both in terms of the scale of the network and the intensity of the collaboration we are seeing in the case studies.

Below we outline how DSI can be seen as supporting or harnessing different typologies of network effects:

Large scale collaboration	Distributed networking enabled by open infrastructures	Large scale mobilisation, advocacy and campaigning	Crowdsourcing non-financial and financial resources	Empathic networking, care, and support between peers
Harness collective intelligence to solve large scale societal problems	Bottom-up, networking, users control personal data	Mobilising critical mass to achieve social & institutional change	New instruments to mobilise resources for DSI organisations	Building strong ties, behavioural change

Table 11

- Large-scale collaboration to solve problems and shared distribution based on open products and platforms i.e. Arduino and Github are both examples of innovations where the total value of the service increases as individual users or clusters of users engage with it. In Arduino, the open hardware approach means that products developed by one part of the community are accessible for all other Arduino users, who might not have played any role in the original development of the products. This is also the case for Github, where code developed in one strand of the network is made freely available for the rest of the developer community. Furthermore methods such as crowdsourcing, or Challenge Prizes, can mobilise the innovation capacities of communities for solving problems and for experimenting new sustainable models.
- Distributed networking enabled by open infrastructures, open knowledge, and sensors Tor provides the best example of how the Internet enables users grow the value of a network with a social purpose through plugging in their devices to a 'network' and thereby growing the overall capacity for civic action, in the case of Tor, for online privacy. Another example is the work by Open Garden on facilitating the sharing of Internet between devices.
- Large scale mobilisation, advocacy and campaigning around common causes Crowdsourcing platforms for ideation, E-Petitions (i.e. Causes and Avaaz), Crowdfunding, and Crowd mapping, social networking and democratic decision making tools, are technologies that allow for the quick identification (and dismissal) of issues. Mobilising people though these platforms allow citizens movements, activists, and entrepreneurs to raise issues and come together online, vote and prioritise issues that should be acted on, thus shifting agenda, public opinions and influencing political decision-making. Open data such as the Open data Vienna initiative allow for citizens to mine previously closed sources of knowledge for problems and new opportunities.
- Crowdsourcing non-financial and financial resources towards a specific cause: while the type of collaboration described above relies upon indicating support and backing, many of the services we are examining in the case studies require (and enable) a more active collaboration, where users are involved in developing or crowdsourcing content. As an example, users of the Your Priorities platform collaboratively work on and prioritize proposals and thereby grow the value of these before they are represented to the

city council. The same is the case for crowd-mapping services like Crisis commons or Ushahidi platforms where it is the contribution of knowledge linked to a geographic location which grows the value of the service. As an example we, in this report, take a detailed look at the Goteo crowdfunding platform, but following on from that it then becomes interesting to understand the concept of 'crowdfunding' as a new way of financing social innovation.

- Empathic networking, care networks, and support between peers such as Tyze and Patients Like Me. While to date we have looked at what the case studies can tell us about digital social innovations, it is, following on from that, interesting to now investigate how digital technologies can support the process of social innovation.

Shifting from Closed innovation models to De-centralized Innovative Social Networks

The proposed vision is to facilitate the creation of a bottom-up Digital Social Innovation Eco-system that can exploit the European added value in the digital economy. Digital means that any data exist in binary form and in standardised formats so that can be aggregated and analysed in real time. Digital innovation today focuses mainly on data "mash-up" process, which synthesize new information by connecting, re-using, combining, and semantically aggregating and elaborating disjointed information extracted from a plethora of sources, in particular information generated by users (e.g. through social networks) or captured from sensors (Internet of Things). Interoperable, customised, and modular services and applications can be built in a dynamic and flexible way, plugging into existing and future Internet infrastructures. An "ecosystem" means that there is an interdependent and dynamic constellation of living organisms acting within a global socio-economic environment.

The Eco-system metaphor emphasises the need for a holistic and multi-stakeholder approach that Europe should give to Innovation, for instance linking DSI bottom-up activities with policy making at EU level. In addition, citizens should fully participate into the innovation process, applying collaborative and multi-disciplinary methodologies and other innovation tools to facilitate their involvement. Moreover, the DSI Ecosystem should be able to deliver social value, and to activate large-scale communities to mobilise collective action to solve structural problems. This will certainly maximise the societal impact of innovation and it would make sure that services deployed answer to concrete unmet local needs and demand. This process will create learning capabilities, and absorptive capacity, exploiting the creativity of Europe, building digital literacy, skills and inclusion.

A network between communities of users and DSI innovators is essential in order to both develop innovations and socialise them, thus building the critical mass needed to exploit the DSI network effect. Once the innovator shares the same social horizon with their community of potential users who benefit from their innovation, the innovator themselves must iterate their own concepts as rapidly as possible while remaining in rapid feedback cycles with their users: sketching user interfaces, asking questions, coding small demonstrations, and the like. As the feedback is continually elicited, the innovator makes sure their creation remains attuned to the world they are trying to change. In this sense, the close work with a small group in the very place where the group lives is of utmost importance. If an innovator is trying to create an application to reduce crime, she should move to a high-crime area to witness the kinds of life lived there. By linking differing communities and innovators via a social network, the innovators can more easily find meta-analogies between their problems and so develop bricolages of innovative techniques that would otherwise never be developed. Likewise, problems the community may take for granted as unchanging or not even noticed by members of the community.

As the network matures, each community itself should also be encouraged to themselves create the social innovation necessary to solve their own problems, as the rich insights that years of experience bring to bear can never be easily replicated. The technical predominance of the hackers and other digital innovator can be overcome by digital natives present in the community itself, so that the innovation becomes co-designed between the innovators and the community's more digitally-skilled members. Eventually the divisions between the "innovators" and the community are revealed over time to become increasingly arbitrary and the network itself becomes a community. And just as this happens on the micro-level with the development of individual innovations, on a macro-scale it develops in a European and ultimately global level as new edifices of interweaved societies and interlocking innovations are constructed.

Are there sustainable models? Towards building Digital Commons for Europe

Inefficiency is an inherent feature of all parts of society, and can be just as endemic to the private sphere of corporations as it is to the public world of civil servants. Indeed, the solution to the problem also crosses both the – often now dissolving – boundaries between the private and public spheres and prompts a focus on transparency and innovation. Without transparency, the waste of public funds and abuse of power cannot even be detected, and a climate endemic with the potential for abuse is created. The public sector faces a scenario characterised by shrinking budgets, increasing demand of services from their citizens, and the need to reinvent themselves in their quest to become smarter, more transparent and accountable. Without innovation, actual long-term solutions to social problems cannot be found. However, in terms of social innovation we find often the most inventive solutions to social problems come from outside government, from grassroots actors and civil society, but they struggle to build long-term, sustainable solutions that enable them to grow and scale.

A renewed public sphere should cultivate its own skills and knowledge, and work in networks across organisation boundaries – including the boundary between the private and public sphere. Imagine the case of developing a unified interface for public services in a City, as shown in the documented case study of City SDK: A commission of independent experts involving both grassroots activists and government employees gathered from across the city, each with a track-record of success in their particular neighbourhoods, would be more effective than so-called "independent" private contractor in determining how to best unify a website that can provide access to information about public resources in the city.

If a particular city like London cannot handle this task, they could ask another city, such as Manchester, for help. This commission of experts should not simply solidify their position as experts in creating websites, but share their skills so that the public service workers in London can maintain their own website without again gathering all the experts from the various boroughs or from a neighbouring city. The point is to spread the network so as to make local communities as digitally skilled as possible and capable of working in networks; thereby tapping into a variety of common resources, to solve large-scale problems, as exemplified by the Commons4EU project.

Digital social innovation activities and Collective awareness platforms can be also understood as "Digital Commons" and it is crucial to identify models of organisation of collective resources to achieve sustainability and scale DSI. The Commons model, as a Governance structure need to negotiate rules and boundaries for managing the collective innovations and access to, shared resources. The commons constitute a social and instructional construction that can lead to alternative and democratic forms of management of common goods, engaging a variety of stakeholders. Different DSI activities are experimenting new ways in which the commons can be governed through negotiated rules and boundaries for building and mobilising communities, managing the social production, distribution, and access to shared (financial and non-financial) resources.

Building and governing Digital Commons honours participation, inclusion, empowerment, equal access, and long-term sustainability. This research into DSI services and activities is showing possible ways to manage the commons and economic alternatives structures based on new institutions of shared, common wealth, grasping the value of networked social production. Even if it is impossible to foresee the precise impact and quantify the multiplier effect of the mapped DSI activities, there is a need to harmonise sound metrics to assess the impact of DSI activities, including the role of ICT networks, number of people/communities involved and "beyond GDP" criteria such as social satisfaction, well-being, ecological footprint and social inclusion.

In the next months of research, we will identify common benchmarking beyond GDP across organisations to better assess the social impact of the identified DSI solutions. The outcome will result in societal impact that can be estimated alongside traditional indicators, and an analysis of the level of sustainability.

We could observe from the example of the Makers ecosystem, that in order to build these distributed innovation network Ecosystems as sustainable and longer-term models, there is a need to take into consideration the barriers and opportunities to grow and scale the DSI ecosystem, and to analyse the following requirements that are emerging as enablers to foster and nourish the DSI ecosystems. The elements below have been identified as key enablers to reach sustainability of DSI initiatives:

- Mix of access to different resources and the creation of new capabilities by DSI organisations to mobilise resources and collective action
- Building communities based on the right mix of motivation and incentives, such as need, passion, and acquisition of reputation
- Access to knowledge, infrastructures, and open licensing schemes
- Mix of financial and non-monetary incentives and outcomes (beyond GDP and beyond monetization)
- New indicators and metrics are needed to measure the impact of DSI and to access what works and what doesn't to calibrate interventions and investments.
- Addressing barriers to growth and scale. Growth & scale is an ambition that should be fostered; you should not stay small and you should connect across boundaries. Reusability of solutions is key to scale without lock-in solutions
- Making social impact most important

Chapter 4 - Next Steps

Work Package 2 – Crowd mapping DSI organisations and activities

The challenges with this approach to date:

The complexity of creating the generative elements has led to a longer development time in the first phase, although filters are in the process of being implemented they are not yet live on the site.

The challenge of balancing quality and quantity within the data set is an aspect that we are constantly monitoring and making small changes to ensure that we get what is needed to make a reasonable assessment of the landscape without disincentivising participation by putting off too many respondents at an early stage – we have tried to mitigate this using the two-part validation process described above.

What the future development looks like:

The next stage of Work package 2 will include the Task 2.2, the development of the website. Although the website and survey is stable, there will still likely need to introduce minor adjustments in response to user-feedback from the study. Given the fact that we need to ideally reach up to a thousand organisations, there must be a concerted focus on Task 2.3 – Facilitate stakeholder engagement in the online platform. As the block in getting more input seems to be the fact that the website and survey is only in English, a multi-lingual version of the survey will be designed in French, Italian, and Spanish. There will also be outreach to see how best to engage actors in places currently under-represented, such as Eastern Europe and Scandinavia. Lastly, Task 2.5 will create infographics based on the data that can help visualize the most salient results of the survey.

It is our vision that the map will become central to all DSI activity in Europe; as a meeting place for like-minded people to come together to share ideas and experiences. The way in which the system maps organisations and the linkages between them, has the potential to become an international social network of practice around DSI and associated activity.

What has been created so far is the fundamental base on which the next layer of functionality and community will be built. However, at the moment the development is constrained by pre-allocated budget and time spend. Below we indicate the elements that will be possible within the future stage two implementation.

Digital Social Innovation web platform www.digitalsocial.eu
Crowdmapping DSI organizations, projects, and resources to engage and support the European Social Innovation community

The Digital Social site crowd maps DSI organizations and the projects they do. In the first phase of the research the mapping site has been mainly developed and used around the needs of the researchers, in order to map communities and their relationships, than serving the community.

We are now entering a second phase of development that will re-orient the experience much more around the user and the community, the engagement experience will be improved and the resources for the community will be highlighted using new content such as funding information and events. The new development should be completed by June.

Overview of objectives of the mapping

1. Mapping and visualising DSI Relational networks: Organisational profiles and their networks:
   - Who (what type of organization) is working with whom
   - What kind of projects (type of DSI activity)
   - Basic taxonomy by technology trends (open data, open knowledge, open networks, open hardware)
   - What impact they have (what domains, what reach)
   - We just develop a more compelling visualisation of organisational information and relational data
2. Mapping Resources and Founding for DSI in Europe
3. Promoting & Socialising main activities, events, outcomes
4. Linking up bottom up DSI community with EU policy makers and policy issues (e.g. regulation, new R&I programmes, public funding) and investors

Future development tasks

Code and data
Full information on the development so far and open source code can be found on the GitHub page here: https://github.com/Swirrl/digitalsocial/.

The website is a Ruby on Rails app, but uses Tripod and MongoDB instead of ActiveRecord. It has an RDF backend created with the Jena RDF engine. All public data is stored in a Fuseki triple store, and accessed via the ORM-like Tripod API. All private data is stored in MongoDB. The current homepage visualization has been created using OpenStreetMaps. Access to the Open Linked Data is provided in multiple formats: http://data.digitalsocial.eu/data.

The following list is a priority list for future development:

- Improve the UI
- Allow organisations entering data to self-tag descriptions of their organisations/activities and for these to feed into a Tag cloud navigation UI
- Add another Taxonomy, allowing to brows and cluster the initiatives present on the map according to the 5 categories we define in the study: New ways of making; (ii) Participatory mechanisms and open democracy; (iii) The sharing economy; (iv) Awareness networks enabling sustainable behaviours and lifestyles; (v) Open access and information Commons), and then with further levels of refinement base on country, language, actors, etc.. In this manner, the website would become not only a data source but also a kind of learning tool to understand what digital social innovation concretely means.
- Create better visualisation with the current relational data that can be exported (see here an example of the current visualisations)
- Better internal search system
- Addition of social network functionalities to the DSI mapping, so to allow creating and visualising dy-

namic clusters of similar activities, and allowing interactions between them

- Recommendation engine that makes suggestions based on similar organisations and projects
- Adding Twitter login option and other social plugins
- Improve organisational profiles (they can add pictures, upload content, or easily share events, funding opportunities etc from other sites)
- Add a section to the site that shows and visualises funding opportunities for organisations. N.B. these are likely to come from EC grants and crowdfunding projects such as CHEST
- Automation of DSI activity/events into event timeline

Long-term Vision (currently out of scope for this tender)

The current crowdmapping facility is a first step towards the creation of a DSI "networking platform" built around the DSI communities themselves, and sustained by them. As the platform matures, data and information can be validated by the community through recommendation and reputation mechanisms. This is our eventual goal as it indicates a point of transition from a platform that is run for the community to a networking platform that in the future will be run in a sustainable manner by the community. This development will represent an important step towards this.

Work Package 3 - Assessing Strategies

The first steps in Policy Research in WP3 will follow a hierarchical schema, starting from the identification of theoretical innovation frameworks that justify policy, their transformation in specific policy approaches by the most relevant agencies, to actual implementation in programmes such as Horizon 2020.

This hierarchical approach will be implemented following different strategies:

Theoretical frameworks
Literature review on Innovation, Policy and market and system failures will be the primary source that will inform this strand.

Grassroots innovation
Grassroots innovation is certainly a new area and little policy exists to address it. Therefore it is difficult to find concrete policy actions diverted to its promotion. However, there are intermediary organisations such as Code for America, Open Knowledge Foundation and Nesta that support these activities indirectly. Our research will therefore focus on the instruments that they use to promote it.

European Policy Programmes
The most relevant European Policy Programmes will be covered, with a special focus on the initiatives from the European Commission, particularly H2020 and work programmes, Digital Agenda, Social Innovation in DG Regio and Social Entrepreneurship in DG Enterprise.

In addition to that, a selection of initiatives from the European States will be covered. This selection will be done on the basis of their potential contribution to the research using expert interviews as the tool for its selection.

The outcome of this research will be a taxonomy of instruments, with their objectives, target groups and mechanisms. This taxonomy will be the basis for the identification of existing gaps in policy instruments.

The theoretical framework will provide an identification of actors that should be addressed by the instruments in an effective manner. Where they are not targeted either completely or partially, this will also identify a gap.

Once gaps have been identified, instruments will be evaluated in terms of their potential effectiveness and adequacy to the task at two levels: both the instrument itself and its design methodology. This will be conducted using interviews with experts, which identify the main failures and shortcomings. These shortcomings will be matched with the design methodology in order to assess if they are a result of the execution or they are rooted in the methodology used for its design.

Work Package 4 - Engaging Stakeholders

To support the growth and spread of DSI it needs traction on multiple levels within the EU, from citizens and developers/practitioners to decision-makers and legislators. Engaging stakeholders, therefore, becomes an important part of both the work on identifying organisations, mapping initiatives and experimentation, as well as in the development of recommendations on strategy, policy, and research. The partnership sees engagement both as a means of undertaking research and gathering knowledge from practitioners, geeks, policy makers and academics, and as a means of ensuring the involvement of these stakeholders in the on-going development and exploration of the DSI agenda. As part of this, the research team will organise two large open workshops during the research, as well as attend events that target and engage different audiences, from policy roundtables to hackathons.

Work Package 5 - Experiment and Pioneer

Because policy aims to shape the behaviour of economic agents by tapping into their motivations and incentives, experimentation has been increasingly used to validate and test policies, particularly in fields such as social innovation where individuals or small companies are the main organisations. This is certainly the case for the policies that this project aims to develop and therefore it is natural to follow this stream of research, validating assumptions in policies through quasi-experimentation techniques. Experiments in spurring innovation with Open Challenges and prizes are now taking place around the world, by governments, corporations and charities - tackling both technical and social challenges.

Work Package 6 – Recommendations

The objective of this work package is to compile the learning of the project by distilling a set of policy recommendations for Digital Social Innovation.

In order to accomplish this objective a policy framework for digital social innovation will be elaborated, building on theoretical insights and best practices in the field. The framework will place special emphasis in five aspects:

- Mechanisms to foster DSI. Exploring the potential of different mechanisms such as open data, crowdsourcing/crowdfunding, Living Labs, etc. and comparing these to more traditional approaches.
- Reaching DSI entrepreneurs and grassroots communities. Finding new ways to reach, create awareness and empower digital entrepreneurs at local and global levels.
- Governance modalities for DSI. Innovation is transitioning towards ecosystems and governance models for social innovation coming from the public sector or public sponsored projects, such as (Knowledge and Innovation Communities (KICs), Public Private Partnerships (PPP), Joint Technology Initiatives (JTIs). This is, in many ways, uncharted territory. Focus will be given to new governance models, looking at openness, interoperability and adopting a holistic and multidisciplinary approach.
- Research instruments and financing tools. Which research instruments and financing tools, such as pre-commercial procurement, can be effectively used under the forthcoming research programmes (Horizon 2020) and how could they involve all the constituencies?
- Impact assessment methodologies. The definition of sound impact assessment methodologies with a mixture of quantitative and qualitative indicators.

Appendix 1 - DSI Case Studies

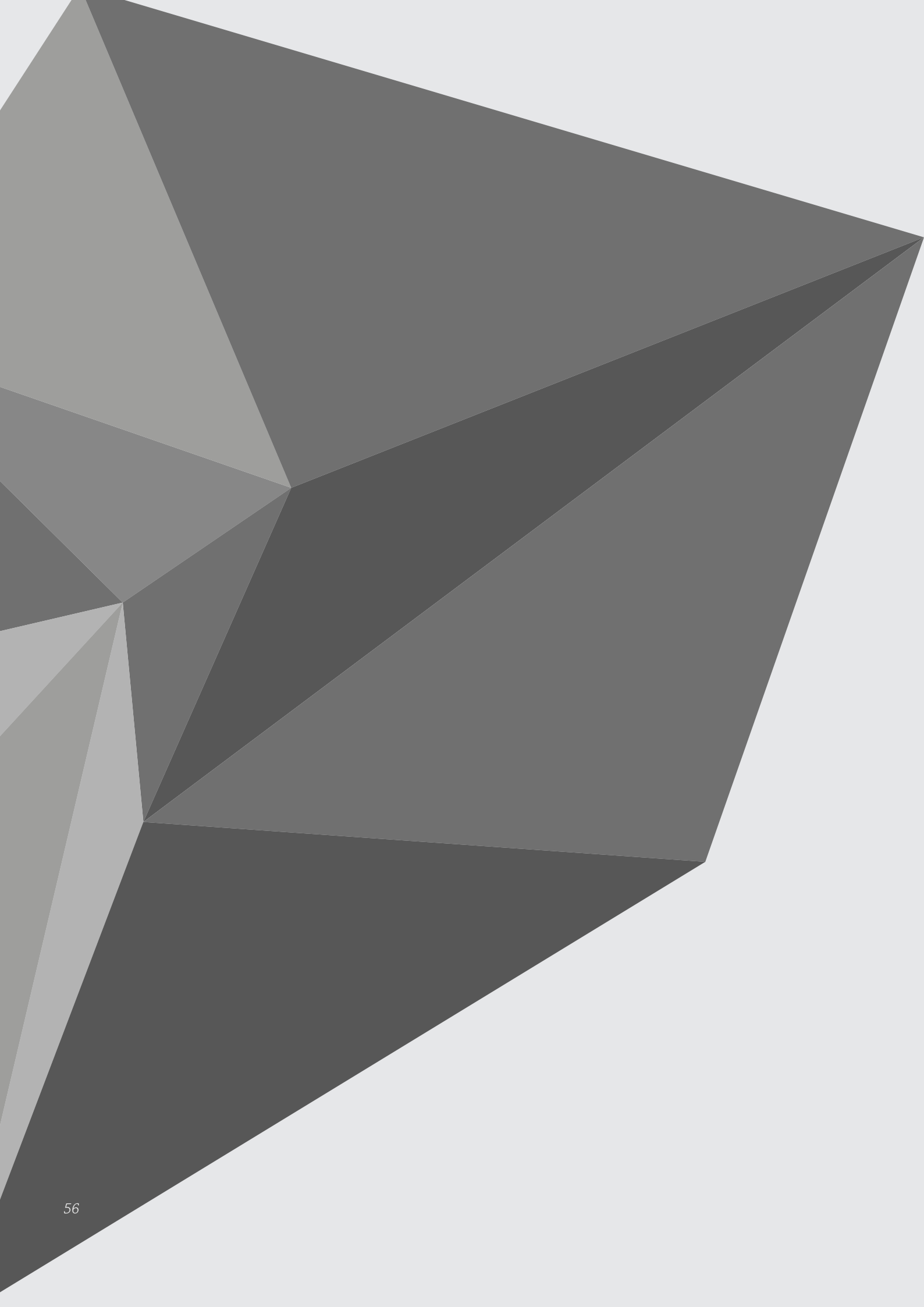
The following appendix provides an overview of the case studies that has been used to inform the framework for grouping DSI organisations and developing our understanding of the characteristics of these organisations and their activities.

The case studies have been written up in format that helps inform the research.

Index of Case Studies

DIGITAL SOCIAL INNOVATION

Case Studies



Arduino

At a glance:

Type of Organisation:	Business
Aim:	Energy and environment, Smart public services, Pioneering science
Technology Trends:	Open Networks, Open Knowledge, Open Hardware
DSI activities:	A network, Operating a DSI service
Key facts:	Over 300,000 official Arduinos has been commercially produced
Website:	http://arduino.cc/

Organisation Name

Arduino

Short description

The core to an Arduino is a simple, ultra-low-cost circuit board, based on an open-source design, armed with a microprocessor which can be programmed with simple, open-source software tools by the user. The idea is that anyone should be able to turn an Arduino into a simple electronic device such as a light switch and sensor.

Type of organisation

Arduino is a business based in Italy.

History and mission

Released in 2005, Massimo Banzi, an Italian engineer and designer, started the Arduino project to enable students at the Interaction Design Institute Ivrea (IDII) build all kinds of electronic contraptions using an open-source hardware board. The software consists of a standard programming language compiler and a boot loader that executes on the micro controller. The project first started with 3,000 euros for the production of 200 units, but when IDDI bought only 50 units, the Arduino team decided to put the remaining units up for sale; and developed a business after realising the board's broader applications for multidisciplinary projects. Arduino has since grown to become popular–selling around 200,000 units in 2011–largely because of its creators' decision to make the board's design "open source" and its quick adoption by hobbyists, artists, scientists, and 'makers.'

What does it do, and how does this activity enhance social innovation?

Arduino is a key player in the international maker movement of D.I.Y. hardware hobbyists and tinkerers. A quick survey of the multitude of diverse projects demonstrates how it has enabled a spin-off of collaboration and creativity. Furthermore, Arduino's ready acceptance that sometimes its own community will have better solutions to some of the technological challenges they encounter (see for example the case of Complubot elaborated on below, where Arduino co-founder Massimo Banzi enlisted the help of two Spanish kids who had made a prize-winning Arduino powered Complubot robot, when he was approached to make an educational Arduino-based robot for kids). This demonstrates an ability to devolve power outside traditional channels in order to enable innovation to occur.

What is the social impact it is seeking, including any evidence of impact to date?

The arrival of Arduino is said to mark the move from open-source software to open-source hardware. Arduino has been described as "LEGO for electronics" in its easy-to-use approach. Furthermore, Arduino has significantly lowered the economic barriers to D.I.Y. electronics thanks to the product's low cost and open source business model. The Arduino designers freely share the specifications for anyone to use, and third-party manufacturers all over the world offer versions of their own, which are often further developed for specific purposes.

Importantly, the social impact of creations developed by Arduino users themselves has been notably wide-reaching – an interesting example with a clear social impact is PHDuino . This is an example of how student scientists are using Arduino-based hardware to replicate scientific equipment using more readily available components in developing countries.

Furthermore, the company highlights that official Arduino boards are "made in Italy", thus not using cheap labour and low quality materials: to emphasise this they had the Italian map stamped on the front of the first board, and also the names they used recall their Italian origin (e.g. Arduino Duemilanove, Arduino Diecimila, and Arduino Uno which is the latest version).

What is the role of the organisation within the DSI ecosystem?

Much like GitHub and Raspberry Pi, Arduino might in some ways be said to form part of the very DSI architecture. Various educational and innovative projects and products have been built on the back of Arduino's hard and software. This is very likely the result of Arduino's clear organisational focus on collaboration and sharing amongst its community.

What technological methods is it using?

Arduino has been designed so that it can sense the surrounding environment by receiving input from a variety of sensors and, vice versa, can affect its surroundings by controlling lights, motors, and other actuators. The micro controller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software running on a computer (e.g. Flash, Processing, MaxMSP).

The boards can be built by hand or purchased preassembled and the software can be downloaded for free. The hardware reference designs (CAD files) are available under an open-source license, and users are free to adapt them to their needs. While the hardware used to power Arduino is open-source, Arduino software is also open-source. The source code for the Java environment is released under the GPL and the C/C++ micro controller libraries are licensed under the LGPL.

What technological methods and tools is it using, and what did these enable that was not previously possible?

During a TED Talk on Arduino, Banzi said Arduino has been a significant catalyst in the 'Makers' Movement.' Arduino has in many senses heralded a paradigm shift from open-source software alone to open-source hardware. Correspondingly, Arduino's low economic threshold has removed a lot of potential barriers to users previously excluded from getting involved in D.I.Y. hardware and robotics – the availability of Arduino hardware design blueprints for download has meant users who ordinarily might not have been able to afford or order the boards have been able to build the boards themselves by hand.

Enhancing collaboration and engagement: DSI network effect

The other way in which Arduino demonstrates technological collaboration is the way that Banzi has relied upon pre-existing advances made by the Arduino community when trying to find particular technological solutions: For example, take the case of a Spanish team called Complubot composed of two kids: Nerea and Iván. Together with their coach, Eduardo, they competed for – and won – the Soccer B category at the World Series of the RoboCup Junior (for high school students). When Arduino co-founder Massimo Banzi was approached to make an educational Arduino-based robot for kids he contacted the Complubot team to enlist their help because of their knowledge and experience in this area.

The Arduino@Heart program is a Brand License Agreement designed for makers and companies wanting to make their products easily recognisable as based on the Arduino technology with a fee for them reaching the maximum of five per cent of the wholesale price. Arduino supports @ Heart partners through promotion of their brand, products and content on its site and social networks with links to documentation and tutorials. This helps ensure that partners' brands are marketed to the right target groups and are clearly associated with Arduino. Incidentally, one of these Arduino@Heart is the Smart Citizen Kit – a hardware kit to gather environmental data, which itself is the subject of one of the case studies in this report.

How is the organisation funded?

The organisation makes a relatively small amount from the sale of each board (only a few euros of the total price), which gets rolled into the next production cycle. The Arduino team has created a company based on giving everything away. On its website, it posts all of its trade secrets for anyone to take – all the schematics, design files, and software for the Arduino board. Arduino design plans can thus be downloaded and manufactured by anyone; as there are no patents. These plans can be sent off to a factory, where the circuit boards are mass-produced and sold by anyone who wishes to do so - without paying the Arduino team anything in royalties.

All of this is allowed to happen because the Arduino board is a piece of open source hardware, free for anyone to use, modify, or sell. Banzi and his team have spent precious billable hours making the thing, yet unlike conventional proprietary business models, they sell it themselves for a small profit – while allowing anyone else to do the same.

Arduino offers an interesting example of how an organisation might be sustainable and open in nature. In fact, the organisation's more significant income comes from clients who want to build devices based on the board and who hire the founders as consultants.

What were the main barriers to innovate?

Many questioned if it would be possible to forge a sustainable business model considering the entire basis for Arduino relies upon open source technologies (in fact, the only piece of Intellectual Property (IP) the team protects is the name Arduino, the main asset of the company which is trademarked in order to ensure that the brand name is not negatively influenced by low quality copies. Anyone who is willing to sell boards using that name has to pay a small fee to Arduino). Despite this, Arduino has established itself as a thriving worldwide business – in spite of giving away all the data required to build Arduinos completely free.

Some commentators have gone further to suggest that Arduino has also short-circuited most conventional industrial infrastructure by 'placing the ability to create wealth directly in the hands of private individuals.' In many respects, Arduino has charted an alternative modus operandi for technology companies of the future: the notion that companies and private individuals can give away their primary products, while making a living on the sideline activities that such donations attract.

What really helps achieve these goals?

Arduino's success can undoubtedly be explained by the sheer scope and breadth of its applicability – a quick scan of some of the projects built using Arduino demonstrates how it has been used by scientists, hobbyists, artists, and students for various projects – and to great effect. Yet other than Arduino's broad appeal, its success can be attributed to a number of factors:

Creative Commons Licensing – Arduino release all of the original design files (Eagle CAD) for the Arduino hardware. These files are licensed under a Creative Commons Attribution Share-Alike license, which allows for both personal and commercial derivative works, as long as they credit Arduino and release their designs under the same license.

Low production costs – while it's possible for Arduino enthusiasts to have their own board manufactured, production costs and profit margins on the boards have been kept low enough for people not to be deterred from investing in a board.

'Open Business Model' – This means there has been a community willing to co-design and collaborate with the founders, who can tap into this pool of expertise and specialisation as needed to offer bespoke consultation services and products to their clients.

Open Source Software – Not only the Arduino hardware is open; the Arduino software is also open-source. The source code for the Java environment is released under the GPL and the C/C++ micro controller libraries are under the LGPL.

Avaaz

At a glance:

Type of Organisation:	Not for profit
Aim:	Participation and Democracy
Technology Trends:	Open Networks, Open Knowledge, Open Hardware
DSI activities:	Operating a DSI service
Key facts:	Approximately 28 Million Users Worldwide. Has taken 155,896,453 actions since January '07, in 194 countries
Website:	http://www.avaaz.org

Organisation Name:

Avaaz

Short Description

Avaaz is an independent, not-for-profit global e-petitioning and campaigning network that works to ensure that the 'views and values of the world's people inform global decision-making.' Avaaz relies entirely on small donations and receives no money from governments or corporations (see more details of spending breakdown below). This global organisation is run by a small, highly-skilled online team of 11-50 employees, with most staff working collaboratively in a "virtual office" environment from four continents so as to ensure 'even the smallest contributions go a long way.'

History and core mission

Avaaz –which literally means "voice" in several European, Middle Eastern and Asian languages–launched in 2007 with a simple democratic mission: 'close the gap between the world we have and the world most people everywhere want.'

Avaaz seeks to empower millions of people from all walks of life to take action on pressing global, regional and national issues, 'from corruption and poverty to conflict and climate change.'

What does it do, and how does this activity enhance social innovation?

At its simplest Avaaz is an online e-petition service, where anyone can launch a petition on a cause close to their heart, just as any Avaaz member is free to sign any of the petitions should they agree with it. Current campaigns include a petition for the ban on trading of lions, another on is on awareness of human rights in Tibet.

As a community Avaaz is unique in its ability to mobilize citizen pressure on governments all around the world to act on crises and opportunities anywhere, within as little as 24 hours. With the launch of its new Avaaz Community Petitions, Avaaz appears to have further expanded the capacity of individuals to reach out to others in order to become mobilised on pressing global, regional and national issues. According to the Avaaz website, their "model of Internet organising allows thousands of individual efforts, however small, to be rapidly combined into a powerful collective force."

The scope and breadth of the organisation's reach is palpable when one considers the organisation campaigns in 15 languages, is served by a small core team of 52 full-time staff worldwide, has thousands of volunteers in all 192 UN member states, including Iran and China, and over 28 million members worldwide. Avaaz members take action: signing petitions, funding media campaigns and direct actions, emailing, calling and lobbying governments, and organising "offline" protests and events – as part of their bid to have the voice of the world's people enter and shape consequent dialogue around decisions that affect us all.

What is the social impact it is seeking, including any evidence of impact to date?

Although the effect of e-petitions is still unclear, their ubiquity online makes them a critical area of study for social scientists interested in the impact of e-democracy. As mentioned above, Avaaz.org has over 28 million members worldwide, with their largest e-petition receiving over 14 million signatures (Hill, 2010). Researchers also believe that particular groups on the Internet may benefit from the strategic opportunities offered by e-petitions, allowing collective action against big businesses, governments, and international organisations (Postmes & Bruntsing, 2002).

While Avaaz has evidently been successful in enlisting the help of large numbers of supporters, critics of this form of crowdsourcing, like Internet theorist Evgeny Morozov, have claimed Avaaz promotes a form of "slacktivism," claiming that they encourage previously tenacious activists to become lazy and complacent. While this may be the case with earlier Avaaz petitions, their Stop Rupert Murdoch campaign suggests a concerted effort to move beyond cyberspace into more direct action paradigm. Similarly, their site encourages the use of both online and offline channels to generate the greatest impact of members' campaigns.

Speaking directly on their influence in the proceedings brought against Rupert Murdoch, Avaaz's founder, Ricken Patel has said their "activism played a critical role in delaying the BSkyB deal until the recent scandal was able to kill it". Last November, in collaboration with 38 Degrees, a similar online campaign group, Avaaz sent 60,000 complaints to Ofcom during its initial review of the BSkyB merger. Through the winter, Avaaz continued, shifting its aim on to David Cameron and culture minister Jeremy Hunt. Shortly before the New Year, 50,000 of its 700,000 British members sent the pair messages that called for a full investigation into the deal. In early March, after Jeremy Hunt decided that the merger would not compromise Sky's editorial independence, Avaaz mobilised another 40,000 complaints (which all had to be read by DCMS officials) and organised several stunts, including pickets outside the Royal Courts of Justice and Hunt's constituency surgery. Avaaz argues that this –

coupled with its 160,000-strong petition in early July – led to the merger decision being delayed until September, which was then referred to the Competitions Commission, and was finally forgone by Murdoch altogether.

In broader terms, a joint report produced by Information Society Unit at the Institute for Prospective Technological Studies (IPTS) and co-financed by IPTS, and the European Commission's Directorates General Education and Culture, Information Society and Media, and Enterprise and Industry during 2007 and 2008, suggests that indirectly, Social Computing applications also empower Civil Society Organisations (NGOs, voluntary groups, associations, etc.), which play a significant role in fighting social exclusion. Concretely, it enables easier participation, wider knowledge aggregation and broader dissemination, and as a consequence, improves resource collection and operational efficiency.

According to this same report, another potential area of impact of Social Computing sites such as Avaaz, is the potential for adoption by a large number of organisations belonging to the so-called third-sector (charities, NGOs, voluntary groups, associations etc.) which play a very important role in fighting many of the root-causes of social exclusion and in assisting socially-excluded people. Organisations such as Avaaz have offered an alternative conception about how these organisations might increasingly adopt Social Computing applications to manage, promote and run their activities, and change their ways of organising, recruiting, raising funds, and broadly enhancing their transparency and responsiveness. In fact, Social Computing is even seen to challenge the established mode of operation of the third sector, by favouring light structures of engagement based on technical solutions which make it easier to link volunteers and activists with a cause and with the resources to support it, without the need for a stable organisation.

Certainly more metrics are needed to measure the impact of e-petitioning and Social Computing. This is critical in the context of informed policy implications. According to the IPTS, the most urgent need is certainly for new metrics to address the emergence of new social media, and in general, for systematic measurements and internationally comparable data. These would enable better assessment of the long-term importance of Social Computing trends in terms of their socio-economic impact, and the quantitative and qualitative differences between the EU and the rest of the world. With specific regard to Avaaz, comparative data would enable researchers to identify which regions have had greater successes through e-petitions, and might allow links between causation and correlation to become clearer.

What is the role of the organisation within the DSI ecosystem?

Builds an online community premised upon civic participation and engagement; seeks to influence global decision-making through various online campaigns and petitions.

According to the Avaaz website, the organisation employs a technical team to make sure the website is constantly secure. The site is also verified by Geotrust, a world leader on Internet security verification. The Avaaz donation pages have addresses beginning with https:// rather than http:// thus signalling they are secure pages.

The site is well integrated with other social media platforms, allowing users to easily share online petitions or campaigns. According to Matt Holland– Avaaz's Online Director, like other high-capacity web services, Avaaz's hosting platform is complex and includes a physical server farm, a content distribution network, and some resources served through Amazon's cloud services.

Avaaz's ability to quickly mobilise citizens to pressure relevant targets to act on crises and opportunities anywhere, within as little as 24 hours, is something that could not have been possible without the Internet. It can do this well beyond the bounds of a particular country, to draw global attention and potentially gain crucial critical mass on what might have been in the past a localised or isolated issue.

Furthermore, in an effort to be more accountable to its members (and to follow its 'bottom-up' democratic mission), Avaaz has pioneered a process of consultation with its members (to be carried out annually) via technological channels. As part of this half a million emails were sent out imploring its members – those who have signed previous petitions, or participated in other actions – to answer an extensive online poll on what should be done in 2013 regarding the direction and future of the organisation. The resulting ballot is perhaps one of the 'biggest exercises in direct democracy ever undertaken': across millions of members, 14 languages, and over a hundred countries.

Questions range from what the general priorities should be (at the time of writing, "human rights, torture, genocide, human trafficking" is top, while "food and health" is lowest priority), to specific campaign suggestions, to how seriously Avaaz staffers should take the poll: at present, 86% of members seem happy for the staff to use it just as a guide, while only 6% think it should form a binding mandate.

It has been through the use of technology in this way that the potential input of Avaaz's member community (which now stands at over 28,000,000 people worldwide), could be factored into the organisation's future goals.

Enhancing collaboration and engagement: DSI network effect

With the launch of Avaaz Community Petitions in 2012 the capability of the organisation's social mission seems set to expand. Avaaz Community Petitions is "a new web platform that gives people around the world the power to start and win campaigns at the local, national, and international levels". It is "a crowd-sourced part of Avaaz, the largest-ever global web movement bringing people-powered politics to decision-making everywhere".

It was initiated by social movement activists and encourages people to participate through an online platform and organising & campaigning. Avaaz.org Community Petitions is local, national and global in orientation and concerned with democracy, politics & representation, economy, education, environment & sustainability, anti-discrimination, equality & social justice, health, human rights, international development, public services and neighbourhood & community.

How is the organisation funded?

Avaaz is 100% member-funded and thus only accountable to its members – not to major donors, foundations, or any special interests.

While Avaaz is a global organisation with staff and members across the world, they are currently incorporated as a non-profit 501(c)4 organisation in the state of Delaware, USA. Under New York State law.

The US Internal Revenue Service requires Avaaz to declare and account for their expenditures in each of the following 3 categories: Management and General, Program (i.e. Campaigns), and Fundraising. Avaaz describe how the financial transparency has had the effect of adding value to the organisation. This has been a useful tool for those wishing to quickly assess the financial focus of the organisation (and was doubtlessly a useful tool when Avaaz put the future direction of the organisation up for democratic vote amongst its members). For instance, in 2010 Avaaz had a total revenue of $6,664,634, whereas its total expenditure was $5,574,908 - which was broken down as $4,613,013 - which was spent on Avaaz programmes, i.e. campaigns (83%), $777,620 on management and general (14%), and $184,275 on fundraising (3%). Transparent financial reporting in this manner certainly aligns itself well with Avaaz's mission to be accountable to its members.

What are the main barriers to innovate?

Security Upgrades: One challenge Avaaz was forced to overcome was a "massive" persistent cyber attack, which it believes a government or large corporation was behind. Hours after the initial attack, the organisation made a public appeal on its website, revealing that a 44-hour distributed denial of service (DDoS) strike hit the organisation's IT infrastructure. That update also revealed the scale of the hit was equivalent to 20 times Avaaz's highest traffic in its history, taking the site down for a total of 14 minutes. The FBI has also been informed about the attack. While Datagram (the site's hosting company), Croscon (who perform ongoing security audits of the site's servers) and Arbor Networks (who provided defensive hardware which helped fend off the attack) all supported the organisation throughout the attack, Avaaz were advised to further upgrade their IT security in the event of similar future attacks. Avaaz consequently launched a campaign (the first of its kind in over 5 years) asking for donations to allow for this security upgrade.

Avaaz's site shows that almost 42,000 people have donated to this campaign. According to Ricken Patel (Founder of Avaaz), the specifics of how the generated funds will be used are still being planned, but will very likely be used to employ a full-time or part-time security office; upgrade to the service level for defensive tools; traffic analysers to more effectively track the source of attacks and upgrading capacity of firewalls. In addition, the fundraiser will also have a wider range of objectives, such as helping to ensure the physical security of the organisation's staff.

According to Patel, the funds generated should support this priority for some time to come: "That's part of how online fundraising and campaigning works – you leverage bursts of engagement from our membership with particular priorities and campaigns to generate longer term sustainable impacts."

What really helps reach goals/ how to overcome these barriers?

Part of the success of Avaaz's model relates to the ease with which potential petitioners can create community petitions. This can be achieved in three simple steps. First, users enter basic information about the anticipated campaign (such as the campaign's goals, targets, as well as the problem the campaign seeks to address). Following this, the user is provided with a preview of the campaign and then given the option to make it live for anyone to sign. Now that the campaign has been made public, users are encouraged to disseminate and share their campaign. All this means that within minutes, community members can start getting the word out on issues that matter to them.

Useful tips are offered to members to assist them in generating the greatest impact with their target, as well as the potential of using on and off-line channels to greatest effect.

Citizens Foundation Your Priorities

At a glance:

Type of Organisation:	Social enterprises, charities and foundations
Aim:	Participation and democracy
Technology Trends:	Open knowledge
DSI activities:	Operating a DSI service
Key facts:	In Reykjavik, Iceland, 40% of citizens use the Your Priorities platform
Website:	https://www.yrpri.org/

Organisation Name

Citizens Foundation (including the Your Priorities platform)

Short description

Your Priorities is a web-based platform developed by the Icelandic Citizens Foundation. The platform enables groups of people to develop and prioritize ideas and together discover which of these ideas are deemed the most important to implement. Since 2008, the Citizens Foundation has used Your Priorities to promote online, democratic debate in Iceland and worldwide, and the open source platform is available free of charge to any group, city or country around the world interested in using the platform to source ideas from citizens. The most prominent use of the platform to date, is its application in Reykjavik, Iceland, where the city uses the platform to source ideas from citizens to be debated in the city council on a monthly basis.

Type of Organisation

The Your Priorities software is open source and the product of the Icelandic nonprofit Citizens Foundation based in Reykjavik.

History and Mission

The mission of the Citizens Foundation is to bring people together to debate and prioritize innovative ideas to improve their communities.

The Citizens Foundation centres upon the belief that great ideas can come from anywhere –not only from politicians. They look at the Citizens Foundation as a startup enterprise, and in many senses the design and functionality of their websites, products and services might be thought of as an attempt to re-design democracy itself. As Gunnar Grímsson, one of its founders explains 'The key metric of success for our websites is participation. Without participation there is no democracy'.

Created in 2008 in the wake of Iceland's economic collapse, Citizen Foundation founders Gunnar Grímsson and Róbert Bjarnason describe how they decided to develop the platform because they felt the economic collapse was as much a democratic crisis as a financial one. To address this perceived loss of trust in politicians, these civic hackers stepped in to encourage citizen participation in governance. Their key offering was the open-active-democracy-platform Your Priorities, which could help citizens debate and prioritize issues in Iceland and beyond.

In the 2009 Reykjavik mayoral elections, the platform gave equal space to all parties. The Best Party used it most widely, and went on to win the election. During the election, 10% of Reykjavik voters voiced ideas on the site, 43% of voters viewed the site, and over 1,000 priorities were created. As a result of its popularity during the campaign, it became integrated permanently into the city's administration, in the form of the Better Reykjavík website, which is built on the Your Priorities platform.

.What does it do, and how does this activity enhance social innovation?

The Your Priorities website enables citizens to voice, debate and prioritize policy ideas, budget decisions and micro-issues affecting their neighbourhood. The best ideas with the most support are elevated to the top and actioned on. The type of 'action' depends on the organisation using the platform. For example on the Better Reykjavik website, each month the top ideas in all categories are gathered by city officials, debated in the city council and where possible sent for processing by the city, keeping citizens informed all along the way. In Estonia, the People's Assembly are also using the Your Priorities platform. The Estonian President has promised to put forward the citizens priorities as law proposals in the Estonian parliament.

What is the social impact it is seeking, including any evidence of impact to date?

Open Active Democracy: Citizens Foundation believe that democracy is under threat, especially as a result of the lack of participation by young people. They hold that the Internet is the best way to reach out and motivate this younger generation to participate in democracy, and that this is the direction of democracy in the future. To this aim, the Citizens Foundation have designed and developed a number of products and services that are intended to put pressure on authorities to do their job properly, as well as harnessing the minds of the masses. The integration of the platform in to Reykjavik city is the strongest evidence of impact of the platform to date. Indeed the main reason the Citizens Foundation was awarded a European e-Democracy Award for their Better Reykjavik website was because of its perceptible impact – in 2011, at the time of the award, the site involved 40% of Reykjavik's citizens and obtained direct implementation of many proposals in political programmes.

What is the role of the organisation within the DSI ecosystem?

Through making the Your Priorities platform available as open source to other organisations, the Citizens Foundation is actively facilitating the easy spread and uptake of their new service.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: The platform relies on the ability of crowds to convene online and deliberate at scale, without being limited by geographical distance or organisational affiliation and hierarchy.

Open Source and Open Collaboration: The platform is open source and free for anyone to download and use, which has led to the spread of the model via the Internet beyond Iceland. Open Active Democracy is the software that powers Your Priorities. As well as being made available on GitHub so that like-minded civic hackers can contribute to and improve this coding, users are also encouraged to translate the site's contents if they are able to do so.

Integration: The fact that Citizens Foundation's website, Better Reykjavik is well integrated into the official political structure – means that citizens can observe how their opinion has the capacity to shape real political debate. This demonstrates how e-democracy has the potential to improve democratic accountability (and therefore legitimacy).

Enhancing collaboration and engagement: DSI network effect

As an organisation, Citizens Foundation remains resolute in its commitment to facilitating re-use of its products and platforms. The organisation is now working on and looking for funding for a democracy project in the Balkans. Currently there are 11 projects from 7 countries signed up with different focus on how to use e-democracy to improve their communities. 'One of the key things is the transfer of e-democracy knowledge from Iceland and Estonia to the Balkans as well as knowledge transfer between the Balkan countries. There are 3 projects from Serbia, 3 from Kosovo and one each from Albania, Bosnia, Croatia, Montenegro and Macedonia.'

How is the organisation funded?

Donations: While users can use the website totally free of charge, the website features an integrated tool to make donations to the Your Priorities project. As a nonprofit organisation, donated funds ensure continual development and maintenance of the Your Priority software.

Social Enterprise services: Cities, countries and groups can also pay to use some of the Your Priority services. The price of these services is contingent upon how many users they have.

What are the main barriers to innovate?

Official political incorporation: importantly, official political buy-in is necessary for platforms like Your Priorities and websites like Better Reykjavik to operate properly.

Marketing and PR: "If you build it they will come" is a famous quote from the early days of the Internet – this was never quite true and certainly is not today. Marketing and promoting a website is a lot of hard work and costs money. As 'democracy nerds' the Citizens Foundation team are worried that most of our social lives are being run by one company, Facebook. But as entrepreneurs they point to a tendency to always try to turn problems into opportunities. Doing so has enabled them to exploit Facebook, finding that it is one of the best ways to attract people to electronic democracy both via sharing and Facebook advertisements.

User Interface: There needs to be as little friction as possible for taking part. Therefore, the team have, for example, made it possible for people to login and participate using their Facebook login. The user interface has been simplified in every generation of the software to enable more people to participate more easily.

Incentivising engagement: To make taking part fun and rewarding, Citizen Foundation websites enable people to earn 'Social Points' for writing up points for or against ideas that many people think are helpful – these can be used to buy promotions for ideas that appear as banners at the top of the page. Another potential initiative in this category that the team are considering is that users could be offered cash prizes for participating: 'You might, for example, have an idea drive to find the best ideas to save money in a given category and give a cash prize to the citizens that come up with the most practical and socially acceptable ways to save money.'

What really helps reach goals/ how to overcome these barriers?

Iterative Learning and Prototyping: Importantly, neither the Your Priorities nor the Better Reykjavik websites were Citizen Foundation team's first attempt at creating an 'electronic democratic' web platform. Rather, these websites are a 'better iteration' of their pilot project, Shadow Parliament– a project which aimed to document and scrutinise the actions of the government. Founders Gunnar Grímsson and Róbert Bjarnason report that Shadow Parliament never gained the critical mass of users required for it to work effectively, but it served them well as a pilot project for their later projects.

Official Buy-in and Partnership: One of the obvious factors which the Better Reykjavik project has benefitted from is the surprising degree of official buy-in from the city council. This is largely a consequence of the Better Party's (Icelandic: Besti flokkurinn) early adoption of the Citizen Foundation Web tools which they used as a guide for their policy focus. The decision to integrate, and in many respects institutionalise, the scheme into the city's administrative system first voluntarily, but later through an official partnership from the 19th October, 2011 has been critical to the project's success. Incidentally this decision has been mirrored to some degree by the national government with the Citizen Foundation's subsequent project, Better Iceland.

As a result of this official partnership and open collaboration, the Better Reykjavik platform has provided citizens with the opportunity to see how their input can directly influence policy. Once a month, the City Council is now committed to meet to discuss the five most popular ideas across the board; as well as the most popular ideas in each of thirteen categories on the website. Citizens involved in supporting a particular

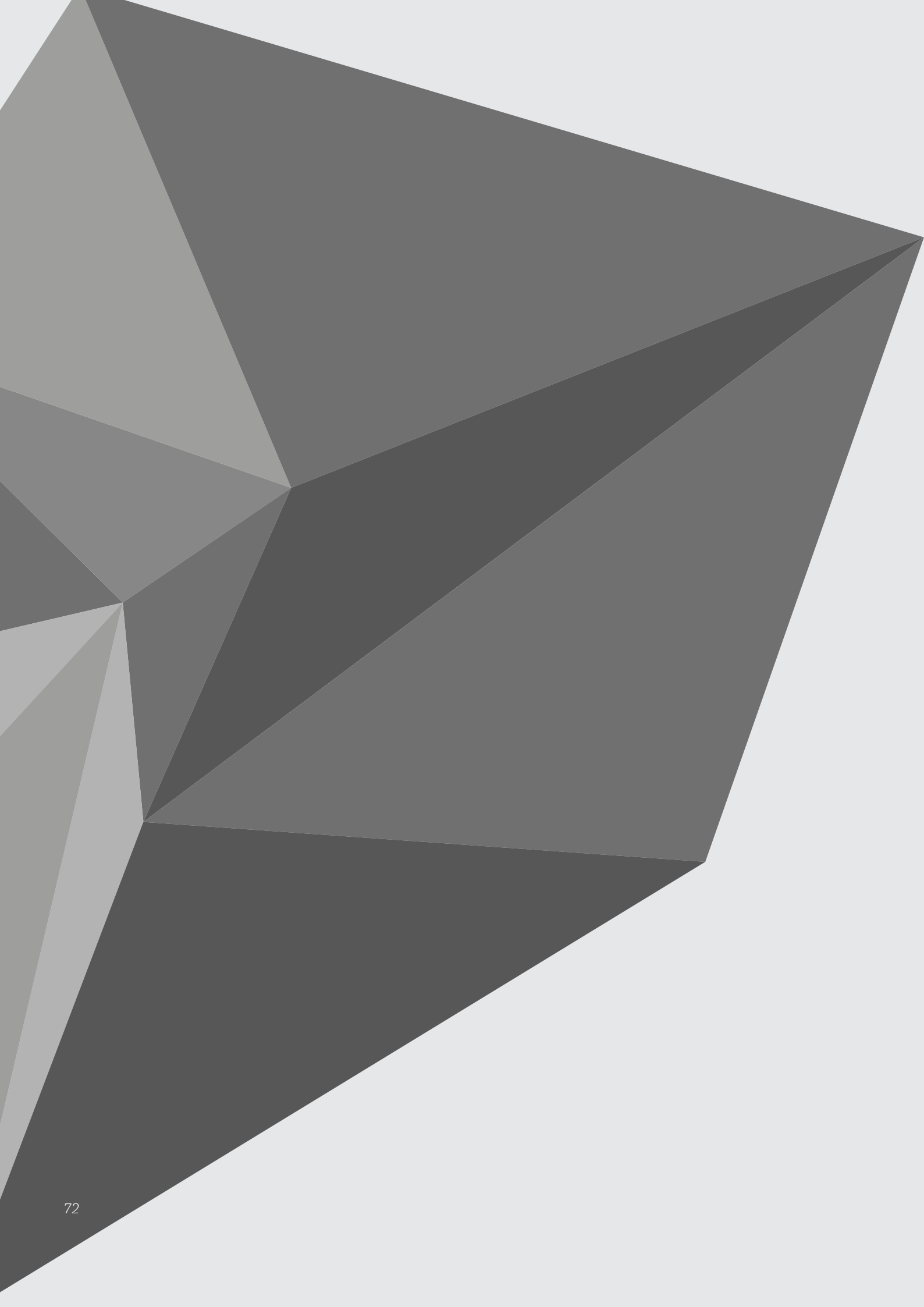
proposal are given regular updates from the city council regarding its viability and processing. This has the result of encouraging greater dialogue between the city council and citizens.

The Pirate Party has adopted a similar model in the context of Better Iceland, using the most popular ideas on the website as a guide for questioning the government, but also as a tool for future law proposals.

This 'official buy-in' has doubtlessly lent an added degree of legitimacy to the Citizens Foundation democratic mission, which is sure to have been a useful aide in their attempt to scale out the Your Priorities platform to a wider international community of users.

How to achieve better European collaboration?

The Citizens Foundation was awarded for their efforts with Better Reykjavik in 2011, winning the European e-Democracy Award thanks to its "potential Europeanness". According to Christophe Leclercq, founder of Foundation EurActiv PoliTech, who delivered the award: "Three things characterise the Reykjavik entry. Its impact, its speed and its potential Europeanness. [...]Firstly, their websites' impact, because they involved 40% of Reykjavik's citizens and obtained direct implementation of many proposals in political programmes. Secondly, their speed, as they achieved this in one week, in the run-up to the Reykjavik local elections. And thirdly, their Europeanness. Iceland is a candidate for EU membership. As Europe prepares for European Citizen Initiatives, this can be a source of inspiration for others in Europe."



CitySDK

At a glance:

Type of Organisations:	Academia and research organisations, non profit and social enterprise organisations
Aim:	Participation and democracy, smart public services
Technology Trends:	Open Network, Open Data, Open Hardware, Open Knowledge
DSI activities:	A Network
Key facts:	CitySDK consist of 23 partners, 9 countries, 3 open source APIs
Website:	http://www.citysdk.eu/

Organisation Name

City Service Development Kit (CitySDK)

Short description

City SDK is a European consortium of partners helping cities to open data, while giving developers the tools they need to develop applications that scale. It focuses on three types of urban domains: participation, tourism and mobility. For each of those domains, an open software API is developed in one of the participating cities or regions, which is then put to use also in several others. The API's help developers make applications that will function in other cities, thereby extending the potential reach for applications manifold. At the same time it provides cities with an easy, open source, standards based way to publish real-time open data.

Type of organisation

CitySDK is a European Consortium consisting of 23 partners in nine countries, led by Forum Virium, Finland. The consortium is made up of eight cities and city regions, six private companies, three development and expert organisations, one network organisation and five research institutes.

History & Mission

CitySDK runs from January 2012-June 2014, and was set up with the purpose of helping cities to open their data and giving developers the tools they need, and through this support provide a step change in how to deliver services in urban environments. With governments around the world looking at open data as a kick start for their economies, CitySDK aims to provide better and easier ways for the cities throughout Europe to release their data in a format that is easy for the developers to re-use.

Taking the best practices around the world the project will foresee the development of a toolkit – CitySDK v1.0 – that can be used by any city looking to create a sustainable infrastructure of "city apps".

What does it do, and how does this activity enhance social innovation?

CitySDK is creating a toolkit for the development of digital services within cities. The toolkit comprises of open and interoperable digital service interfaces as well as processes, guidelines and usability standards. Through this CitySDK seeks to enable a more efficient utilisation of the expertise and know-how of developer communities to be applied in city service development. Apps and tools for CitySDK are developed in cooperation with the Code for Europe fellows (see http://www.codeforeurope.net).

The Project focuses on three Pilot domains: Smart Participation, Smart Mobility and Smart Tourism. Within each of the three domains, a large-scale Lead Pilot is carried out in one city. The experiences of the Lead Pilot will be applied in the Replication Pilots in other partner cities.

The CitySDK project wants to engage with the Developer community in each of the participating cities and across Europe. This will take place through hackathons, apps challenges, and developer meet ups in the partner cities, and becomes embedded in existing events such as PICNIC, FutureEverything and OKFest. In addition, CitySDK will be made publicly available, along with links to the open data from the various partner cities, and developers will be encouraged to work with this to create new ideas and applications for the partner cities and others.

The actual work is divided into five activities:

- Developing a Technological Framework (lead: University of Tilburg).
  Consolidating and packaging existing practices and assets into a technological framework and reference architecture that enables the effective transfer of smart city service components between cities.
- Smart Participation Pilot (lead: City of Helsinki).
  Creating an open interface that acts as an issue-reporting channel between the citizens and civil servants. It is based on the Open311 technology, which is a standardized protocol for location-based collaborative issue tracking.
- Smart Mobility Pilot (lead: Waag Society).
  Bridge the mismatch between the many European mobility datasets on the one hand and the app development community on the other.
- Smart Tourism (lead: Municipality of Lisbon).
  Creating a European-wide market for tourism applications based on Open Data made available by public or private entities.
- Dissemination activities (lead: Manchester City Council).
  Identifying key stakeholder groups and ensure that the project reaches the widest possible targeted audience.

Part of the work is technical in nature: selecting standards, developing frameworks and architectures, as well as writing the actual code for the API's and applications. Another part is stimulating engagement and update: organising hack-a-thons, presenting at conferences, to students and in city halls, bringing together city officials and the (coming) development community. Lastly there is work in deciding where the results will go after the project, to ensure uptake and growth of the solution.

What is the social impact it is seeking, including any evidence of impact to date?

CitySDK wants to create a profound change in the way that cities and developer communities are able to work together to create new services and products using "open data". It fosters and facilitates international knowledge sharing around the best practices, APIs and tools being developed within the project.

Although the CitySDK API's have only reached a stable form in the second half of 2013, several applications have been developed. One of them is FixMyStreet in Helsinki, making use of CitySDK's Open311 interface to insert service requests by citizens into the city's backend system. Another is the Open Data Globe, showing the dynamics of European cities based on the available open data. There are several applications related to mobility, such as the Greater Manchester Realtime Scheduling application, the Park Shark City Platform and the City Navigator, a fully Open Source, mobile HTML5 public transport journey planner and navigation application for on-the-go use.

What it the role of the organisation within the DSI ecosystem?

CitySDK develops tools and standards that provide benefits for both city officials and development communities. CitySDK has a strong press and attracts users from both sides. It bridges the very real gap to enable them to work together, solving the cities problems by employing the vast amount of development talent that is typically not affiliated with large IT companies. Furthermore, it enhances capacity building and strengthens the Smart Citizen – citizens that know and use technology and use it to further their own goals, and that of society.

What technological methods and tools is it using, and what did these enable that was not previously possible?

CitySDK makes use of: the Internet, as a way to collaborate, disseminate knowledge and data.

Open Source Software, which enables the uptake and extension of the software by the development community forgoing stifling discussions on IP and closed development silos

Open Data, as it builds software to publish Linked Open Data in standardised formats that enables app developers to make royalty-free applications that scale

Open API's, that provide a non-proprietary way for data-owners to publish (real-time) datasets use those in applications

Agile Software Development, by way of SCRUM tools and methodologies

Next to these, standards are used like GTFS (General Transit Feed Specification) and Open 311, and languages like JSON and RDF API's written in Ruby and Sinatra. Data stored in PostgreSQL/PostGIS database.

Collaboration using digital technologies is done mainly using e-mail, video conferences and Google docs for communication and Github to share code and specifications.

CitySDK itself would not have been possible even five years ago. It is technically and organisationally state-of-the art project combining the

above mentioned technologies in previously unimaginable ways.

Standards and implementations have become so user friendly that the potential user base is large. The Open Data policies implemented by the EU and individual countries facilitate the building of CitySDK as well as its rapid spreading and uptake.

Enhancing collaboration and engagement: DSI network effect

Through the apps and services it is developing CitySDK aim is to build smart services where user generated data make up the core activity of the service.

How is the organisation funded?

CitySDK is a 3.4 million Euro project, 50% funded by the European Commission within the ICT Policy Support Programme of the Competitiveness and Innovation Framework Programme. The other 50% is brought together by local funding and national funding; each partner having a different mix. Currently, business models for the period after the project are being developed.

What are the main barriers to innovate

Governments and civil servants are hesitant, or incapable of opening high quality data that is in high demand, e.g.. real-time traffic data.

Governments and civil servants demand results too quickly. It takes perseverance as well as investment in time, money and relationships before good outcomes happen.

Business cases for implementing the resulting API's are currently missing; this however will probably be overcome since some partners are actively pursuing the start-up of companies, and some others have managed to get a lot of government support.

Lack of developers that manage to think 'big', e.g. develop application that scale outside of their countries.

Good results in terms of applications that solve problems need the input of domain experts. Generic coding skills lead to beautiful visualisations, not more.

What helps to reach goals and overcome barriers?

Evangelists and believers within city governments are key to spreading the news, instilling goodwill and overcoming barriers regarding opening data, implementing API's and working with the local development community.

Visual applications of technology (like http://dev.citysdk.waag.org/buildings/) help to inspire others and lead to follow up questions and applications.

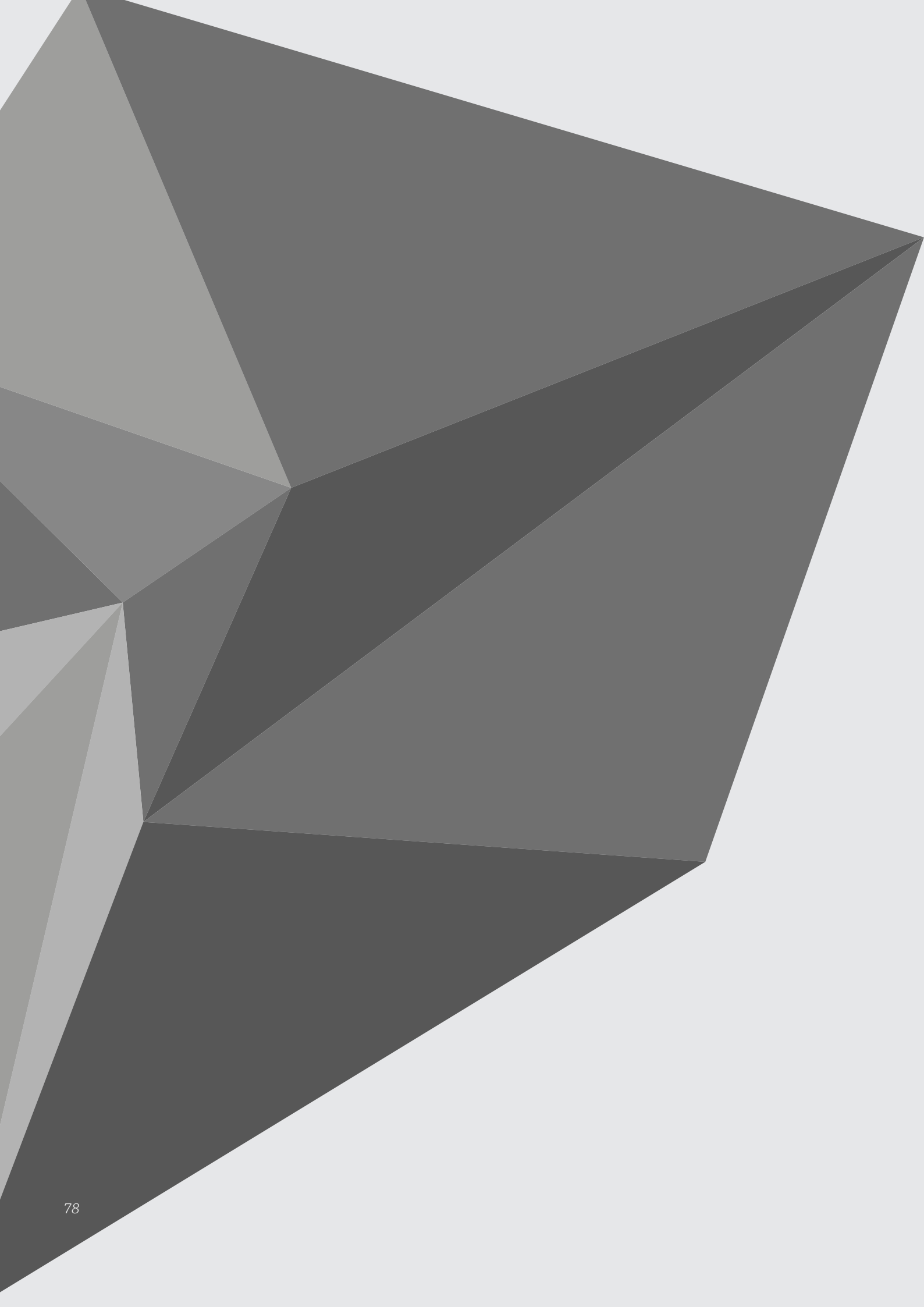
A lot of effort is spent is connecting data owners, technicians and domain experts. This pays off in the end.

How does it achieve better European collaboration?

CitySDK sets the groundwork for an ecology of applications that can travel across Europe – or more specific, across governmental bodies that implement the ensuing API's. It fosters standardisation from the bottom-up based on actual use cases. It turns out this actually works well for the development community and data owners alike. This opens a whole new market for developers and businesses in terms of spatial

scale, as well as local governments and regions that can use the best-of-breed applications developed elsewhere to solve their local problems (e.g.. by use of EuropeCommons, http://www.europecommons.org/). Because the results are openly available, anybody can take the (final) applications and extend them, or adapt them to their needs. CitySDK creates a set of codified, reusable knowledge in the form of applications, which by nature strengthen collaboration across all that are willing to add to it, or profit from it.

Finally, the 23 partners within the consortium work together for an extensive amount of time and get to know each other very well. This will add to EU collaboration for years to come.



Commons 4 Europe

At a glance:

Type of Organisations:	Cities, non profit agencies and academic institutions
Aim:	Participation and democracy; Culture and arts; Other
Technology Trends:	Open Data; Open Networks; Open Source
DSI activities:	Operating a DSI service, Network
Key facts:	As part of the project the consortia developed Europe commons, a catalogue of applications with demonstrable impact
Website:	http://commonsforeurope.net/

Organisation Name

Commons4Europe/Commons4EU (consisting of Code4EU, BuB and Europe Commons)

Short description

"A new wave of fostering innovation in cities and creating cutting edge digital services"
Commons for Europe (Commons4EU) is a pan-European consortium that mirrors a similar initiative in the USA called Code for America. Code for America involved 'a new type of public service based on the work of volunteer programmers that has sought to building bridges between the public and new technologies.' Inspired by this, Commons4EU aims to enable users 'to provide real time validation for innovative methodologies and new applications arising from cutting edge technology in wireless networks, sensors integrated in Wi-Fi networks and other technologies based on fibre optics to the home (FTTH).' The overarching Commons4EU project focuses on networked collaborative projects for use online and with mobile devices, based on the experience of Code for America, which aims to be beneficial to all the participating countries. Their application is expected to reduce administrative costs, increase transparency and participation, and to bring about effective citizen engagement. Practical examples of applications created as part of this initiative include use of city-owned buildings and spaces, to creating digital tools for museums and heritage and building new applications for use of public transport in the cities.

Type of organisation

Commons4europe is a consortium of cities, agencies and academic institutions from across Europe.

The network of organisations Commons 4 Europe is a pilot project part-funded by the European Commission, and modelled on the Code for America project. The project's consortium consists of fourteen organisations coordinated by ESADE, with the participation of Barcelona City Council and members of the NeTs group (Networking Technologies and Strategies). These organisations are coordinated by Miquel Oliver, of the Department of Information and Communication Technologies (DTIC) at UPF, which is a leader in the creation of pan-European broadband pilot projects. Aside from these organisations, nine European cities are at the heart of the project: Barcelona, Amsterdam, Barcelona, Helsinki, Manchester, Rome and the British group of municipalities involved in the Nesta project – who together form an associated network through their joint commitment to the project for its 3 year duration (from end of 2011 until the anticipated end of this phase of the project in October, 2014).

History and Mission

The Commons 4 EU project was started in 2011 with an initial core team of 7 cities: Amsterdam, Barcelona, Berlin, Helsinki, Manchester, Rome and UK-Nesta (UK cities involved in the project through Nesta) and fourteen organisations coordinated by ESADE. The project is planned to last for 36 months, at a total cost of 4.8 EUR million. It came about as an attempt to emulate some of the success of the USA's Code for America project.

Commons 4 EU's principal raison d'etre has come about as a response to questions of great importance to governance structures today: how can cities provide the diversity of services required in an advanced society in a scenario with limited resources and budgetary constraints, and what benefits can new technologies offer this paradigm? To deliver on these objectives, the Common4Europe network is broken up into two main projects:

Code for Europe: this is a network of different parties (city authorities, fellows, etc.) who work together to replicate and adapt the Code for America model for Europe. They develop collaborative web projects following the methodology of Code for America 'based on principles rather than on sectors and by opening existing code in the participating cities and leveraging the European EPSI (European Public Sector Information) platform.' Code for Europe follows a certain model to achieve certain project objectives:

Projects should be based around web/mobile applications.

Applications should enable cities to connect with their constituencies in ways that reduce administrative cost and engage citizens more effectively.

Projects should support the shift towards transparency and collaboration.

There should be a consistent focus on re-use, meaning that an application built for one city could be used by any other city.

Bottom-up-Broadband Common (BUBs): The BUB project seeks to engage and explore with users in 'real-life environments', using primarily

three new technologies: 'Super Wifi, Sensor integration into wifi networks and fibre deployment as commons (both new techniques such as aerial as well as fibre bandwidth management)'.

What does it do, and how does this activity enhance social innovation?

The Commons 4 EU partner cities and organisations seek to innovate their services through technological means. The specific technologies used are very flexible, varying from city to city according to local needs, or the technological preferences of the 'fellows' (developers, entrepreneurs and designers who are being positioned within the participating city halls to help make a breakthrough in how these governments ('service their citizens'). These 'fellows', who are based within the city halls of a number of the participating cities, are each tasked with mapping out digital solutions to key challenges the cities have set them. The benefit of situating a fellow in such close proximity to the partner city authorities, is evidenced by the host of custom-tailored web applications that have emerged to address specific, 'local' needs. These range from maximizing use of city-owned buildings and spaces, to creating digital tools for museums and heritage and building new applications for use of public transport in the cities.

Another spin-off project of the network has been Europe Commons, a website with a broader scope than either the BuB or Code for Europe projects. Europe Commons is intended to catalogue applications which have some sort of demonstrable impact and capacity for scale, that taps into the project's overarching focus and 'shareability' and re-use.

What is the social impact it is seeking, including any evidence of impact to date?

City services and authorities have had growing demands placed on them by citizens at a time when they are concurrently facing significant budgetary cuts. As a sector, these same authorities are often characterised as being 'slow to innovate', with little collaboration occurring across different cities or within different city departments. This network has thus been formed at a time when re-thinking how these governance models operate is becoming more necessary than ever. Commons4EU seeks to explore possible solutions to some of the challenges city authorities are presently facing, looking to digital technologies as a means of doing so.

Commons4EU identifies the need for more open innovation; greater collaboration; and much more agile project development. The overarching principle is how can it bring together people defined as 'change agents' (be they developers or fellows) into the context of city halls. In tandem with this, the project aims to have city authorities think of new ways technology might be used to solve city challenges. Formed with the intention of exploring ideas like Smart Cities – Commons4EU has sought to bring together a network of pan-European city authorities who together can explore how technology might be used to supplement how certain services are delivered in the context of the city. Thus, in a number of respects, Commons4EU is fostering an iterative, collaborative learning network between city authorities, agencies and the other institutes involved.

Although the project is not expected to draw to a close until late-2014, its apparent value seems to have already been acknowledged. 12 months on Helsinki city have hired their fellow on a full-time basis. This demon-

strates the value of having someone who can translate ideas into a 'digital reality', and is also an illustrative example of the kind of cultural change that has come about through the city's involvement with the Commons 4EU network. In the case of the city of Amsterdam, there has similarly been more interest in forming more long-term partnerships. More generally, there has been greater momentum building, for example with the project looking likely to scale out to Wales.

Alongside this the social impact of the Commons4EU project is evident from some of the useful applications that have been created as a result of it. "Tag. Check. Score." is one such application. It simultaneously taps into current technological trends such as open data, open source, as well as digital volunteerism (crowdsourcing), in a way that has a clear social impact. The application was created to address a challenge presented to many museums around Europe, where countless cultural heritage pictures have already been digitized, but remain 'untapped' – in sum, 'the metadata is missing and the cultural heritage is thus not searchable.' Due to a lack of personnel, it is difficult for museums to gather the relevant information. The Ethnological Museum in Berlin now engages citizens via the app "Tag. Check. Score." in order to solve the problem by crowd-sourcing metadata for the digital image inventory. The "Tag. Check. Score." application was developed by Alan Meyer, Fellow of Code for Europe, together with Fraunhofer FOKUS and the Ethnological Museum Berlin. Like Zooniverse's Cell Slider, "Tag. Check. Score." is underpinned by the principle of digital volunteerism. Citizens assist in enriching the photographs of the museum via the app by tagging pictures with meta-data, checking and correcting existing tags and thereby scoring points: Tag. Check. Score. Because digitization has presented a whole host of challenges for many museums, libraries and archives, the aim was to also develop a reusable IT open source solution. In the Berlin State Museums alone six million objects await to be recorded. Therefore, the Source code of "Tag. Check. Score." available on GitHub, while the code is licensed under AGPL.

What is the role of the organisation within the DSI ecosystem?

Commons 4EU aims to build up the capacity of cities to foster more social innovation, whether this is related to grassroots initiatives or more large-scale projects such as they shift towards becoming 'smart cities'. To lay the foundation for future digital social innovation, Commons 4EU recognises also the need to equip citizens with the requisite civic toolkit to utilise digital technology for democratic ends.

What technological methods and tools is it using, and what did these enable that was not previously possible?

As mentioned above, the technological specifications across the Commons 4 EU tend to vary widely from project to project. From the 'Super Wifi, Sensor integration into wifi networks and fibre deployment as commons' (which includes new techniques such as aerial as well as fibre bandwidth management), to the web applications developed by fellows for Code for Europe – these smaller projects tend to be reflective of the local needs of the partner city or of the fellow's own technological preferences. This flexible approach to technology is reflected in the wide range of technologies employed by the different fellows – who will work with their own preferred web platform (using open source languages like

Python and Ruby on Rails) to build their open web applications.

On a larger scale, this might be indicative of how Commons 4 EU looks beyond more traditional 'big tech solutions' to offer a simpler, much looser set of solutions; "with smarter design, to re-think and explore new ways of delivering some of the 'lighter touch public services' such as libraries and parks, etc."

Despite the fact that Commons4EU aims forge digital solutions that will supplement rather than supplant pre-existing governance structures. Technology has nonetheless enabled the active sharing of new ideas in a way not possible in the past. While more needs to be done to continue to encourage this active sharing and re-use of good ideas, websites like Europe Commons and collaborative tools like GitHub offer a glimpse to digital technology's potential for collaboration and quick re-use.

Enhancing collaboration and engagement: DSI network effect

Commons4EU is in many senses a network formed with the aim of connecting up civic innovators –with the world of the city authority. In this way Commons 4 Europe acts as a 'connector.' Yet as well as operating as a connector generally, Commons4EU also works with other social innovators on more specific challenges as part of an informal global network and conversation about how technology might be used to rethink the way we approach city governance. Collaborative work of this kind has been carried out with other organisations like Code4America, Code4LatinAmerica and Code4Africa. Furthermore, the network has worked closely with Future Gov, and mySociety.

Yet Commons4EU does not simply act directly as a collaborator. Rather the network aims also to foster and encourage a spin-off network of active collaborators. Code4Europe is illustrative of this. It encourages more re-use of successful applications across Europe and to promote a culture of borrowing from one another and sharing of open source code. To this aim, the fellows work together on a joint GitHub account – and every project being worked on for Code4Europe is coded and documented here for all to see thereby offering additional support the overarching collaborative aim of the project.

Nesta, one of the project partners, have also created a platform called Europe Commons. Applications and products which have indicated some sort of demonstrable impact and capacity for scale are catalogued here. This is intended as a collaborative tool for potential social innovators – offering a useful guide of what is already out there in terms of solutions that are relatively easy and cheap to replicate; or possibly a basis upon which digital social innovators can build their own applications. In the case of Europe Commons – the site's open source coding is hosted on Drupal.org, where like Code for Europe interested civic developers can contribute to the site's code in a similar way to GitHub.

How is the network of organisations funded?

Of the 4.8 EUR million allocated to the project for its 3 year duration, roughly 50 per cent of the funding has come from the European Union (specifically the Competitiveness and Innovation Framework Programme of the European Union), while the remaining 50 per cent comes from contributions from each of the partner cities and agencies.

What are the main barriers to innovate?

Trying to have cities buy-in culturally and financially: The most substantive changes occur in those teams and city authorities that recognise that this is an opportunity to do more than simply upgrade technological products and service offerings, and to instead reflect more deeply upon the ways they too can innovate. The best instances are those that forge a partnership with the tech talent and the front-line team.

How to move on the agenda so there is more use and re-use of successful innovations: While moving to a predominantly open-source mode of code production has a great deal of value, there is still a degree of operational resistance from some developers – re-use requires an upfront investment from developers who must take the time and energy necessary to break down and understand someone else's code. While collaborative coding tools such as GitHub have challenged somewhat the often asocial aspect of software coding, the culture of developers who simply favour building applications from scratch sometimes persists.

What really helps reach goals/how to overcome these barriers?

No information on this.

COMMUNIA

At a glance:

Type of Organisation:	Government and public sector organisations
Aim:	Science, Other
Technology Trends:	Open Networks, Open Knowledge
DSI activities:	An advisory or expert body
Key facts:	Established in 10 EU Member States
Website:	http://www.communia-project.eu

Organisation Name

COMMUNIA

Short description

COMMUNIA – The European Thematic Network on the Digital Public Domain, is an international association based in Brussels.

The overarching aim of Communia is to become a European point of reference for theoretical analysis and strategic policy discussion of existing and emerging issues concerning the public domain in the digital environment'.

Type of organisation

COMMUNIA is an international a network of researchers and practitioners from universities, NGOs and SMEs established in 10 EU Member States. All members, including organisations and individuals need to pay a yearly membership fee. The network has been incorporated under Belgian law since 2012.

COMMUNIA has been a World Intellectual Property Organisation (WIPO) observer since October 2012.

History and mission

The mission of the COMMUNIA Association is to foster, strengthen, and enrich the Public Domain, defined as the wealth of information that is free from the barriers usually associated with copyright protection, either because it is free from any copyright protection or because the right holders have decided to remove these barriers. It is the raw material from which new knowledge is derived and new cultural works are created. This definition is extracted from the Public Domain Manifesto, an output of the Thematic Network:

'COMMUNIA effort is aimed at helping to frame the general discourse on and around the public domain in the digital environment by highlighting the challenges arising from the increasingly complex interface between scientific progress, technological innovation, cultural development, socio-economic change on the one hand and the rise and mass deployment/usage of digital technologies in the European information society'

The COMMUNIA association is built on the eponymous COMMUNIA Project Thematic Network, funded by the European Commission from 2007 to 2011, which issued the Public Domain Manifesto and gathered over 50 members from academia and civil society researching and promoting the digital public domain in Europe and worldwide.

What does it do, and how does this activity enhance social innovation?

The COMMUNIA Association aims to maintain and reinforce a network of European and international organisations that provide reference for policy discussion, such as the World Intellectual Property Organisation (WIPO), and to take strategic action on all issues related to the public domain in the digital environment and related topics.

Activities include publications, meetings, conferences, projects, consultations, studies, research and collaboration with other associations and entities in Brussels, in Europe and worldwide.

In particular, the fields of endeavour of the COMMUNIA Association include:

- Preservation of the Public Domain in its strict sense, after copyright expiration: COMMUNIA EU Positive Agenda for the Digital Public Domain and COMMUNIA WIPO Positive Agenda for the Public Domain;
- Celebration of the Public Domain Day every year;
- Alternative forms of licensing for creative material, such as Creative Commons or other free/open licenses: COMMUNIA policy paper on proposed Directive on collective management of copyright;
- Open government data and public sector information: COMMUNIA policy paper on the proposal to amend the European Directive on re-use of Public Sector Information;
- Open access to scientific publications and open scientific data: COMMUNIA Position on EC Horizon 2020 Open Access policy;
- Access to and re-use of cultural heritage;
- Management of orphan works, i.e. works whose author is unknown: COMMUNIA policy paper on the proposed orphan works directive.

What is the social impact it is seeking, including any evidence of impact to date?

The COMMUNIA Association and its Members raise awareness in, educate about, advocate for, and offer expertise on and research about the Public Domain, in the digital age within society and with policy-makers.

The COMMUNIA association seek to address the lack of representation of the interest of the public domain at the national, European and international levels. This has prompted the association to continue their research and advocacy activities after the end of European funding by creating a non-profit entity. They want to give a voice to the public domain

and raise awareness of its potential and value for society. The number of contributions they make to debates reflects this: blog posts, participation in consultations, drafting of policy papers, amendments and statements. COMMUNIA believes if they manage to change the law to recognize and preserve the public domain, they will have been successful.

What it the role of the organisation within the DSI ecosystem? The COMMUNIA association gathers organisations and partners who are interested in and willing to work together to foster, strengthen and enrich the Public Domain. The association works on deliverables such as policy papers, projects, and WIPO statements. Event-wise the association organises meetings, conferences, projects, and consultations.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The Internet prompted the creation of the association.

Without the opportunities presented by the Internet, the association would not exist. After decades of measures that have drastically reduced the public domain, typically by extending the terms of protection. The association claims it is time to strongly reaffirm how much societies and economies rely on a vibrant and ever expanding public domain. The role of the public domain, whilst crucial in the past, is even more important today, as the Internet and digital technologies enable people to access, use and re-distribute culture with an ease and a power unforeseeable even just a generation ago.

How is the organisation funded?

The COMMUNIA Association was started based on the COMMUNIA project funded by the European Commission. The business model is based on the association's independence, and the budget depends on the membership fees of the members. The association is also a part of the European Thematic Network and receive funding through this.

What are the main barriers to innovate and how are they in the domain?

The association has encountered mainly four barriers:

- Governance and the definition of decision-making procedures
- Incorporation and drafting of articles of incorporations under Belgian law
- Understanding of EC voting and amendment procedures
- Funding and sustainability as a voluntary-based organisation

What helps to reach goals and overcome barriers?

According to Dr. Melanie Dulong de Rosnay, who is the president of the Administration Council at COMMUNIA, it is the contribution from the association members, which helps overcome these barriers so that they can reach their goals, in terms of expertise from members, contributions of time, as well as membership fees.

Also, the activities within the association are organised on a voluntary basis, the member who identifies a question proposes it to the group and leads it. This enables the members to most efficiently organise research or activities, and feeds motivation and engagement.

How does it achieve better European collaboration?

The association coordinates activities in partnership with other organisations in Europe, in terms of:

- Publications, meetings, conferences and other public events.
- Studies, research; projects and consultations.
- Representation of the Association and of issues related to the digital Public Domain towards institutions, notably political and international organisations.

Confine

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Research on and with community networks
Technology Trends:	Open Networks
DSI activities:	A community networking test bed
Key facts:	Since 2011 when the project launched, it has now over 30.000 users.
Website:	http://confine-project.eu

Organisation Name

Confine

Short description

The Confine Testbed experimental facility supports experimentally-driven research on Community- owned Open Local IP Networks. This integrated project offers a testbed for experimental research that integrates (in a federation) and extends three existing community networks.

Type of organisation

The programme is delivered by a number of European public and academic institutions, including, Universitat Politècnica de Catalunya, INESC TEC Technology & Science, Fundació Privada per a la Xarxa Oberta, Lliure i Neutral guifi.net. FunkFeuer, Athens Wireless Metropolitan Network, The OPLAN Foundation, Comunicació per a la Cooperació – Pangea, Fraunhofer institute and Interdisciplinary Institute for Broadband Technology.

History & Mission

CONFINE is a project funded by the Framework Programme 7 (FP7) and is running from October 2011 to 2015. The background to the project is that recent technological developments have pushed forward the Internet and its possibilities, leading to a seemingly omnipresent Internet. However, providing sustainable, cost-effective and high quality Internet connection, with coverage for all citizens is still a challenge. Often this stems from economic causes, as Internet provision in a metropolitan area is usually more economically attractive than providing access in rural areas. “Community networking”, also known as “bottom-up networking”, is an emerging model for the Future Internet, where communities of citizens build, operate and own open IP-based networks. Hundreds of

community networks operate across the globe, in rural and urban, rich and poor areas. These networks are usually run by non-profit organisations and can cooperate with local stakeholders to develop community services, including local networking, voice connections and Internet access.

CONFINE offers an open distributed infrastructure for researchers to experiment with community networks. Community Networks are large scale, self-organised and decentralised networks, built and operated by citizens for citizens.

The goal is to advance research and empower society by understanding and removing obstacles for these networks and services.

What does it do, and how does this activity enhance social innovation?

In practice CONFINE is attempting to develop a unified access to an open testbed with tools that allow researchers to deploy, run, monitor and experiment with services, protocols and applications on real-world community IP networks. This integrated platform – Community-Lab – will provide an open, distributed infrastructure to these emerging networks supporting any stakeholder interested in developing and testing experimental technologies for open and interoperable network infrastructures, strengthening open community networks. The goal of Community-Lab is to advance research and empower society by understanding and removing obstacles for these networks and services.

CONFINE's Community-Lab integrates and extends three existing community networks: Guifi.net (Catalonia, Spain), FunkFeuer (Wien, Austria) and AWMN (Athens, Greece); each is in the range of 500 – 20,000 nodes, a greater number of links and end-users. This test bed provides researchers with access to these emerging community networks, supporting any stakeholder interested in developing and testing experimental systems and technologies for these open and interoperable network infrastructures.

Community-Lab is a resource for the research community to address the limits and obstacles regarding Internet specifications that are exposed by these edge networks. It supports an integrated and multi-disciplinary effort to address and assess the usefulness and sustainability of community networking as a model for the Future Internet.

Five research projects: Confine is a project that seeks to expand research and collaboration on community networking, starting from the FIRE (Future Internet Research and Experimentation) community nourished by the EC. An open call for participation in the research was published in September 2012, which received 36 applications. Five research proposals were selected and give 50,000 euros in funding to cover the preparation and performance of experiments. Each of these 5 applications represents an external research group with previous promising research results. The researchers will take advantage of the Community-Lab test bed to advance their research with new experiments running for one year. In September 2013, with a more mature and larger test bed, a second open call for participation will be announced to allow the selection and support with project funding of a larger set of new experiments from external participants.

Future collaborations: However, only restricting the project to the test-bed would allow for limited outside participation. CONFINE hopes to be able to share testbed access with a number of partners outside the open call, which is not feasible, at least in the short term. More devices would be needed, which comes with strong financial implications.

Therefore, the project also wants to generate open data sets for research that will allow for outside participation and research collaboration, with a strong focus on community networks and to a lesser extent the test bed. Actually, the open data efforts will be focused more on the Future Internet context of CONFINE, rather than the test bed itself.

What is the social impact it is seeking, including any evidence of impact to date?

The primary goals of a community network may include providing a sustainable, trusted platform for an urban neighbourhood, suburban village, town or region to enhance a vital community communication that strengthen participation and a functioning democracy. The project brings in additional users (researchers) with a common entry point and additional resources (nodes, servers, links) in sparsely populated areas.

The CONFINE project targets the exploration and advancement of the community networking model, moving towards providing the right quality of experience and sustainability of community networks, by looking at the social, technical, economic and legal implications.

What it the role of the organisation within the DSI ecosystem?

The CONFINE project addresses the need to explore bottom-up future sustainable Internet infrastructures. Since this aim requires contributions from all social groups, the CONFINE project focuses on performing research and experimenting ideas, with its academic and research groups. The project makes uses of social networks to organize its activities, to make the knowledge addressing, sharing and spreading easier. In addition to the Community-Lab testbed, CONFINE maintains two additional academic testbeds for experimental purposes, connected to the Community-Lab testbed over FEDERICA. In Belgium the academic testbed is maintained by iMinds, in Germany it is maintained by Fraunhofer FKIE.

What technological methods is it using? How is it using digital technologies to collaborate?

From a technical point of view, community networks are large-scale, distributed and decentralised systems composed of many nodes, links, content and services. Community networks expand over neighborhoods since their inhabitants are able to establish new nodes or groups of nodes linked to other nearby nodes. Nodes connect using affordable and accessible wireless IEEE 802.11 a/b/n technology, using equipment from various manufacturers, with diverse dynamic routing protocols running on different zones of each network. Operation is done in the un-licensed ISM frequency bands at 2.4GHz and 5GHz. Most networks use wireless technology although fibre links. When forming a large scale mesh network in a dense urban area, channel allocation becomes very challenging to achieve correctly. Moreover, when deploying IEEE 802.11 technology over long distances, some networks have links spanning more than 20 kilometers, the MAC protocols have to be optimized or radically changed

to keep functioning. The characteristics of heterogeneity, required network neutrality, openness and size of these networks are a great challenge to routing protocols and its implementation on low-cost devices.

To reduce costs and democratize their construction, community networks are often built with simple and low cost off-the-shelf hardware. The nodes are usually running an open source distribution, such as Linux (Openwrt) or FreeBSD. A Community-Lab node consists of two or three devices: the community device, the research device and an optional recovery device to force the research device to re-boot in case of malfunction. These devices are connected by a wired local network, with the community device acting as a gateway. Community-Lab node may either be isolated from others or within what we call a Community- Lab cloud.

A broad range of application services is used in these community networks, such as VOIP, content distribution, on-demand and live media streaming, instant messaging, remote backups and updates, file storage and file sharing.

The project has also set up http://opendata.confine-project.eu/ using the Comprehensive Knowledge Archive Network (CKAN) [23] software. This central catalog points to open data available from the different CONFINE partners. With CKAN, the datasets can be easily tagged and commented on (Braem et al. 2013).

What did technology enable that was not previously possible?

From a technical point of view, community networks are large-scale, distributed and decentralised systems composed of many nodes, links, content and services. They are extremely dynamic and diverse, as they are built in a decentralized manner, mixing wireless and wired links with diverse routing schemes with a diverse range of services and applications. Governance, knowledge and ownership of the network are open and include citizens as active participant in the network. Therefore these networks are not just decentralized but also self-owned and self-managed by community members, self-growing in links, capacity and services provided.

How is the organisation funded?

CONFINE is a European funded research project funded in FP7 as a large scale Integrated Project. Run time: 2011-2015, contribution 4.942.000 euros. However, sustainable models are also in place since participants can self-fund their networks with community financing.

What are the main barriers to innovate?

At the physical layer, community networks often use wireless networks because of their lower costs when trying to build large-scale networks. However, the absence of cabling requires extensive wireless planning. Furthermore, to reduce costs and democratize their construction, community networks are often built with simple low cost off-the-shelf hardware. The characteristics of heterogeneity, required network neutrality, openness and size of these networks are a great challenge to routing protocols and their implementation on low-cost devices.

A broad range of application services is used in these community networks, such as on-demand and live media streaming, instant messaging, remote backups and updates, file storage and file sharing. These services face enormous challenges due to the limited capacity of servers and links

and the structure of the network. Operating in this large and constantly changing environment requires the deployment of distributed service infrastructures that exploit locality, react to environmental changes and rely on cross-layer optimizations.

Regulation can also be a barrier, since Confine propose a community network that is very different from well known commercial or private networks that often receive the most attention. From a privacy point of view, community networks pose an unusual challenge. Users should be able to cooperate in the network, while maintaining the privacy of their data and the data they relay. This leads to different threat models and a new notion of trust between users.

What helps to reach goals and overcome barriers?

Community networks are an emerging field to provide citizens with connectivity in a sustainable and distributed manner in which the owners of the networks are the users themselves. Research on this field is necessary to support Community Networks growth and scope, and improve their operation and quality.

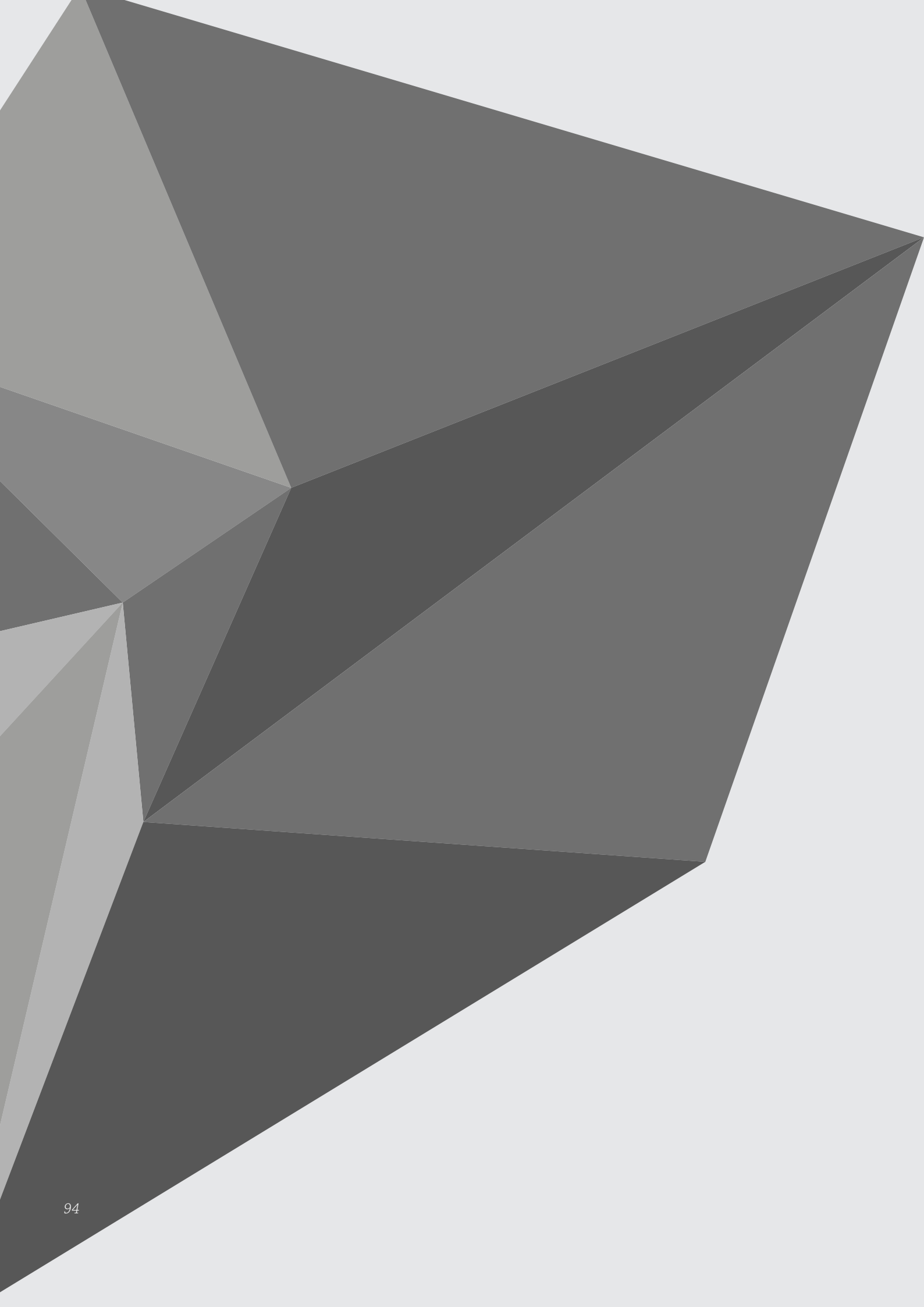
How does it achieve better European collaboration?

The project aims to have a project team that is active across Europe. Since its launch it has gathered a group of students, researchers, professionals, and large-scale communities from Spain, Austria, Greece, UK, Germany and Belgium.

The testbed is ready for experiments, growing in functionality, tools and number of research devices spread across the participating community networks. An open call for participation was published in September 2012, resulting in the reception of 36 applications. In September 2013, with a larger testbed, a second open call for participation was announced.

Therefore, a European community is being built up, where people have the same belief and work on the same goal, while sharing different experimental approach via meetups, events, etc.

Networks also exist beyond Europe, e.g. in the USA, WasabiNet is running in St. Louis, Missouri while The Personal Telco Project is deployed in Portland, Oregon. In Latin America, numerous networks exist and cooperate, e.g. Bogota Mesh and Monte Video Libre. In Melbourne, Australia, Melbourne Wireless is a quickly growing community network (Braem et al. 2013).



Desis Network

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Health and wellbeing, Energy and environment
Technology Trends:	Open Networks, Open Data, Open Knowledge
DSI activities:	An event, A network, Running/hosting maker spaces and hackerspaces, Operating a web service
Key facts:	Members active in Europe, America, Asia, Australia, and Africa
Website:	http://www.desis-network.org

Organisation Name

Desis Network

Short description

DESIS (Design for Social Innovation towards Sustainability) is a network of design labs, design schools and design-oriented universities, actively involved in promoting and supporting sustainable change. It is made up by a network of non-academic actors and institutes who have come together with the overarching goal of coordinating international research projects on social innovation design.

Type of organisation

DESIS Network is largely based on self-organisation at the local level and on network-wide distributed responsibilities and administrative roles. In this spirit, it is coordinated and directed by a Council (the DESIS Council, with one representative for every DESIS Lab). On the administrative side, each DESIS initiativeis managed, and administrated, by a partnership of DESIS Labs. Therefore, the administrative responsibility of DESIS Network is limited to international coordination and website management.

History and Mission

The DESIS Network originates from three main international activities in the 2006-2008 period: 'the European research EMUDE (2005); the UNEP Program CCSL (2008) and the international conference Changing the Change, within the framework of Torino World Design Capital' (2008). In the 2009-2011 period, DESIS spread to several regions of the world, establishing partnerships with other entities and moving towards the current organisational network and way of working: a consortium of Design Labs based in design schools and in other design-oriented universities that work alongside local, regional and global partners to promote and support social change towards sustainability.

DESIS Network aims to clarify the design for social innovation potential both inside and outside the design community. That is:

To make it clearer, inside the design community (designers, design researchers, design media and design schools), that social innovation is, and will continue to be at least for the near future, a fundamental field of application for all the design disciplines.

To give social innovators tangible evidence of the potential of design thinking and design knowledge in supporting the processes in which they are involved.

What does it do, and how does this activity enhance social innovation?

DESIS research projects: DESIS collaborates with several partners and design schools, and is actively researching and exploring digital possibilities in social innovation. One interesting example of a research project by the network is "Sustainable collaborative services on the digital platform: definition and application". A paper which explores a number of examples of how digital collaborative services have been used to deliver presently unmet social needs (amongst these is Hitchhikers, 'a service created by hitchhikers to connect people with empty seats in their cars and people in need of a ride.')

In this way DESIS's output of research serves to bridge the gap between grassroots activity and this network of designers and social innovators (whilst simultaneously expanding the potential outreach and awareness of these instances of digital social innovation).

DESIS Labs and Network: DESIS Labs are groups of professors, researchers and students who orient their design and research activities towards social innovation, while also attempting to grow and expand potentially useful alliances with other potential partners. They can operate at the local scale with local partners and, in collaboration with other DESIS Labs, they also engage in regional and global large-scale projects and programmes. They are based in Design Schools and design-oriented universities and can be extensions of already existing entities or new, specifically established ones.

What is the social impact it wants to achieve?

DESIS Network's overarching social goal is to better understand the value of social innovation (including digital social innovation), and its potential for scale. DESIS Network aims at using design thinking and design knowledge to co-create, with local, regional and global partners, socially-relevant scenarios, solutions and communication programmes. It does all of this in a number of key ways:

Scaling-up social innovation DESIS Network's main aim is to use design thinking and design knowledge to trigger, enable and scale-up social innovation. That is:

To enhance its potential by creating a more favourable environment (social, cultural, political, economic).

To raise its visibility by searching for promising initiatives and communicating their existence and significance to a larger audience.

To stimulate new initiatives, by proposing visions and solutions as seeds to be developed in open and collaborative interactions with local communities and other involved actors.

Promoting an Open Design Programme: DESIS Network's most ambitious aim is to promote a broad and flexible design programme intended to generate a platform of open knowledge. A design programme where several local, regional and global projects may converge, reinforce each other and generate innovative scenarios and solutions adequate to the great challenges of contemporary society.

In short the DESIS Network's higher ambition is to generate an Open Design Programme able to give different projects visibility, to facilitate their alignments, collaborations and synergies and on these basis, to develop visions and proposals.

What is the role of the organisation within the DSI ecosystem?

As a global research network DESIS is in a unique position to disseminate and develop findings research on digital social innovation.

Enhancing collaboration and engagement: DSI network effect

DESIS Network collaborates with other networks whose focus (such as social innovation, quality of everyday life, design for sustainability, and design school coordination) is complementary to their own. In this spirit, to date, formal agreements have been established with: Social Innovation Exchange (SIX), Sustainable Everyday Project (SEP), Learning Network on Sustainability (LeNS), Partnership for Education and Research about Responsible Living (PERL) and International Association of Universities and Colleges of Design, Art and Media (CUMULUS). DESIS also establishes special partnerships with private companies, non-profit organisations, foundations and government agencies that share similar views and are willing to co-develop open projects on topics and areas of common interest.

How is the organisation funded?

No information available

What are the main barriers to innovate and how are they in the domain?

No information available

What helps to reach goals and overcome barriers?

No information available

How does it achieve better European collaboration?

The very structure of the DESIS network is one geared towards collaboration on a European level. As already mentioned above, DESIS members come from all over Europe and whilst research projects tend to be locally funded, the results of this work and research are shared all across the DESIS network. For example, the research report "Piloting digital storytelling and action research as an approach to stimulate pro-environmental advocacy and behaviour change", was funded and commissioned by DEFRA (the Department for Environment, Food and Rural Affairs based in the UK) and conducted by the University of Bath to explore the effectiveness of digital storytelling. It conveyed this through the use of short video clips, as a means to stimulate pro-environmental advocacy amongst the 50 plus age group, and shared their detailed report on the DESIS UK website. This is just one instance that demonstrates how DESIS has forged useful alliances between academic institutes and government authorities.

Everyaware

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Health and wellbeing, science, energy and environment, participation and democracy
Technology Trends:	Open networks, Open data, Open knowledge, Open hardware
DSI activities:	Research project, network, operating web service, providing education & training
Key facts:	3-year project EU funded with € 2.1M
Website:	http://www.everyaware.eu

Short description

The Everyaware project aims to empower citizens to engage actively in improving their own environment and making it more sustainable. The project does this by providing capabilities for environmental monitoring, data aggregation, and information presentation to users by means of mobile and web-based devices such as smartphones, computers and sensors. The work on Everyaware is presently ongoing (the project runs from 2011 – 2014), therefore this short case study is a snap shot of the project's ambitions and activities and does not purport to present any final findings from the overall project.

History & Mission

The Everyaware project was set up in 2011 as a collaborative research project between academic organisations from across Europe, coordinated by Fondazione Istituto per l'Interscambio Scientifico in Italy. The project receives 2,1 million euros in funding under the European Commissions 7th framework (FP7).

Type of organisation

Everyaware is an academic research network with partners from across Europe, including Fondazione ISI, Italy; Sapienza Università di Roma, Italy; VITO (Flemish Institute for Technological Research), Belgium; University College London, UK; Leibniz University, Hannover, Germany.

The main driver behind Everyaware is the belief that 'the current organisation of our economies and societies is seriously damaging biological ecosystems and human living conditions in the very short term, with potentially catastrophic effects in the long term. The enforcement of novel policies may be triggered by a grassroot approach, with a key contribu-

tion from information and communication technologies (ICT)'. Building on this, the four high-level aims of Everyaware are:

- Involving citizens in the process of monitoring the environment, combining objective and subjective measures
- Enhance citizens' awareness
- Ultimately change individuals' behaviour
- Putting pressure on policy makers.

Everyaware sees the creation of methods and technological innovations that can make people fully aware of their actual environmental conditions and the future consequences of their actions. For Everyaware, such methods and innovative technologies are key factors for driving the change in behaviour towards more bottom-up initiatives that will lead to more sustainable lifestyles and societies.

What does it do, and how does this activity enhance social innovation?

Through the project Everyaware intends to integrate theoretical and practical techniques from the disciplines of environmental sensing, computer science, statistical physics and social science to collect and analyse physical measurements from sensors and associated subjective opinions of participants. In practice the project aims to do this through two main activites, the Everyaware platform and a set of case studies which will explore the detailed aspects of ICT-enabled citizen engagement in environmental monitoring.

The Everyaware platform: The overarching aim of the Everyaware platform is to develop an integrated hard and software platform which enables citizens to effortlessly capture information related to their behaviour and choices, which EveryAware refers to as 'subjective data'. It pairs this with 'objective environmental data' from sources such as static sensors. The aim of this is to undertake a comparison between sensor data and subjective opinions which will expose the mechanisms by which the individual perception of a known phenomenon is translated into its social perception and eventually into choices and actions.

A central server efficiently collects, analyses and visualises data sent from arbitrary sources. The Everyaware platform will handle both sensor and subjective data acquisition. It will host a modular system based on two hardware components: a smartphone controlling the data acquisition and a modular sensor box with several pluggable sensors. This approach guarantees high scalability of the overall system and allows for an optimal distribution of sensors (e.g., wearable sensors for air or noise pollution). At the same time, web-interfaces allow users to easily upload their sensor readings, and equally easily tag these with subjective information.

Experimental Tribe is the first prototype of such platforms to be realised. It is a web platform for gaming and social computation. It helps researchers to devise web games/experiments, and offers a platform for others to join in, meaning the public can both enjoy and contribute to the scientific research.

The web platform is built to engage social computation, letting the different organisers of projects collaborate and coordinate on the shared platform. Users can run experiments, partake in experiments, share their experiences, and carry out research. Experiments range from urban dynamics, mapping human behavior patterns, opinion dynamics, to perceptions of political networks. Or through gaming, users can contribute to scientific research. Since the games on the platform have been created for research purposes, the researcher can then work with all sort of statistics related to players and the gameplay.

The data storage system and the gaming platform are the two main components of the Everyaware web-based infrastructure, which complement each other by addressing specific goals in the context of collecting, storing and analysing relevant environmental data.

Case studies: Case studies concerning different numbers of participants will test the scalability of the platform, aimed at involving as many citizens as possible to leverage on the low cost and high usability of the sensing devices. Everyaware includes several case studies, and projects that have strong focuses on environmental issues. Example case studies that Everyaware has carried out include WideNoise and Air Pollution Sensing project.

WideNoise is an iPhone and Android app that helps people to understand the soundscape around and to help live a healthier life. WideNoise also has an online real-time interactive map, which shows the collected data and indicates the noise pollution levels all over the world. At the same time, WideNoise also visualises the data to explain to users in a more accessible manner how they might gain a deeper understanding of the problem.

SensorBox, AirProbe, a dedicated Web server and Web application, together form a system that measures concentrations of pollutants in the air and localises them through a GPS. This enables users to see the measurements in real time by using a Bluetooth and AirProbe app on their smartphone, and also makes it possible for users to access the aggregate data gathered by the community, as personalised information concerning personal levels of exposure to pollutants. Based on this system, there is also an international competition APIC (AirProbe International Challenge) organised between four cities: London (UK), Antwerp (Belgium), Kassel (Germany), and Turin (Italy). Users in the 4 cities compete to build the most complete map (in terms of time and space) of air pollution for their city.

What is the social impact it is seeking, including any evidence of impact to date?

Everyaware seek two types of social impact with the project:

- Through research it seeks to develop a knowledge base around why and how citizens can become engaged in assessing the state of the environment through ICT and using this information to affect change.
- To develop practical tools and platforms that provides the necessary infrastructure for the change it seeks, and by demonstrating how this can be done in practice.

What it the role of the organisation within the DSI ecosystem?

Everyaware projects tend to have similar approaches and goals to enhance its research and development. Everyaware also experiments in building platforms such as Experimental Tribe, where a high social engagement is emphasised. This supports the research and development of finding solutions towards environmental issues, and raises awareness from people based at the grass root level.

What technological methods and tools is it using, and what did these enable that was not previously possible?

In their research and practical work, Everyaware focus on sensing, mobile and location-based technologies, as well as data visualisation.

Sensing technologies: Along with sensors, human beings can act as a probe to monitor many phenomena, especially in the environmental area.

Mobile and location-based technologies: Cell phones and PCs incorporate sensors of increasing accuracy: GPS sensors, cameras, microphones, accelerometers and thermometers are already a default equipment in most of the mentioned devices. Networks have also accompanied this process, by expanding the availability of an Internet connection throughout daily life.

Online communication platforms: It is developed within the Web2.0 paradigm to provide users with the opportunity of collectively categorising, evaluating and filtering the content they browse.

Everyaware believes its technological focuses will enable citizens to be involved in a techno-social integrated process, this means, low-cost sensing technologies, which allow the citizens to directly assess the state of the environment; social networking tools, which allow effective data and opinion collection, and real-time information spreading processes. In addition, theoretical and modelling tools developed by physicists, computer scientists and sociologists have already reached the maturity to analyse, interpret and visualize complex data sets. The integration of participatory sensing with the monitoring of subjective opinions is novel and crucial, as it exposes the mechanisms by which the local perception of an environmental issue, corroborated by quantitative data, evolves into socially shared opinions, eventually driving behavioural changes. Enabling this level of transparency critically allows an effective communication of desirable environmental strategies to the general public and to institutional agencies.

Generating data and sharing opinion in a user-friendly manner: The combination of sensor-based data generation and online sharing provides the possibility of gathering opinions in a user-friendly manner. Sensor-based gathering of temperature and noise-level information, for example, allows collection of data on totally new levels of scale. Use of mobile phones for this purpose seems a particularly powerful way of getting ordinary people involved, as it could integrate subjective data (such as moods or opinions) as well as scientific readings. It is possible to make more sense of the collected data when they are displayed over a base map of the local streets either via GPS readings or by captures through a map interface.

Raising awareness and effecting decision and policy making: This focuses on the question of whether 'socially accepted' data gathered in this way could induce widespread opinion dynamics leading to changes in behaviour. The idea is that the availability of locally relevant digital data, together with their analysis, processing and visualisation should trigger a bottom-up improvement for social strategies. The appropriate and personalised representation of the collected data to users has the potential of triggering a bottom-up improvement of citizens' behaviours. On the other hand, the augmented awareness could also act as a source of pressure on the relevant stakeholders and policy makers.

Reducing the gap of the views between public and individuals on environmental issues: The comparison between sensor data and subjective opinions aims to expose the mechanisms by which the individual perception of a known phenomenon is translated into its social perception and eventually into more informed choices and actions. A deeper understanding of this mechanism, grounded in real-life scenarios, paves the way to engineering better incentives for change and poses the basis for an effective strategy of environmental communication reducing the gap between the general public and institutional bodies, with a stake in environmental policies.

Grass root community supporting scientific research: Everyaware aims to generate awareness within various grass root movements. These socio-semantic systems have also attracted much attention from the scientific community, to investigate quantitatively how cooperative phenomena arise and could be harnessed to improve the performance of such collective tasks.

How is the organisation funded?

The Everyaware project receives 2,1 million euros in funding under the European Commissions 7th framework (FP7). It is a EU project funded under the Seventh Framework Programme, Information Society Technologies, IST - FET Open Scheme, contract n. 265432.

What are the main barriers to innovate and how are they in the domain?

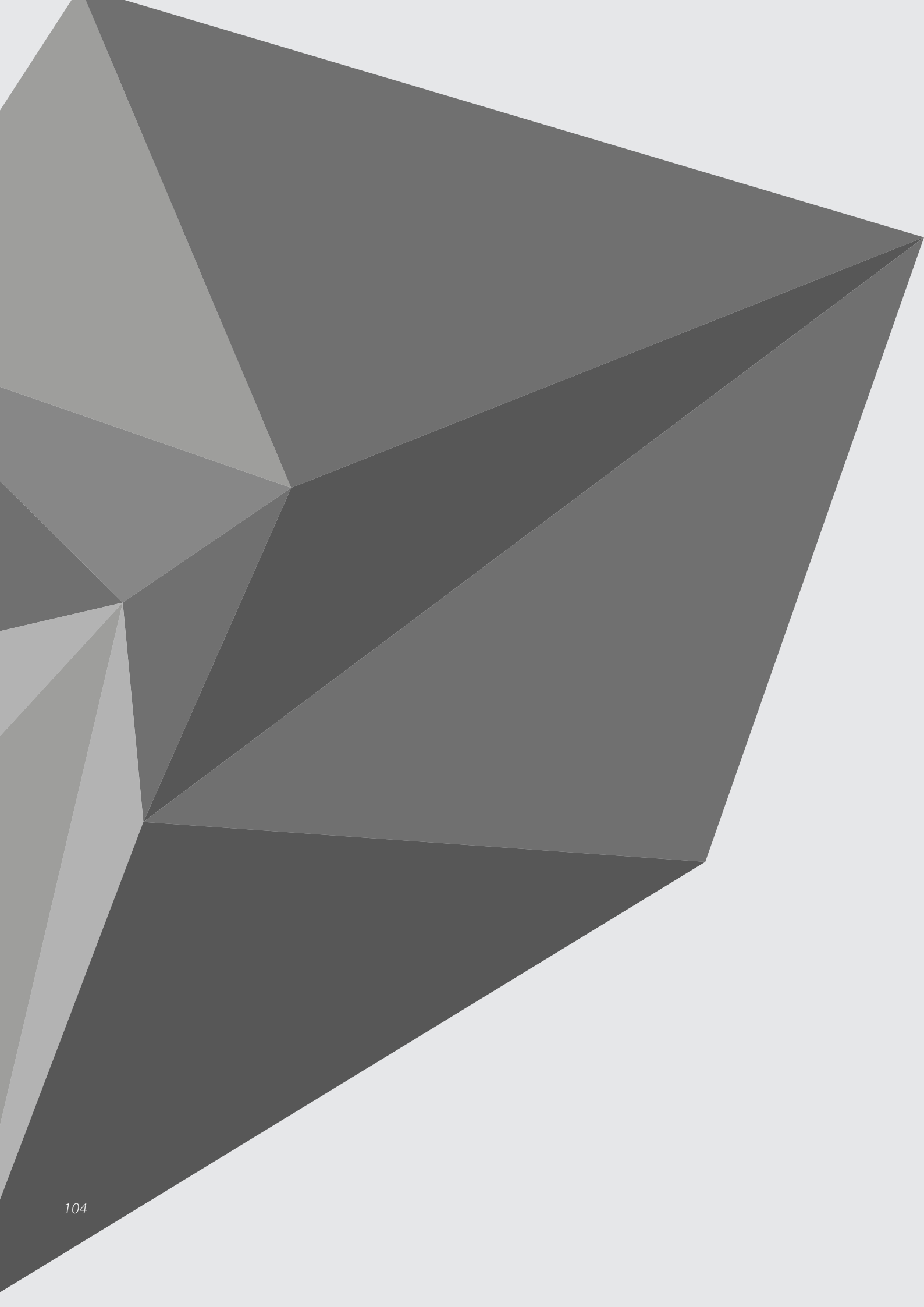
N/A

What helps to reach goals and overcome barriers?

N/A

How does it achieve better European collaboration?

The platform is a cross-European research network. It will be a resource for capturing new types of data across EU.



Fablab Amsterdam

At a glance:

Type of Organisation:	Social enterprise, foundation
Aim:	Education and Skills, Science, Culture and Arts, Energy and Environment
Technology Trends:	Open Networks, Open Hardware, Open Knowledge
DSI activities:	A network, hosting makerspace/hackerspace, providing education & training
Key facts:	Over 250 individual fabrication projects done in Fablab Amsterdam
Website:	http://fablab.waag.org/

Organisation Name

Waag Society

Short description

Fablab Amsterdam is a Fab Lab (short for fabrication laboratory), fully equipped with digital equipment, where people with ideas for projects and products can experiment with transforming those ideas into prototypes and products. Fablab Amsterdam is also part of a global network of standardised open hardware setups.

Type of organisation

Fablab Amsterdam is part of the international Fablab community (there are now Fablabs in most parts of the world, from inner-city Boston through to rural India, South Africa and the North of Norway. The network shares standards on what equipment is required for a Fablab to be fully functional as well as the capabilities needed, fabrication and production knowledge, as well as project experiences. Fablab also forms a network of intellectual property for exchanging ideas within the community, with its expertise in digital designs and fabricated solutions.

History and mission

One of the cornerstones of Fablabs is that users must learn to do it themselves, and they must share use of the lab with other uses. An added mission of Fablab Amsterdam is to provide education possibilities in digital fabrication. Training in the Fablab is based on doing projects and learning from peers. A Fablab gives access to individuals to use lab facilities to make almost anything (that does not hurt anyone).

Fablab Amsterdam first started in 2008 as an outreach project at Waag Society, by Professor Neil Gershenfeld, Director of the Center for Bits & Atoms, MIT. Waag Society is a non-profit organisation that focuses in the field of social innovation through creative technology, and the creation of Fablab Amsterdam was for Waag Society in synch with their ambition to pioneer new ways developing, prototyping and testing concepts and sharing knowledge.

Alex Schaub, who was working at Waag Society that time and is now the Fablab manager, went through the intensive training from Fab Academy and built up the very first network of Fablab Amsterdam, which is still very active. With the community effort, Fablab Amsterdam has grown to be a fully equipped fabrication workshop that gives everyone, from small children to entrepreneurs and businesses, the capability to turn their ideas and concepts into reality.

Fablab Amsterdam is situated within Waag Society's space 'De Waag' in the centre of Amsterdam.

What does it do, and how does this activity enhance social innovation?

Activities in Fablabs range from technological empowerment to peer-to-peer project based technical training, local problem solving and small-scale high-tech business incubation as well as grassroots research. Users learn by designing and creating objects of personal interest or importance. Empowered by the experience of making something themselves, they both learn and mentor each other, gaining knowledge about the machines, the materials, the design process, and the engineering that goes into invention and innovation.

Fablab Amsterdam opens two days a week free of charge to the public, to anyone who is interested in working in the Fablab and using its machines to develop new products or projects. The only requirement for using Fablab Amsterdam in open days is to document the work and project on the Fablab website and share the designs with the rest of the community under a Creative Commons license.

For this reason there is a huge variety in the types of prototypes and final products developed at the Fablab, from small scale projects with little social purpose such as a 3D plug for a bicycle handlebar to larger more complex social purpose projects such as the Low Cost Prosthesis which is described in more detail below.

Outside the open days, Fablab Amsterdam charges a small fee for using the facilities. It is also possible to hire Fablab crew to help better use the equipment and achieve ideas. Other activities that are carried out at the Fablab Amsterdam include workshops and Fab school for children. Waag Society also regularly schedules events that use the facilities of the Fablab.

In addition this Fab Academy, a distributed course in digital fabrication run by MIT, can be taken in Fablab Amsterdam.

What is the social impact it is seeking, including any evidence of impact to date?

As part of its work on enabling invention by providing access for individuals to tools for digital fabrication, Fablab Amsterdam has seen several areas that where this approach can have a social impact.

Creating networks of makers: A lot of people who have a passion for DIY (Do-It-Yourself) come to Fablab Amsterdam to work on their own projects with the lab's machine. The Open Days have made this easier and encouraged more people to join in. People then help each other, and share knowledge and experience. Building on this, the team behind Fablab Amsterdam describe how people that use the lab in addition to working on their own ideas, form a DIY community.

Healthcare: A priority for Fablab Amsterdam in 2013 has been developing and running the healthcare programme, Fablab Cares. This project was started based on a belief that people with physical limitations and disabilities have managed to find all kinds of ways to get through living with their condition, and the Fablab low-cost approach to making can help people make healthcare tools of their own and become less dependent on expensive devices.

To develop Fablab Cares the team in Amsterdam sought global collaborations especially in rural areas of the developing world, which the team see as fertile ground for beginning this work. One example of this is the Fablab Low Cost Prosthesis program, a technology to produce a lower knee prosthesis for less than $50, which was started together with HON-Fablab, a Fablab Network member from Indonesia. The project is being developed in line with open innovation principles, enabling end users, designers, researchers and manufacturers to jointly develop the prosthesis together in the Lab.

What it the role of the organisation within the DSI ecosystem?

Fablab Amsterdam uses digital fabrication to create an open hardware environment, and builds an open network based on that, in which open knowledge is being shared. It engages different parties in digital social innovation, by addressing what has been achieved with its facilities.

What technological methods and tools is it using, and what did these enable that was not previously possible?

A mix of arts, crafts and digital fabrication: Fablab Amsterdam believes in and applies both digital fabrication and traditional craftsmanship in its design and production work. The digital fabrication include machines such as, Laser cutter, Milling Machine, Vinyl Cutter, Embroidery Machine, 3D Printer, Thermal Cycler, Microscope, Centrifuge, Spectrometer, Incubator, Autoclave, Rotary Evaporator, etc. Different machines are placed in an open space, to make the work with different machines easier.

Teleconferencing system and digital communication: To Fablab Amsterdam, it is very important to build and be part of the global Fablab network. An advanced video conferencing system is installed in the lab, enabling every Fablab to be connected to each other. This makes it easy for Fablabs to share knowledge and information, especially things such as the production process, which can be shared across different labs in real-time. The network also makes it possible for people to attend the Fab Academy from all over the world.

Open Hardware and Open philosophy: Much of the work in the Fablab relies and is based on open source design and open hardware such as Arduino. One example of this is Alignment laser, which aims to engineer a low cost prosthetic alignment laser (P.A.L.) system that meets the specifications of higher cost industry laser systems. Building on this all designs that are made in the Fablab are made freely made available online for anyone to replicate under a creative commons license.

The digital fabrication enabled the Fablab community to execute the idea of creating a global DIY community. Before the Fablab people with a DIY interest wouldn't have been able to access the technology and machines in the lab such as 3D printers and laser cutters. In addition to this, the low cost technologies that are experimented with in Fablab have created the possibility of reducing the production cost of new products, just as the open licenses enable the quick spread of these between Fablabs and other DIY communities.

Enhancing collaboration and engagement: DSI network effect

The distribution of knowledge between the different DIY communities around the world helps to grow the overall value of the Fablab network. The free or low cost access to open source hard and software means that Fablab communities both benefit from and contribute to the value of these, which benefits a global DIY community using the same open tools.

How is the organisation funded?

Fablab was funded as a project of Waag Society, with the aim of making it easier for Waag Society to prototype its design concepts, as well as to carry on international knowledge sharing.

What are the main barriers to innovate?

Financing the Fablab. Fablab Amsterdam is not making money at this moment, its business model is mainly only to maintain the lab and its community. The small incomes from the fee charged to use the space are used to supply the open days. But this form of running the lab will be kept for at least a while. To make this possible, Fablab Amsterdam has been helped by a lot of interns and volunteers. The financial situation is a challenge for the whole Fablab community. It is difficult to attract a diverse range of stakeholders for whom the Fablab is a hub and exchange. Fablabs are often dependent on public funding. Most Fablabs are not prepared for requesting commercial funding and instead only focus on reducing costs. A danger is to start cannibalizing the free access in an attempt to generate revenue, which, by destroying the prime directive of the Fablab concept, actually increases the threshold for new makers to come play and experiment and thus serves to reduce the revenue potential, instead of increasing it. Almost none take lateral approaches to generating revenue and becoming a stable and energy-giving node in the local ecosystem.

Skills to take on complex projects with the DIY community: In its recent venture into healthcare Fablab Amsterdam identified a lack of skills as a barrier to growing the Fablab approach. Creating projects such as the Low Cost Prosthesis requires specialist skills, such as biomechanics, that often goes beyond what the team and volunteers in the Fablab have. A challenge going forward is to identify how to connect specialist skills to the DIY community, in order to take on more complex projects.

Setting up the organisation and building the skills: Alex Schaub describe how Fablab Amsterdam was concept-less when it was founded, and he and the other founders Schaub was given the total freedom and responsibility to set up and grow the lab. This naturally required a lot of hard work, as did finishing the Fab Academy training to give him the skills and capabilities to run the Lab.

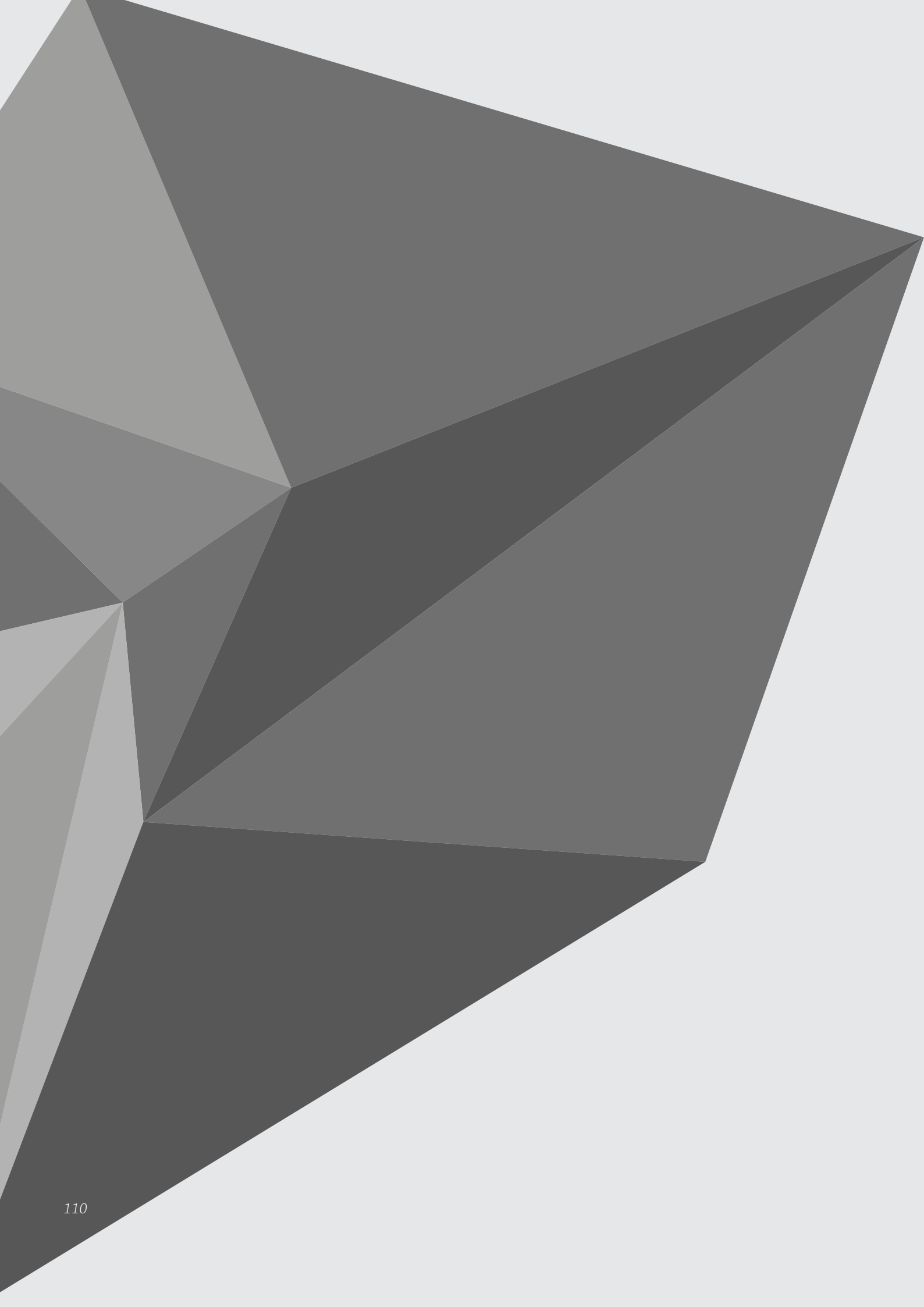
What helps to reach goals and overcome barriers?

Being locally relevant and globally connected

Locally relevant: Fablab Amsterdam finds a key success factor of the Fablab is its ability to be locally relevant, by providing space for innovation and creation, and hosting lots of events to an Amsterdam based community of DIY makers, whilst at the same time being globally connected, collaborating on projects with other Fablabs.

Run by volunteers: The majority of work in the Fablab is run by an active community of volunteers. This, the Fablab team sees as one of the most important drivers for success, as the value of the lab is determined by the activity and uptake of its facilities.

Getting support and help from other stakeholders: Getting external support from more established organisations has also proven to be extremely helpful for Fablab projects. For their work on Fablab Cares, Wieden+Kennedy (W+K), one of the largest independently owned advertising agencies in the world, helped make a video for Fablab Amsterdam for free, which helped the lab promote its belief in DIY healthcare innovation. Alex describes how this support came about as W+K were attracted to the social purpose work of the Fablab.



Fairphone

At a glance:

Type of Organisation:	Social Enterprise
Aim:	Create a 'transparency economy' by opening up the supply chain for electronics
Technology Trends:	Open Hardware, Open Knowledge
DSI activities:	product and research
Key facts:	25,000 phones sold in less than 6 months. 50,000 followers on Facebook.
Website:	http://www.fairphone.com/

Organisation Name

Fairphone

Short description

Fairphone is a start-up company producing the world's first ethically sourced smart phone, initiated at Waag Society in the Netherlands.

History and mission

Fairphone was founded as a social enterprise in 2010. The organisation can't be described as an ordinary smartphone manufacturer. It started as a joint project between Waag Society, Action Aid and Schrijf-Schrijf in the Netherlands as a campaign against the dire conditions endured by people working in sections of the global and often very complex electronics goods supply chain. This included attempting to shine a light on people working in the tin, cobalt and tantalum mines (materials used in mobile phones) of the Democratic Republic of Congo (DRC), many of which are controlled by armed groups, to the assembly lines in China where harsh conditions and long hours are often the norm.

"As a social enterprise we work like other businesses, but we are different, Our goal is social change rather than profit." – Fairphone founder and CEO, Bas van Abel.

The campaign and research ran for three years. In 2013, the social enterprise was founded with the aim of designing, creating and producing its own smart phone. Through its own phone production, Fairphone sought to take the next step in uncovering the story behind the sourcing, production, distribution and recycling of electronics, and demonstrate how a more transparent supply chain could be developed.

What does it do, and how does this activity enhance social innovation?

Fairphone wants to create a smart phone that puts ethical considerations over and above improving merely technological ones. Thereby creating an alternative in the smart phone market and raising the bar for the industry. The project is not about the phone itself, instead Fairphone aims to open up the supply chain behind making the smart phone, and create full transparency around how the product is made. The phone is a storytelling icon and the starting point of a conversation about transparency in production processes and supply chains. By connecting the dots for consumers about the social and environmental impacts of the electronic products they purchase, they become part of a larger movement for redefining the economy.

To achieve its goals Fairphone is created as an open platform using mainly social media; anyone can step in and help crowdsource relevant information and follow each step in the development of the Fairphone, from individuals, businesses and organisations to funds and bloggers.

Production of a fairer smartphone: Fairphone aims to prove that it is possible to build a reasonably priced, well-specified smart phone with a low environmental impact, sourced from the same countries mobile phone companies would normally source material and assembly from, but by supporting independent miners and manufacturers who guarantee basic standards to their employees. On November 13 2013 Fairphone announced that it had sold the first batch of 25,000 smartphones, using only social media for marketing. The Fairphone team sees this as a unique achievement, as this means 25,000 people were willing to buy a phone that has not been produced yet from a company that has never produced a phone before, based on belief in the values and mission behind the company. The organisation aims to deliver the phones by the end of December 2013.

The tin and tantalum in the first edition Fairphone are sourced from conflict-free mines outside of the control of warring parties in countries such as the Democratic Republic of Congo, where natural resources have frequently been used to fund a long-running and highly destructive civil conflict. The company is working with stakeholders and partners on the ground to achieve similar assurances about other materials used in the phone and to negotiate terms with manufacturers to ensure a living wage for workers assembling the devices.

Research: As described above a cornerstone of the Fairphone model is to understand and demand transparency from every link in the supply chain. To do this, the organisation undertakes local research and partners with NGOs on the ground in the countries from where it sources it materials. In the DRC for example Fairphone looks to ensure that the raw materials that go into the phone do not fund the warring parties in the country.

The research is coordinated by a lead researcher within the Fairphone company. Through the online platform (50,000 followers on Facebook) every step in the research and development is communicated. Fairphone has received many research requests and cooperation offers since the start of the enterprise. There are five action areas defined and through active advisory groups all the relevant input from the community is being incorporated.

What is the social impact it is seeking, including any evidence of impact to date?

The founding principles behind Fairphone is that the entire global supply chain is too complex and overwhelming to be addressed as whole, which is why Fairphone started with a single product. Fairphone see the smart phone as a practical starting point for telling the story of how the economy functions, as it is an everyday object that nearly everyone owns, uses or can identify with, which makes it both a tangible device and a great symbol of the connected and social world the supply chains that the organisation is trying to shine a light on operate in.

"It's not our aim to become the biggest phone company in the world, it's our aim to influence the biggest phone companies in the world," Tessa Wernick , Fairphone communications director.

However, it is important to note that Fairphone do not see the phone as a solution in and of itself, instead they see it as a vehicle for change, through the revelation of its story, understanding how phones are made and producing an alternative.

Through mobilizing 25.000 potential consumers, Fairphone feels it has demonstrated how collective action can be made to count and how a community has the power to fuel change.

What it the role of the organisation within the DSI ecosystem?

Fairphone grew from a community platform to the first open mobile phone manufacturer. It is a great case of the open design movement creating grounds for new relations between product, manufacturers and consumers. The appealing story together with the careful community-building by the partners brought a lot of media coverage and made the initiative grow.

What technological methods and tools is it using, and what did these enable that was not previously possible?

In their own words 'Fairphone is not just a bunch of do-gooders; it is making a super cool, high-performance smart phone packed with all the modern features'. The truly outstanding feature is the community though; basically a large group of followers on Facebook and twitter. Since this started as a very collaborative project Fairphone has depended on the community for feedback and input. In the course of its lifetime a committed and talented community grew actively supporting the initiative and product.

As a very small organisation - there are only eight full-time staff - Fairphone is maximising its impact through an open-source, social and collaborative approach, with audits run through partnerships with charities and NGOs, research through crowd sourcing, sales and marketing solely through social media. Every step in the development process, every decision the company makes, is being shared online for people to react and comment on. All the feedback is taken seriously and valuable tips and information are taken into account. This open approach extends to plans for the phone itself and the software, although there is some way to go on this.

How is the organisation funded?

As a research project of Waag Society, Fairphone received funding from Doen Foundation and the Dutch expertise and advisory centre for citizenship and international cooperation . Fairphone won the ASN world prize in 2011. Since Fairphone decided to establish as a social enterprise and design, create and produce its smart phone, it has received funding from Bethnal Green Ventures to participate in a startup Bootcamp and set up its business proposition in London and later about 400,000 euro of private funding to cover operations until its pre-order campaign.

The phone itself is being sold in a pre-sale model, and in batches of 25,000 at a time. 5000 people order and pay for the phone before the company decides to go into production. This way a healthy relationship with the manufacturer can be built, allowing feedback and iterations.

What are the main barriers to innovate?

The supply chain for the production of electronics is very complex. It is, therefore, very difficult to create a fair product in this industry that is used to dealing in extremely large numbers. The strategy is to take small concrete steps and to keep telling the big story. New economies do not grow overnight. It takes a lot of effort and a long term vision.

What helps to reach goals and overcome barriers?

Fairphone can also be seen as a platform to bring best practices together. Not only brokering partnerships between stakeholders, but also using existing initiatives like CFTI (Conflict-free Tin Initiative) and Solutions for hope, that source tin and tantalum from conflict-free areas. This change can only be achieved by doing things together. Fairphone works with factories where a specially established fund will ensure decent wages are distributed amongst workers. It's all about opening up the supply chain, creating transparency.

GitHub

At a glance:

Type of Organisation:	Private business
Aim:	Work and employment, other
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	The platform has 4 million users worldwide
Website:	https://github.com/

Organisation Name

GitHub

Short description

GitHub, a San Francisco-based company, was started in 2008 as a way for open source software writers in various locations to rapidly create new and better versions of their work collaboratively. It has since grown to be the largest social coding repository in the world. GitHub has an apparently flat organisational structure; out of its 227 employees there are virtually no managers, and staff are given a great degree of autonomy in choosing the types of projects they wish to work on; a system of self-allocated work spurred on by the belief that creativity and innovation are contingent upon employees investing themselves in the projects they commit themselves to.

History and Mission

GitHub sets out with a seemingly simple objective: to build better software together. Source code management was historically a particularly asocial (and sometimes antisocial) practice. By shifting this once solitary activity to one centred instead around digital collaboration or indeed 'social coding', GitHub has managed to craft a successful business model based around code review and code management for open source and private projects, by tapping into this community of collective coders.

GitHub started in October 2007 in an effort by Preston-Werner and co-founder Chris Wanstrath to solve some of the challenges presented by Git, a version control system developed by Linus Torvalds, the creator of Linux. Over time, GitHub's mission evolved from offering a paradigm

shift in the way programmers had coded largely in isolation to something more. Since then the platform has gone through a rapid development and is now largest social coding repository in the world with more than 9.8 million repositories.

What does it do, and how does this activity enhance social innovation?

At its simplest Github can be described as open source tool for people to come together online and collaborate around a project, in the majority of cases the projects people use Github to collaborate around are code for websites and software solutions. As a project is developed Github stores and manages revisions to projects. To make it easy for developers to collaborate Git has developed a number of features such as a Web-based graphical interface, wikis and basic task management tools for every project. However, the key feature of Github is the ability to 'fork' projects. This allows the copying of a repository from one user account to another (possible because the code is open source). This enables a developer to copy a code that he or she does not have writing or editing access to and modify it. The developer can then share any modifications the original owner through a "pull request". He or she can then choose to accept any changes made and merge these with the original version.

This makes it both a tool for quickly developing new project collaboratively, and building on this facilitates new digital collaborations to emerge online through 'forking' and 'pulling'. Equally, the fact that all code is open means that people often won't have to start from scratch when developing a new product, but can instead build on existing projects already shared on Github.

What is the social impact it is seeking, including any evidence of impact to date?

Digital collaboration is at the very heart of what GitHub does. Indeed, as the graph below illustrates, Homebrew – a platform used by developers to make code run more smoothly with the Mac OS – was the most heavily trafficked project on GitHub in 2012. This infographic illustrates the flow of code and dialogue that resulted in over 2,000 changes to enhance and improve the Homebrew source code. While Homebrew is just one sample project hosted on GitHub, there are over 5 million other projects on the site involving 3 million coders.

However it seems GitHub wants to stretch digital collaboration and transparency to its limits, far beyond the realm of coding alone: "We want lawyers, people in the government, everyone to use GitHub," its co-founder and CEO Tom Preston-Werner has said. Speaking at TechCrunch Disrupt SF, he said the aim was to "extend the use cases for GitHub…I want people to use this for every reason."

What was the social impact?

A study based on a series of in-depth interviews with central and peripheral GitHub users (carried out by the School of Computer Science and the Center for the Future of Work, Heinz College and Carnegie Mellon University); found that people make a surprisingly rich set of social inferences from the networked activity information in GitHub, such as inferring someone else's technical goals and vision when they edit code, or guessing which of several similar projects has the best chance of thriving in the long term. Users combine these inferences into effective strategies for coordinating work, advancing technical skills and managing their reputation.

How is the organisation funded?

Famously self-sustaining from its founding in 2007, the company has maintained long-term sustainability by offering private code hosting starting at $7/month for five repositories, and up to $50/month for fifty repositories. Instances of GitHub can be licensed to run on private servers inside a company's firewall under the Enterprise plans ($5000/year/20 seats). These Enterprise plans are claimed to be the Github's 'big-money option.' This plan enables clients to download a version of GitHub to live locally on their servers, and cost clients millions of dollars a year. Enterprise clients include Lockheed Martin, Microsoft, LivingSocial, VMWare and Walmart.

Another revenue stream is GitHub Jobs where employers can post job offers for $450/listing. According to Peter Levine, general partner at Andreessen Horowitz, GitHub had been growing revenue at 300% annually since 2008, "profitably nearly the entire way." Overall the 'open source' culture of GitHub translates into their business model in one particularly obvious way: programmers or companies can use the collaborative platform for free as a place to build open-source software, or if they opt not to host their code in this way– favouring instead more proprietary 'closed' code–they pay a premium rate to have to code hosted in private repositories. This second option allows companies to make use of the built-in collaborative features of GitHub, but requires them to give up use of Github's 'distributed global network of talent.'

In July 2012 GitHub received its first ever external funding, when the venture capital firm, Andreessen Horowitz, invested $100 million in the company during its Series A Funding. This additional funding has helped GitHub expand its user base to over 3 million users (now over 4 million). As of July 9th the company was valued at $750 million.

What is the role of the organisation within the DSI ecosystem?

For the many DSI organisations and projects that make up the DSI ecosystem, GitHub has formed the very backbone of a number of these – encouraging collaborative coding for projects like Commons4Europe, mySociety and Open Ministry, whilst building up a community of 'user-contributors'.

On October 15th 2013, Github announced the launch of GitHub Government; a platform set up with the aim of helping governments become more open source, open data, and open government. This portal is specifically aimed at helping governments all over the world to open source datasets, legislation and information so that citizen programmers can help solve local problems.

What technological methods and tools is it using, and what did these enable that was not previously possible?

GitHub uses Git, a multi-platform version control application created for use by developers of the Linux kernel, to coordinate collaborations and to manage uploads and downloads (pushes and pulls) to GitHub. Though developed for software code, any types of files can be part of a GitHub repository, and any text-based files (including plain text, MarkDown, HTML, LaTeX, and LilyPond music notation software files) can take advantage of Git's version tracking and "merging" features. GitHub is also a kind of social network, providing collaborators an easy way to discuss issues in a project, and to follow other users and projects of interest.

Furthermore, by making use of the latest HTML5 API, activities like navigating through a code directory structure are greatly enhanced. As the system of record for software, it is natural that the rest of the software development ecosystem (bug trackers, project management, continuous integration and testing tools) are now scrambling to integrate with GitHub. This will continue to reinforce their leadership position and make life easier for developers. Travis CI gives a glimpse of what the future holds. Checking code into GitHub automatically triggers a test and integration build on Travis CI, a framework running on Heroku. This relieves developers of the tedium of integration testing and will result in better quality software.

GitHub has remodelled how programmers engage with Source Code Management (SCM) – a fundamental tool for programmers, that stores, versions and branches source code being developed by teams of programmers. While traditionally SCMs have been a highly complex, esoteric and cumbersome systems to manage; they have also been notably asocial in their nature. GitHub has thus radicalised this system's approach in two ways:

Rather than forcing every development team in the world to deploy their own SCM, GitHub runs one big SCM in the cloud and the management issues vanish.

GitHub organises projects around people rather than code.

While these changes may seem simple at first, their ramifications have been widely sensed. Because modern programming tends to be about assembling code–in the form of libraries, open source work, etc.–as well as writing it, a great deal of code (over 3 million Git repositories) have been stored on GitHub, where it has been easy to access in one central repository. In essence this people-centred approach to programming has meant GitHub has become a social networking site for programmers.

Enhancing collaboration and engagement: DSI network effect

GitHub hosts open-licensed projects and is designed for collaboration; allowing any user to fork any public project. By clicking the "fork" button, any GitHub user can almost instantaneously create their own version of an existing project. That "forked" project can be used as the basis for a new project, or can be used to work out new features that can be merged back into the original.

Yet while GitHub was originally developed as a way to share and merge software code, this same logic can be applied to any types of files that make up the GitHub repository, making it a potentially useful collaborative tool for academics, legislators and government workers. Since any open-licensed project can be hosted on GitHub for free, it can function as a publishing platform, a peer-review system, a learning management tool, and a locus for intra- and inter-institutional collaboration.

What really helps reach goals / how to overcome these barriers?

GitHub's success can be largely explained by the way it has opened up what was in the past a closed, asocial aspect of software coding. By making its coding repository far more transparent, potential contributors are likely to understand how it is GitHubbers interact and develop collaboratively. This in turn has the benefit of accelerating the time it would normally take to have someone become an engaged and productive developer, and also affords junior or novice developers the opportunity to see how more senior coders write code and communicate.

Related also to this point on collaborative learning is the fact that contributors heavily rely on existing tests in project when creating their own tests. Such knowledge can help GitHub project owners to get contributors to deliver more tested code.

Others have commended how few infrastructural barriers there are to someone making contributions to ongoing projects on GitHub (however big or small). Such commentators report that a lot of potential productivity is lost when you require users to fill out forms or register for barely usable software before they too can get involved, etc.

What were the main barriers to innovate?

Open Source vs. Closed: While GitHub has stood out as an outrider of how e-businesses might operate in an open-source landscape; the cultural and operational change needed to accompany such a paradigm shift has by no means been seamless. The case of Healthcare.gov offers an interesting allegory in this regard. Healthcare.gov is a platform intended to enable users to navigate through its site, and to choose the most suitable healthcare package. The code for the informational part of Healthcare.gov – the "frontend" of the site – was written by a Washington, D.C. startup (Development Seed) and a small team of consultants. Whereas the code for the healthcare exchange – the "backend" of Healthcare.gov – was built by more than 50 contractors at CGI Federal and was never made public. Bloomberg Businessweek has reported that Development Seed was brought in as a subcontractor specifically because it had lots of code on GitHub. The conflation of these two approaches to coding resulted in confusion and chaos – Millward Brown Digital reported that a mere 1 per cent of the 3.7 million people who tried to register on the federal exchange in the first week actually managed to enrol. On the 1st of October, all Healthcare.gov code hosted on GitHub was removed.

According to the Centers for Medicare and Medicaid Services this is because people were using the GitHub repository – which contained only frontend code – to report issues with the backend, and because the backend had extensive technical problems, the GitHub repository was overwhelmed with misdirected bug reports.

What really helps to reach goals / how to overcome these barriers?

Source Code Management: According to Preston-Werner (a GitHub founder), the main problem is the site's forbiddingly technical approach. "We've got a lot of educating to do," he said. GitHub is built on top of Git, an eight-year-old source-code management tool that most users still manage via a command-line interface. While understanding Git may pose as a barrier to innovation more recently there has been an emergence of free tools to learn Git online, and GitHub now comes with graphical interface tools that you can download and use without knowing a line of Git.

More negatively, a focus on build- and test-driven development has resulted in fewer tests for bad input: Many newer contributors have never learned to write test suites (i.e. a series of tests designed to test a software program has a specified set of behavior), but senior developers often assume the opposite. Using Behavior-driven development or Test-driven development without teaching "safe testing" leads to 'a lack of tests for invalid results and functionality, only tests to confirm that the intended results occur upon the intended input.'

Funding and business model: GitHub's 'Freemium business models' (a term which relates predominantly to the fact that organisations will pay a premium price to host their source code privately with GitHub) is underpinned by the fact that as the cost of computing, storage, and (most importantly) bandwidth has fallen over the past few years. For these reasons, GitHub has been able to offer free project hosting to millions of users. The marginal cost of each new project is likely less than $1 per year.

Goteo

At a glance:

Type of Organisation:	Charities, foundation and social enterprise
Aim:	Platform for crowdfunding for projects generate a collective return through fomenting the openness
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	14.000 registered users, launched 100 successful projects and sourced more than 700 non-financial contributions
Website:	http://goteo.org/

Organisation Name

Goteo

Short description

Goteo.org is an open source social network for crowdfunding as well as distributed collaboration based in Spain. The explicit mission of Goteo.org is to help finance and support "the independent development of creative and innovative initiatives that contribute to the common good, free knowledge, and open code". Building on this, the platform aims to facilitate 'the collective investment in open projects with social, cultural, scientific, educational, technological or ecological objectives that generate new opportunities for the improvement of society and the enrichment of community goods and resources'.

Type of organisation

Goteo is managed by the non-profit organisation – Fundacion Fuentes Abiertas (Open Source Foundation).

History and mission

The explicit mission of Goteo.org is to help finance and support 'the independent development of creative and innovative initiatives that contribute to the common good, free knowledge, and open code'. The Goteo founders have described how there were three primary drivers behind the development of Goteo.

Firstly, Goteo wanted to create a crowdfunding service for people in Spain. When they were developing the platform, Kickstarter, the leading international crowdfunding platform at the time, had a limitation of people not being able to publish projects without an American bank account.

However, secondly, and more importantly to the Goteo team they also saw a flaw with existing crowdfunding platforms and a subsequently a gap in the market for Goteo to target. The crowdfunding taking place on Kickstarter, Indiegogo and similar crowdfunding platforms very easily lend themselves to what Schulbaum and Senabre refer to as 'problematic practices of 'crowd capitalism' where crowdfunding helps raise money for a commercial venture with global production processes, with the risk of subcontracting critical tasks to global sweatshop factories.

Thirdly, Goteo identified that the majority of existing platforms didn't encourage collaboration, and broke down the relationship between people using the platform in traditional consumption relationships. On the hand were artists/producers of crowdfunded products and projects and on the other were audiences or consumers of these. Goteo saw a potential exploring crowd benefits that mixed financial as well as social ones, through creating a platform that enabled the donation of time, skills and a will to collaborate as well as financial resources.

How it all came about: The genesis for Goteo came in 2010, when Platoniq (a collective of cultural activists, open source practitioners and Internet researchers) came together to explore initiatives for giving monetary support online to different people and causes with a social purpose. This included looking at new models for financing ventures such as the micro credit site Kiva, P2P lending models and emerging crowdfunding platforms like Kickstarter. The aim of the exercise was to understand how compatible crowdfunding was with crowdsourcing lessons learned from the open source world. In the initial development phases the team organised workshops and meeting with the different communities of practice, potential project leaders, backers and institutions which could help them validate some of the ideas they had got from the initial research phase and also discover new concepts and interesting things to develop. Following on from this initial scoping of the platform the team began to write the code for the Goteo platform with the central idea of openness and collaboration in mind. This meant both replicating some features of crowdfunding from other sites, but also adding new features such as optimum and minimum costs needed, petitions for collaborations as well as monetary help, and specially the need to identify and propose some valuable collective reward apart from individual ones.

This lead to the development and launch of Goteo in late 2011.

What does it do, and how does this activity enhance social innovation?

At its simplest Goteo can be described as a social network that helps facilitate both the collective funding of and distributed collaboration or crowdsourcing of projects.

Crowdfunding: The crowd-funding platform features of Goteo follows the basic principles of most other crowdfunding platforms. The platform facilitates the sourcing of many small financial contributions towards projects that contribute to developing the commons, free knowledge and/or open source. Unlike most other crowdfunding platforms Goteo operate with two funding windows for a campaign, each with a duration of 40 days. The first is an "all or nothing" round for the minimum essential budget, while the second is for an optimum sum to carry out additional improvements.

This method of finance stands in contrast to more traditional types of financing products and projects, which typically happen through large contributions from a small set of investors or lenders.

Crowd 'collaboration': This second component of Goteo is based on a belief that that crowdfunding offers benefits beyond new opportunities for finance, and that 'everyone who contributes to a project should become part of the economic/productive/creative process they helped to improve, rather than support the generating of knowledge and resources for a private party'. Therefore, projects that raise finance on Goteo also have the opportunity to source non-financial support from backers that can help make the projects a reality. As an example, Nodo Móvil is a campaign to create a mobile wifi connection unit for social movements and public spaces. In addition to raising well beyond its minimum funding goal, it also succeeded in attracting support from developers, a hacklab space for working, a 3D printer for prototyping, volunteer testers for their prototype solutions, as well as an offer to collaborate with local authority on testing the project in a public area. Another example is how the Infinit Loop campaign to develop a reusable wrap for gifts made of high quality cloth with a QR identification code, which allows people to follow the wrap as it is used on future presents with web geolocation, was able to get support from app developers in addition to the reaching their funding goal.

What is the social impact it is seeking, including any evidence of impact to date?

A core criteria for Goteo is that all campaigns the platform helps have to meet a cultural, scientific, educational, technological or ecological objective. In addition to this projects must permit through the use of licences the copying, public communication, distribution, modification and/or use of part or all of each creation. As Schulbaum and Senabre describe in an interview with Sharable magazine, they are adamant that 'the project is transferable and reusable by other people and collectives (common good) according to the rights which govern free knowledge and which are usually regulated on a legal level through free and open licenses'. Therefore projects are built on collaborative, open source and open design principles. As an example the Infinit Loop cloth mentioned above is for example built with an open design license.

Although a relatively 'young' platform, Goteo has already experienced a significant traffic and usage of the platform. After 11 months of activity the platform had more than 14,000 registered users, with more than 9,000 daily visits, and significant social media attention as well (the platform has more than 8,000 Twitter followers and 3000 Facebook likes). Most importantly more than 100 open projects have been fully funded and supported to date via the platform, raising a total of nearly €350,000, with more than 700 offers of different types of contribution and collaboration from volunteers.

What is the role of the organisation within the DSI ecosystem?

As a crowdfunding platform focusing on the commons, Goteo has helped raise finance for a suite of digital social innovation projects. One of the more prominent of these include the Smart Citizen kit, an environmental sensor kit for citizens, built on Arduiono (case studied elsewhere is this report).

What technological methods and tools is it using, and what did these enable that was not previously possible?

To facilitate the crowdfunding of campaigns, Goteo relies heavily on the ability of people to easily transfer money online, just as social media and networks such as Twitter, Facebook, Flickr and Youtube are a crucial part of launching, promoting and engaging online communities of potential backers in Goteo projects. Goteo has used open coding platform Github to develop the code for the platform and have made the source code for the platform available for everyone to access on Github.

While not directly technologies, the project relies heavily on the open hard and software standards developed by and for the open source community, such as creative commons to set the standard for how campaigns launched on the platform should use and develop open technologies.

Modern crowdfunding and its ability to quickly mobilise large groups of often very geographically dispersed people online around a common cause, would not have been possible before the emergence of the Internet.

The projects launched on Goteo often rely on the access to low cost and open hard and software solutions to develop their products. The Nodo Móvil project campaign is, for example, built on the Arduino Open Hardware board. Other projects, like the Tuderechoasaber, an online platform for accessing and creating information requests to Spanish public bodies, relies on open data.

How is the organisation funded?

The Spanish Minister of Culture has helped co-fund (amount unclear) the early development of the Platform. All projects on the platform are funded by individual backers, who vary on a project by project basis.

What are the main barriers to innovate?

No information available

What helps to reach goals and overcome barriers?

No information available

Landshare

At a glance:

Type of Organisation:	Social enterprises, charities and foundations; grassroots communities
Aim:	Work and employment, other
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	Landshare has got 55,000 members worldwide
Website:	http://Landshare.net

Organisation Name

Landshare

Short description

At its simplest, Landshare can be described as an open platform that allows people to share land. Anyone who wishes to be involved in the Landshare project can register and to search the list of other Landshare Members to identify people who they may wish to contact to assist them (whether as a grower, landowner or helper) in setting up their own land-sharing arrangements.

Type of Organisation

Landshare is a community-based social enterprise.

History and mission

Landshare sets out 'to bring together people who have a passion for home-grown food, connecting those who have land to share with those who need land for cultivating food.'

The landshare project was launched in 2009 through celebrity television chef, Hugh Fearnley-Whittingstall's Channel 4 television show River Cottage. Since then it has grown into a community of more than 60,000 growers, sharers and helpers.

What does it do, and how does this activity enhance social innovation?

Landshare takes an entrenched social problem (i.e. the shortage of available land allotments) and sets out to solve it in an innovative, digital way; by using its site as a social network where interested D.I.Y. growers can join forces to form a growing collective, or can search for or list land that might be used for this reason. It also uses geolocation mapping tools to offer a helpful, searchable visualisation of available allotments, where users can enter their post code to explore their own locality to see what's available.

What is the social impact it is seeking, including any evidence of impact to date?

Landshare's online community is dedicated to reducing land waste and promoting home-grown food (both for its health and environmental benefits), and address the basic challenge that there are more than 100,000 people on allotment waiting lists in England alone. Landshare aims to unlock latent land assets through its digital collaboration thereby achieving its aims.

Overall, its objectives are to lower barriers people face, mainly space, in growing their own food. This initiative thereby addresses issues of 'health, food access and equality, environment, food security, and community cohesion.'

Part of the difficulty in assessing the impact of the project relates to the fact that much of Landshare's success can be attributed to the media channels from which it benefits. This has certainly done a lot to raise Landshare's profile, and has created buy-in from those who associate the project with its founder's celebrity profile. It is thus difficult to establish the impact of the digital platforms which the project uses to map and match growers with land sharers. Having said that, the site boasts over 73,000 members, and claims to have a community of over 60,000 growers and sharers.

What is the role of the organisation within the DSI ecosystem?

Landshare seeks to match interested parties up with disused land that might be used as allotments; seeks to allay potential barriers by supporting users in their efforts to secure land through local councils. Landshare's Let's Grow Campaign aims to assist in the matching up of growing groups with disused land. It informs interested parties of six or more people (who pay council tax in approved regions in the UK) of their legal right to access an allotment made available for use by their local council. It also offers them the tools to form a group for this reason, as well as tips in how to lobby their local councils (such as a pro forma letter).

What technological methods and tools is it using, and what did these enable that was not previously possible?

In August 2010, Landshare launched a free iPhone app. The app featured a 'landspotting' camera tool which incorporates geocoding technology that enables users to photograph areas of unused land and plot them on a map. They can send this to their local council to request allotment space. The app was developed by KEO Digital.

The Landshare.net website includes some built-in social networking features such as message inbox, forums, and chat functions where users can ask 'vegetable doctors' for advice on particular questions, or consult other members for any advice they might need.

Considering the project boasts over 70,000 registered users - as of November 2013, Landshare's use of open networking and crowdsourcing has evidently proven useful resource for growers, sharers or helpers interested in getting involved or joining the 'grow your own' movement.

Enhancing collaboration and engagement: DSI network effect

Users can set up groups via the app, inviting friends or people living in the same area to join Landshare. Once a group has six members, a letter can be automatically generated and sent to their local council requesting an allotment. This same feature is available to those who opt to use the website.

The website also includes a number of sharing and support platforms that promote digital collaboration related to finding or sharing land, finding groups in a member's local area, and advice for starting up a community garden or approaching local councils to try to secure an allotment. By entering in your postcode to the searchable map on the website, members are potentially presented with a number of helpers, sharers or growers in their area. This clearly demonstrates how Landshare is using digital technologies for the purpose of collaboration.

How are projects funded?

Individual Landshare initiatives have been funded using Landshare's sister site the crowdfunding platform Peoplefund.it, which, like the Landshare website and app, was also set up by KEO Digital. Peoplefund.it works in a similar way to crowdfunding platform Kickstarter. As an example the platform was used to successfully raise £4,401 (109 per cent) of the £4,030 target for the proposed Dyfi Landshare. The £4030 was intended to be used to pay for office space for one day a week; Staffing: two members of staff for one day a week; telephone line rental and call charges; printing and office supplies; website fees; travel expenses and Welsh translation services.

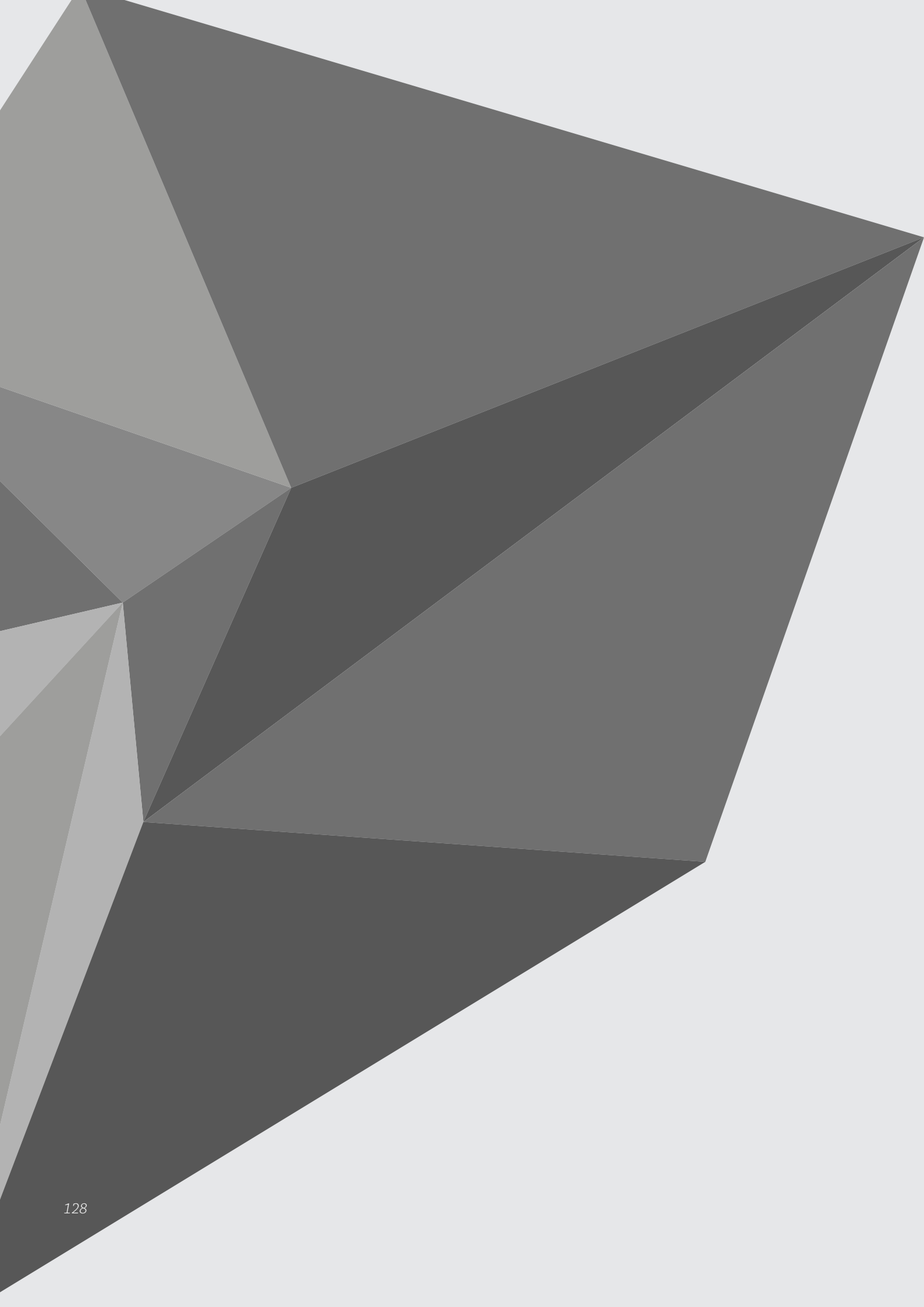
Recently, Landshare.net has decided to run a trial to test the inclusion of some 'contextual advertising' to help pay for the continued development and maintenance of its website. According to the site, the income from these adverts will help to fulfil the initiative's primary objective: to connect as many growers with available growing space in the UK and beyond.

What really helps reach goals?

Undoubtedly Landshare's success has been largely a consequence of the immense media muscle power the project has had since its inception: the initiative was born out of celebrity chef Hugh Fearnley-Whittingstall's River Cottage television show, and has the benefit of having Channel 4 as a primary partner. It is therefore difficult to know if the initiative would have had the same degree of buy-in from the public and from local councils in the absence of these important profile-raising networks.

What were the challenges they needed to overcome?

No information available



Liquid Feedback

At a glance:

Type of Organisation:	Grassroots communities
Aim:	Participation and democracy
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	Used by the pirate party in Germany to source policy from members
Website:	http://liquidfeedback.org/

Organisation Name

Liquid Feedback

Short description

Liquid feedback is free open source software which enables platforms for bottom-up political opinion formation and decision making.

Developed by the Public Software Group based in Berlin, Germany, the platform combines aspects of representative and direct democracy enabling participants in the platform to both vote directly on issues or by proxy through delegating their vote to other members of the organisation using the platform. To date the most prominent use of the platform has been by the Pirate Party in Germany and the MoVimento 5 Stelle (5 Star Movement or M5S) in Italy, who have used the Liquid Feedback to engage party members to shape and vote on the parties policy.

Type of organisation

The Public Software Group who developed the Liquid Feedback software is a not-for-profit organisation based in Berlin, Germany.

History and mission

The Liquid Feedback software was first published in October 2009 by Public Software Group. The software was first used by Germany's Pirate Party that same year, and has, amongst others, since also been used by the Five Star Movement in Italy. However the developers are fully independent from the users of the software. The Liquid Feedback software is published under an open MIT license and free for anyone or any organisation to download and use.

At the core of Liquid Feedback sit an ambition to create a platform that addresses the gap between representative democracies where people elect representatives to represent and vote for them on policy decisions and direct democracy, where one person equals one vote. The problem Liquid Democracy identified was that while the latter is considered a more 'pure' democracy, it does not scale well, and individual voters might not always be knowledgeable on the often very complex policy issues being discussed. As a response they developed the liquid democracy model where people can both vote directly by proxy, through delegating their vote to other members using the platform, as explained in more detail below.

What does it do, and how does this activity enhance social innovation?

The basic activity of Public Software is to make the Liquid Feedback software freely available to organisations interested in using the platform to create a more deliberative process around shaping and agreeing on policy initiatives. While the platform was original developed for political parties and was first used by the Pirate Party in Germany, it is also used by associations and NGOs allowing all members to participate in voting as well as developing, which can aid board members in their work. One example of the latter is the Slow Food an organisation based in Germany with more than 11,000 members. Finally, it can be used directly by government to get civic participation around local policy issues and private businesses and corporations who want to engage their employees in making strategic decisions.

At its simplest the process of using Liquid Feedback can be described as follows. An organisation, such as the Pirate party commits to using Liquid Feedback, and its members sign up to the platform to be able to use it. Once signed up, any member can propose policy. However for the proposal to be taken forward it needs to gather 10 percent quorum. Once it has been taken forward in to a 'revision period', any member has the opportunity to pitch an alternative proposal. With one or more proposals suggested it is now up to members to vote up or down on the different proposals until a winner emerges. As mentioned earlier, liquid feedback tries to address the gap between direct democracy and representative democracy and therefore allow for three types of voting.

1) Through global delegation where members give their vote to a representative on every issue. 2) In subject delegation people give their vote on specific subjects such as health or transport, only. Finally, members can choose 3) issue delegation, where a member only entrusts another member with their vote on specific issues. In all instances, when one voter gives his or her vote to someone he or she trusts would vote on their side, that person can then give his or her vote, along with all of his delegated votes, to someone else. At any given time voters can reclaim their votes. This, Ingo Bormuth from the German Pirate Party has explained is an ideal setup for the party as they 'want effective people to be powerful and do their work, but we want [the grassroots] to be able to control them'.

What is the social impact it wants to achieve?

The overarching aim is of Liquid Feedback is to create a tool and platform that encourages more bottom-up engagement in the policy-making process within political parties and similar organisations.

To date the most significant impact of the platform can be argued to be the update of the platform by the Pirate Party and M5S. The Pirate Party has experienced a rapid growth in Germany and have amongst others secured seats in the parliament of the city-state of Berlin, seats in the regional parliament of Saarland. More than 10,000 members of the Pirate Party in Germany take part in the party's use of the Liquid Feedback platform. In Italy the 5 Star Movement or M5S has also experimented with the platform.

Finally, and on a more general level, Liquid Feedback is built on an open source licence. The rationale for this is that everyone interested in adopting the platform to their organisation should be able to do so freely.

What is the role of the organisation within the DSI ecosystem?

Through providing an open platform for anyone to use, the platform seeks the easy distribution of tools that can help any organisation create a more democratic model for developing policy.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: At heart of Liquid Feedback sits an ambition to create a platform that lets people come together online to crowdsource and prioritise ideas. This type of participation would arguably not have been possible, or it would have been too costly and time consuming to work efficiently, before the advent of the Internet. Finally, the open source approach, as described above, allows the platform to be adapted by organisations that are both diverse in type and their geographical base.

How is the organisation funded?

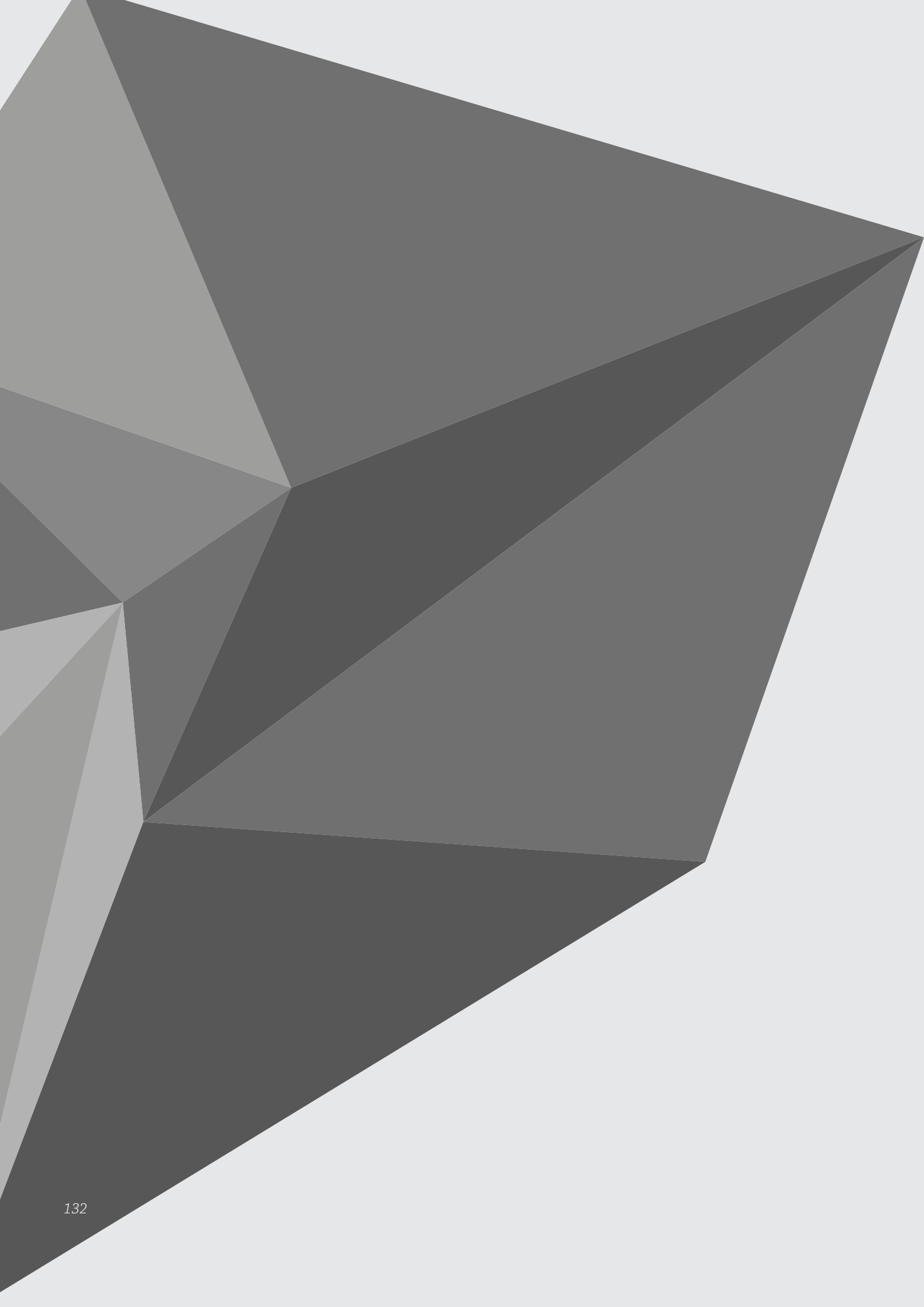
No information available

What are the main barriers to innovate?

No information available

What helps to reach goals and overcome barriers?

No information available



Makerfaire

At a glance:

Type of Organisation:	Private business, social enterprises, charities and foundations
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open hardware
DSI activities:	Organising an event
Key facts:	165,000 people attended the two flagship Maker Faires in in 2012. 30,000 people attended the Rome 2013 Mini Maker Faire
Website:	http://makerfaire.com/

Organisation Name

Makerfaire

Short description

Maker Faire is an event created by Make magazine to "celebrate arts, crafts, engineering, science projects and the Do-It-Yourself (DIY) mind-set".

In 2012 there were 165,000 people attending the two flagship Maker Faires in San Francisco Bay Area and New York, with 44% of attendees first timers at the San Francisco Bay Area event, and 61% in New York. In 2013, over 60 community-driven Mini Maker Faires are expected around the world, including Tokyo and Rome.

Type of organisation

Maker Faire is a series of events created by Maker Media, a for profit business, which publishes MAKE magazine.

History and mission

The first Maker Faire was held on April 22 – 23, 2006, at the San Mateo County Event Center. It included six exposition and workshop pavilions, a 5-acre (20,000 m2) outdoor midway, over 100 exhibiting makers, hands-on workshops, demonstrations and DIY competitions. The launch of Maker Faire in the San Francisco Bay Area in 2006 demonstrated the popularity of making and interest among legions of aspiring makers to participate in hands-on activities and learn new skills at the event. The first Maker Faire in the United Kingdom took place on March 14–15, 2009, in Newcastle upon Tyne, as a joint venture with the Newcastle ScienceFest.

At the heart of Makerfaire is an ambition to create a space where DIY makers and people with an interest in making can come together to showcase, share and develop projects. This is based on the insight from 'makers' that they often have no place to share what they do on DIY (Do-It-Yourself), as it is often invisible in the communities, taking place in shops, garages and on kitchen tables. It's typically out of the spotlight of traditional art or science or craft events.

Maker Faire is an all-ages gathering of tech enthusiasts, crafters, educators, tinkerers, hobbyists, engineers, science clubs, authors, artists, students, and commercial exhibitors. All of these "makers" come to Maker Faire to show what they have made and to share what they have learned. Maker Faire is organised and run by Maker Media. Maker Media, the publisher of MAKE magazine, and seller of DIY electronics, tools, kits, and books.

What does it do, and how does this activity enhance social innovation?

The Maker Faire events are primarily designed to be forward-looking, showcasing makers who are exploring new forms of making and new technologies. But it's not just for the novel in technical fields; Maker Faire features innovation and experimentation across the spectrum of science, engineering, art, performance and craft.

Flagship Faires: Flagship Faires is the major Maker Faires that take place in San Mateo, California, Detroit and New York. The New York Maker Faire is also known as "World Maker Faire". It is a family event, as the vast majority attend with children.

At the event there are a variety of activities taking place, such as interactive exhibits, live conversations and presentations. Topics and areas include electronics, 3D Printing, technological product demo, design, craft, sustainability and domestic arts, as well as making in education. For example the event featured demonstrations on the DIY opportunities in the Arduino open source electronic board and Raspberry Pi. Other events include presentations and workshops on collective innovation and the diffusion of open innovation, social networks, crowdsourcing and 3D printing, and the benefit of participating in such open innovation environments for DIY product designers.

In addition to showcasing opportunities for DIY making, Make also sell DIY kits that can help people easily get started on making, such as an Arduino compatible kit which can help potential DIY makers develop their own 2-player reaction game.

Mini Maker Faires and Other Events: Mini Maker Faires are small-scale Maker Faire events in local communities organised by independent event organisers, with support from Make Magazine. Mini Maker Faires have been successfully organized in UK, the Netherlands, Norway, Spain, Italy, Singapore, Japan, Australia, Canada and lots of cities in the USA. In 2013, over 60 community-driven Mini Maker Faires were run around the world.

The mini Maker Faires are usually held by local institutions, such as people from local fab labs, research centres, universities, and also individuals who are evangelical about Maker Faires and the whole maker movement. The Mini Maker Faires are community-driven, and independently organized. Maker Participants are mostly "local makers" who are actively pioneering in a variety of disciplines such as culture, technology, design, and education. The Mini Maker Faires are promoted with the Maker Faire branding while organized based on different local practices. For example, Groningen Mini Maker Faire in the Netherlands charges 2 euro for entry, whereas Bristol Mini Maker Faire is free of charge with support from several sponsors, while Barcelona Mini Maker Faire takes donation to help fund the project and to continue providing workshops and empower local makers to succeed.

One of the most successful mini maker faires to date is the Rome Maker Faire, where 30,000 people attended the four faire.

What is the social impact it is seeking, including any evidence of impact to date?

Besides making for hobby or enthusiasm, many makers are also creating new products and producing value in the community, starting companies and becoming entrepreneurs. Maker Faire and MAKE Magazine believe that this kind of grassroots innovation can be fostered in every community. They are very proud of having been and continuing to be a nurturing ground for this growing community of creative and curious people. The sheer numbers of people who participate in the Maker Faires (more than 160,000 at the last flagship faires), as well as the global spread of Mini Maker Faires to Europe, Asia and Africa goes some way to show the popularity and impact of Maker Faires on the DIY maker movement.

In addition to this, the Maker Faires can be argued as seeking a social impact in three main ways:

- Making ideas visible: Having an event that gathers people with DIY mindset, simply made it easier to see different concepts, designs and projects that people in this community are working on.
- Making ideas more valuable by sharing: Talks and presentations in the faire provide a chance to inspire makers to better develop the ideas into their next stage. Maker Faire has the ambition that the interactive exhibits, knowledge sharing and feedback in real-time, make it much more likely that people will have additional thoughts about their ideas, thus making the ideas more valuable.
- Encouraging and celebrating making: As the Maker Faire aims at "celebrate arts, crafts, engineering, science projects and the Do-It-Yourself (DIY) mindset", it functions as a big party where all makers are welcome to have fun and celebrate their mindset. This can generate a lot of motivation and thus enhance the community to be more active.

What it the role of the organisation within the DSI ecosystem?

The Maker Faire creates a real-time sharing platform that is offline. Lots of products or projects that will be shown in Maker Faire have a strong focus on using digital social innovation technology such as open hardware, but the faire provides an offline stage where makers can share their digital creation face-to-face. The highly interactive approach brings not only the chance of making the ideas more valuable, but also a party-like gathering event, which highly motivates the community.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Attendees at Makerfaire showcase and work on a wide range of soft and hardware, some of the most popular and frequent of these include open hardware such as Arduino micro controller and personal 3D printing. Several advantages of open source hardware show its importance to the Maker Faire community:

Help streamline the design Makers can reduce risk by basing designs on open-source hardware and taking advantage of a proven design that has operated successfully in the past. Thus, they can work from a known starting point and easily see what's there, what's missing, and what is unnecessary. It saves development time.

Giving back Open-source hardware is about sharing work with others for everyone's benefit. It is beneficial for all parties to provide upgrades and additions to the community whenever possible so that the next user can add other enhancements. When a user adds a function to hardware, it affects the software, which adds a reason to enhance and improve the overall performance of the software to take advantage of the new feature.

Low cost access open hardware gives grassroots audience the ability to turn their ideas into products or services, and even build business upon it. There are also many applicable business models for implementing some open-source hardware even in traditional firms. For example, to accelerate development and technical innovation the photovoltaic industry has experimented with partnerships, franchises, secondary supplier and completely open-source models.

How is the organisation funded?

Maker Faire is made possible with a variety of sponsorships. Equally, some mini maker faires are partially financed through charging fees for attending.

What are the main barriers to innovate and how are they in the domain?

Not applicable

What helps to reach goals and overcome barriers?

Not applicable

mySociety

At a glance:

Type of Organisation:	Not for profit, foundations and social enterprise
Aim:	Participation and democracy Neighbourhood regeneration
Technology Trends:	Open data; Open knowledge
DSI activities:	Advocating and campaigning; Operating a web service
Key facts:	The WhatDoTheyKnow app has helped over 130,000 Freedom of Information requests. The FixMyStreet app has helped report more than 250,000 problems reported
Website:	http://www.mySociety.org/

Organisation Name

mySociety

Short description

mySociety's key mission is to help people become more powerful in the civic and democratic parts of their lives, through digital means. Most prominently it has done this by developing a range of applications such as Fixmystreet, which enables citizens to more actively communicate issues to politicians and public authorities.

What type of organisation is it?

mySociety is legally part of the charity - the UK Citizens Online Democracy (UKCOD). mySociety is the UKCOD's main project, which is broken down into two distinct arms – mySociety and mySociety Ltd.

History and Mission

mySociety's mission is to help people become more powerful in the civic and democratic parts of their lives, through digital means.

Since 2004 they have launched various websites that made it easy to do tasks such as identifying which politician(s) represent you, writing to them about your concerns, and making requests under freedom of information laws.

mySociety was founded because its founders believed that it must be possible to build applications that could give people the 'simple, tangible benefits' that e-commerce sites give people, but in the civic and democratic parts of their lives. This belief was one founder Tom Steinberg (and others) had shared since the late 1990s, but by 2003 it had slowly become apparent that the pre-existing institutions (charities, governments or campaign groups) which one might have expected to set up such services did not see any interesting possibilities in this field. So a new organisation was required, which Tom set up after leaving his job in government in the summer of 2003.

What kind of activity they carry out to enhance social innovation?

mySociety carry out activities to enhance social innovation in primarily three ways:

Building websites that make it easy for people to write to their politicians to get potholes fixed, get public transport issues resolved and extract information from governments.

Providing consultancy, bespoke software development and software products to organisations keen to meet the expectations of digital natives.

Developing free and open source software for individuals and organisations around the world who want to build copies of the sites mySociety builds.

Some of the most prominent websites and software solutions developed by mySociety are listed below.

FixMyStreet - FixMyStreet Platform is open-source software built to help people run websites for reporting common street problems, like potholes and broken street lights. It has been used in many countries around the world, from Norway to New Zealand to Georgia to Italy - where versions based on the original UK FixMyStreet website have been built.

ALAVETELI - "Magnify the power of Right to Information laws in your country". Alaveteli is the popular 'Right-to-Know & Freedom of Information software', designed for easy re-use in any country or jurisdiction. Citizens can use Alaveteli to request information from governments, and official responses are automatically openly published for anyone to see. This can turn a request by one person into a request of use to thousands of people. In the UK, Alaveteli powers mySociety's busy WhatDoTheyKnow.com website.

MAPIT - MapIt Global's API uses OpenStreetMap data to 'establish the location of different administrative boundaries, anywhere in the world.' Boundaries data is essential for anyone creating geographic web and mobile services that rely on locating a particular point within the correct country, district, county, city or region.

POMBOLA - "Helping you keep tabs on your national parliament or congress". In 2012 mySociety worked closely with Kenyan NGO, Mzalendo, to relaunch Kenya's independent parliamentary monitoring website. The software created for this purpose is called Pombola. It's free, open source and available for use anywhere in the world. The core features of this website are:

A structured database that links people to places, organisations and roles. It's an accessible display all of the members of a particular house of parliament , all of the elected representatives of particular areas and even all of the politicians who attended a specific college.

A database of parliamentary transcripts linked to the individual speakers, making it easy to display how often a politician has spoken in parliament and what they have said

Boundary information (stored in MapIt) allows users to search any location covered by the Pombola instance and discover the elected representatives for that area

Integrated tools allow users to comment on and socially share individual pages

Twitter streams on the home page and a blog for news items

The Pombola code has been since been used to run sites in Ghana, Nigeria and Zimbabwe.

What is the social impact it is seeking, including any evidence of impact to date?

mySociety believe that strong democratic accountability and a thriving civil society are vital to our common welfare, and that these cannot survive where people do not engage with government and communities.

The mySociety work online because they believe that the Internet can meaningfully lower the barriers to taking the first civic or democratic steps in a citizen's life, and that it has the capability to do so at scale.

mySociety's UK sites are the best showcases in terms of pure volume and engagement:

FixMyStreet: Over 250,000 problems reported, with 50% of users having never reported a problem to their local authority before

TheyWorkForYou: Over 1.5m unique users a year. From surveys we know that three out of five users had never looked up information on what their MP was doing in Parliament before using TheyWorkForYou and about 90% of users said that TheyWorkForYou had improved their knowledge of their political representatives.

WhatDoTheyKnow: Over 130,000 Freedom of Information requests issued so far.

Mzalendo: One of the candidates running for President in the 2013 Kenyan Election contacted the site personally to query the data behind their scorecard rating. mySociety emphasize the fact that, if Presidential candidates care about how they are being represented on the site, then that is an indicator of impact – not least because awareness that they will be held to such a level of scrutiny in the future could help drive higher standards of behaviour.

What is the role of the organisation within the DSI ecosystem?

Seeks to promote civic engagement and enhance e-democracy (which they term as 'civic power'); uses a variety of online services and products to promote greater transparency, accountability and to promote social good.

What technological methods and tools is it using, and what did these enable that was not previously possible?

mySociety's sites are all open source. Some of the mySociety codebases have been worked on extensively to make them easy to use for the newcomer. For instance, FixMyStreet's code is available on GitHub, and there is also a detailed guide on how to start contributing. MapIt's code is also available on GitHub, another open source project which can be installed locally, and customised to user's precise needs. Others are a little more tricky and require a lot of familiarisation before you can really get started. Currently, the mySociety team are working to update the Pombola codebase so that it runs their PopIt and SayIt components. So, while the code is available on GitHub, those interested in setting up a site using Pombola in their own country are encouraged to first contact the team to get more information.

As the impact facts above should illustrate, mySociety's websites seem to have used technology to achieve their objective of holding governments more to account, while building platforms that encourage civic engagement. In 2007 they launched FixMyStreet.com, which makes reporting street problems to the local government (e.g. broken street lights) a comparatively straightforward process.

In the case of TheyWorkForYou, (which has over 1.5m unique users a year) three out of five of their users had never looked up information on what their MP was doing in Parliament before using TheyWorkForYou and about 90% of users said that TheyWorkForYou had increased their knowledge of their political representatives. It is questionable how an organisation like mySociety could have had such obvious results in the absence technological advances made with the Internet.

Enhancing collaboration and engagement: DSI network effect

mySociety actively encourages digital collaboration for its online coding. As mentioned above, all of its sites and applications use GitHub Issues for tracking bugs and feature requests, and some of them are labelled "Suggested for volunteers" (or something similar) to mark those that might be particularly suitable for civic hackers to try working on. Furthermore, developers are encouraged to contact the mySociety team directly in instances where code is less 'open' in nature – as is the case for the Pombola code.

How is the organisation funded?

According to the organisation, three pieces of early key funding were critical to mySociety succeeding in 2003/4 (the details of which are elaborated on further below).Tom Steinberg, one of the founders of mySociety, has indicated that the loose ties of this round of funding (which enabled the team to develop services that were much more 'radical' than might have been allowed had the government vetting process been more rigorous) were critical to mySociety first being set up.

Yet, while initially mySociety was financed largely via government funding streams, the disappearance of this funding channel by 2006 meant that mySociety knew it had to develop its own income streams to compensate for this. One of the benefits of mySociety being a digital NGO is that presently software development is globally a relatively lucrative profession. This means that for organisations like mySociety, it is possible to make profits doing commercial work that can be re-invest-

ed in charitable, open source projects without having to employ a huge factory of staff.

After recognising in the period following 2006 that official government funding streams had been wound down, the mySociety team thus began to explore alternative funding channels. As part of this they began to solicit commercial requests to do software development or consulting. In order to keep this activity within the bounds of UK charities law, they founded a commercial company that is 100% owned by the charity, and it is this company (mySociety ltd) that does commercial work. Today about 40% of mySociety's income is from commercial work and they work towards expanding this, while developing 'a reputation as a software company that can solve problems that more traditional web companies can't.' mySociety Ltd., this wholly owned trading arm now accounts for about half of mySociety's profits, while the other half comes from donations from donors, large and small.

What are the main barriers to innovate?

Realities of open source: Before accepting contributions to a project, the practical considerations around the overheads of testing, checking, and managing the incoming code have to be thought out.

Insecure funding environment: Funding streams normally come and go much faster than project will need them to survive. "Real change movements take years or decades sometimes to have an impact, but there will be strong pressures to deliver and wrap up a project in 6 or 12 months." Working out who and how to fund ongoing services can be a major challenge.

Measuring Impact: It is easy to start projects without having pre-defined success, rendering substantive impact hard to measure. The organisation tries to quantitatively define some outcome that counts as success in order to overcome this challenge, which is sure to lend credibility to the organisation when vying for future funding.

Development Budgeting: many socially focused websites set up at similar times were expected to deliver immediately, and then were killed off by virtue of short term budgets. Noting the absolutely fatal project vulnerability of project budgets that assume projects are 'finished' when they're launched, mySociety arranged itself so that money could be spent as far as possible after a product launch, so that even in the 'lean times' the organisation could afford to keep sites running for years at a time. They now consider longevity and sufficient development budget to be the absolutely critical factors required to bring any digital service to scale.

What really helps reach goals/ how to overcome these barriers?

Early key funding: According to the organisation, three pieces of early key funding and a favourable funding environment (grants with loose ties) were critical to mySociety succeeding in 2003/4. Tom Steinberg has suggested that mySociety's service offerings would not have been possible today given the stricter and tighter scope of the government's system of grant-giving. The acquisition of money, some strong project ideas, and three highly talented developers was what enabled mySociety to expand over the first two years, and exit this period with a strong enough reputation to be able to acquire further funding and business on the back of its reputation.

Commercial focus: mySociety Ltd.'s social enterprise model, means that the organisation are not solely thinking about the needs of funders - but also about clients' requirements quite often, 'which is a healthy thing for design focus.'

Technical/design aspects that have contributed to the organisation's success:

Projects that are extremely simple adding features in response to what users ask for. Thinking about the minimum possible number of features your new project could have when it launched, and then removing 50% is the approach that they used.

Re-use of other people's code, and contributing to shared tools. This allows for a feedback of improvements not possible had all code been written privately and from scratch, and encourages a community of coders to take interest in a mySociety project.

mySociety has a strong culture of user-centered design, and a culture that regularly questions whether features or projects will actually have any impact.

Beta releases and long-term developmental budgeting: Scalability: mySociety always had a focus on scalability. Their first business plan stated "Every project we build must be able to serve a million people for the same running costs it would take to serve ten" .

What does the future look like?

mySociety has future plans that relate to various different parts of their work:

To grow the open-source communities around some of their core websites and components so that they are of ever greater value to larger numbers of people.

To upgrade their UK sites to make sure that they are always serving the needs of local users as best as is possible, and to use the UK as a lab to experiment with projects that have re-use value elsewhere.

To explore technologies that enable people to collaborate to put pressure on decision makers.

To build more partnerships, especially with campaigners and pressure groups who are strong at PR and protest, but weaker at the technology side of change.

To grow the commercial side of their operation not just to grow revenues, but because they believe there are some kinds of reform (especially of government systems) that are best done by selling better quality digital systems that embed user-centred values, plus the values of openness and transparency.

To develop better impact metrics to gain a better understanding of how their services do or don't impact positively on users.

Open Government Wien

At a glance:

Type of Organisation:	Public sector and government
Aim:	Participation and democracy, Neighbourhood regeneration, public services
Technology Trends:	Open networks, Open data
DSI activities:	Operating a web service
Key facts:	Has released 160 datasets which has lead to the development of more than 109 apps
Website:	https://open.wien.at/site/

Organisation Name

Open Government Wien (Vienna henceforth)

Short description

Open Government Vienna is part of the Smart City and Open Government strategies of the City of Vienna. Open Government is defined as "the comprehensive redesign of politics and administrative activities according to the principles of modern Public Management and Public Governance." In simpler terms the Open Government Vienna project has seen the city adopt an open data policy and share data related to population, economics and science. Relevant data also comes from around the areas of statistics, geospatial, transportation and economics. This shift to transparency, collaboration and participation has seen a whole host off web and phone apps emerge to enhance how citizens engage with the city.

Type of organisation

The Open Government Vienna strategy is part of the Smart City strategy of the City of Vienna, and as such is a project that is housed with the city authority.

History and Mission

The Open Government initiative of the City of Vienna started in May 2011 with opening up datasets on data.wien.gv.at. The main targets of the Open Government strategy for Vienna are: transparency, collaboration and participation. Furthermore the data and spin-off apps that come about as a result of the Open Government Data strategy are hoped to have positive impact on citizen engagement and participation; business and research; and administration in the city of Vienna.

What does it do, and how does this activity enhance social innovation?

Open Government Vienna is part of the Smart City and Open Government strategies of the City of Vienna. To this end, the city hosts competitions with awards for innovation and development coming out from the open data generated to deal with the particular needs of citizens in the city, and encourages citizens to create apps that can be used to promote the city's Open Government Strategy. The resulting apps range from those that trace the historical location of water pipe to projected urban plans. One particularly novel application that has been created is "Fruit Fly" an app that offers users a visual map that captures data on all fruit trees on public ground in Vienna. Colour coded pins are used to illustrate different types of fruit. Crowdsourced data is also used to index which fruit is ripe or in season. The result is a quirky app that citizens or visitors of Vienna can use to navigate their way towards a free but healthy snack.

What is the social impact it is seeking, including any evidence of impact to date?

In opening its data records to the public, the City of Vienna is taking an important step towards implementing its Open Government Strategy. The Open Government Strategy was launched in 2011 in the city of Vienna 'to further make public e-services and PSI available for use for citizens and companies.'

The term "Open Government" refers to the city's decision to create administrative structures based on more transparency and participation, enabling closer cooperation with the local population, local businesses and the scientific community. Due to the new structures, the city administration makes increased use of Internet technology. A summary of the city's Open Government activities and the first edition of the Open Data catalogue are available online, to be accessed via an all-new web portal.

Presently 109 apps and visualisations have been made that make use of Open Government Data Vienna, and the community of over 500 users is made up by a diverse demographic of students, teachers and professors, professionals, makers and hackers.

Undoubtedly, initiatives like Open Government Vienna have played a part in Vienna being voted Europe's most innovative city. On a worldwide scale it ranks in third place just behind US cities Boston and New York City. According to a study by the Austrian Institute of Economic Research (WIFO), innovation has a visible impact and is clearly measurable in economic terms; approximately two thirds of Vienna's real economic growth is due to innovation.

What is the role of the organisation within the DSI ecosystem?

Open Government Vienna is embedded in an international framework of commercial and government organisations that bring forward the most important improvements with regards to technological and strategic issues in the field of Linked Open Government Data (such as strategy forms and consultation).

What technological methods and tools is it using, and what did these enable that was not previously possible?

The Open Government Vienna initiative has clearly been heavily influenced by recent technology trends around open data and open networks. As part of this city-wide effort to make Vienna a 'smart city', the City of Vienna offers 'a comprehensive range of e-government options', 'with about 600 official e-government web pages and a variety of administrative services available online.' For instance, more than 180 different applications to the city administration can be completed and submitted online. There is also a free online city map of Vienna with more than 120 layers (i.e. levels showing specific geographic information, such as the location of pharmacies, kindergartens or one-way streets) and new e-services are being added and updated continuously.

In addition to this, the City of Vienna launched an Open Data portal and an Open Government Portal in 2011. Four times a year new datasets are published – which now stands at over 160 datasets with geographic and statistical datasets in several open formats and APIs, and for the first time the aggregated data has been made open to the public as an Open Data Catalogue. Lastly 109 apps and visualisations were created by the community, some of which are of particular value to the citizens and tourists of Vienna.

A report produced by the City of Vienna,' Open Government Implementation Model' suggests that a 'focused look at public sector data management has been missing so far in Public Management' and that 'a control gap has become evident due to the trend toward the release of data in Open Government Data Portals.' It also concedes that the Open Government Data Implementation Model 'is a contribution toward closing this gap' by producing 'data catalogues, implementing evaluations in the context of internal data monitoring and the planning and implementation of approval cycles in the first stage of Open Government constitute a contribution to Data Management and Data Governance as new disciplines of Public Management.' Yet advances in public management of this sort would doubtlessly be impossible without the improvements in computing storage and high levels of Internet penetration.

Enhancing collaboration and engagement: DSI network effect

Open Government Vienna has centred itself around interaction, communication and collaboration with the community in several ways: while the Open Government project looks to more 'conventional' digital communication channels such as Twitter, Facebook and emails, there are public "life platforms" where users can chat or meet the experts of the City of Vienna, as well as an online forum. In 2012 two participation projects based around ideas of 'collaborative democracy' took place: "Schwedenplatz" (where citizens came together with experts as part of a design competition organised by the City of Vienna to draft a mission statement to regenerate the Schwedenplatz area). Likewise the "Wiener Charta" (Vienna Charter) initiative seeks to develop 'principles and rules for good coexistence'.

How is the organisation or project funded?

No information available

What are the main barriers to innovate?

Unpredictable impact: With any innovative project like Open Vienna, there is a challenge in engaging stakeholders when, from the outset, the impact of such projects remain unknown or unclear.

Data quality: data management tools like CKAN are necessary to build up a range of datasets that are of a high standard, and that can in turn generate useful cross-referenceable findings.

Data islands: transferring data over from older devices posed a challenge for the Open Government's push for open data.

What really helps to achieve goals?

Political buy-in: the scope and breadth of what Open Government Vienna has achieved would not have been possible had the city authority not voted to make open data a major priority focus.

How to achieve better European collaboration?

The model implemented in the Open Government Vienna initiative has already been used by other Authorities in Austria (e. g. Environment Agency Austria, small municipality of Engerwitzdorf, City of Graz, Region of Styria and others). Similarly its potential value has also been acknowledged by German Authorities, Trentino (IT) and others. This demonstrates that the model is suitable or many different kinds of administrations implementing Open Government initiatives.'

Avoin Ministeriö (Open Ministry)

At a glance:

Type of Organisation:	Government and public sector organisations
Aim:	Participation and democracy
Technology Trends:	Open knowledge
DSI activities:	Advocating and campaigning, Operating a web service
Key facts:	Five citizen driven law proposal have reached support from 50.000 people and have subsequently been debated in the Finish Parliament
Website:	http://openministry.info/ (The Finnish language platform is at http://avoinministerio.fi/)

Organisation Name

Open Ministry (Avoin Ministeriö in Finnish)

Short description

The Open Ministry is a Finnish non-profit, non-partisan organisation based in Helsinki, Finland. It was set up with the aim of enabling the crowdsourcing of legislation, promoting deliberative and participatory democracy and citizens initiatives.

Type of organisation

The Open Ministry utilizes crowd-sourcing in the preparation of citizens' initiatives and it is fully operated by volunteers independent of governmental organisations and political parties.

History and core mission

The overarching purpose of Open Ministry is to help citizens and NGOs with national citizens' initiatives, EU citizens' initiatives and develop the online services for collaborating, sharing and signing the initiatives.

A change of law in Finland was a major precipitating factor that made Open Ministry's mission a possibility. On 1st March 2012, the Finnish government amended the national constitution so any proposed legislation supported by at least 50,000 signatures (1.7% of the voting population) within six months must be put to a vote in the parliament. While it was proposed that citizens could submit draft proposals onto an official Ministry of Justice website due to be launched in Autumn 2012, Open Ministry came about to bridge this gap. The backdrop of the international financial crisis also played a significant role in the organisation's establishment.

What kind of activity they carry out to enhance social innovation?

Open Ministry is a flag bearer of social innovation in that it presents the average citizen with the platform and support (both within the organisation, but also externally, to circulate a campaign to a wider pool of citizens) so that a 'good idea' might be transformed into law proposal to be voted on in parliament.

There are three major stages to get an initial proposal through to a vote.

Ideation and Development: An initial concept needs to be refined into a clear proposition, including robust discussion between interested parties and lawyers helping to frame language in a way that will be acceptable to parliament.

Campaigning: To gain 50,000 votes broad campaigning on social media and beyond is required, needing directed energy from many people.

Lobbying: Once a proposal goes to parliament individual lobbying of politicians needs experience and structure to shape thinking and voting.

The Copyright Law initiative: The Open Ministry's work on the 'Copyright Law Initiative' is one example of engaging citizens actively to potentially alter Finland's legal landscape. The initiative to change Finland's copyright law was suggested to the Open Ministry by a street artist called Sampsa in October 2012. Volunteers were brought in to work on the project and to gather expert advice and opinions on the subject. During the drafting of the legal proposal, more than 30 influential people from the cultural, corporate and academic sectors joined to endorse the campaign publicly. Working within the six month window that potential proposals have to gain the necessary traction to pass through to parliament, all stages of the drafting of the proposal have been open to the public for comments and additional ideas on the Open Ministry platform, and active comments have been asked for from countless experts and copyright organisations. A number of factors surrounding copyright law in Finland demonstrate how it is an example of an initiative likely to gather the critical mass necessary for it to be voted on in parliament.

Open Ministry hopes that, in the spirit of deliberative democracy, this grassroots initiative will spur public discussion and continue to gather support and media attention.

Having been reviewed by these volunteer experts, the Open Ministry's law proposals are more compatible and thus more likely to be approved when submitted to the Ministry of Justice for approval.

While most of the initiatives do not gather enough signatures to enter the parliamentary discussion, in some cases citizen initiatives can reveal an overwhelming public support for a particular initiative that has been previously neglected or overlooked by the parliament. The network offered by the Open Ministry platform aims to support and translate these potentially valuable citizens initiatives into credible law proposals to be voted on in parliament.

What is the social impact it is seeking, including any evidence of impact to date?

Open Ministry founder, Joonas Pekkanen, has described how one of the precipitating factors that gave rise to the Open Ministry being first set up was the need to redress the democratic distancing between citizens and their political representatives brought to light in the aftermath of

the financial crisis. In some ways Open Ministry might be said to be narrowing this perceived gap. Through Open Ministry's novel system of crowdsourcing legislation, the Finnish parliament has for the first time been forced to tackle issues identified and voted for by the public outside parliament. Importantly, the Open Ministry goes further than the Ministry of Justice web platform by providing citizens with the tools and support to make potential citizen initiatives far more comprehensive, and legally-compliant; thereby meaning they are far more likely to be successfully passed. By doing so, Open Ministry in some ways offers citizens the opportunity to be co-creators of a set of laws more reflective of their values and concerns.

Supported five law proposals to date: Five law proposals have reached critical mass (i.e. have been supported by more than 50,000 signatures) and have proceeded to the parliamentary phase for debate. These include a proposal to ban the practice of farming animals for the fur trade, to change donation laws to enable crowdfunding projects, a law proposal on marriage equality, and the copyright law proposal – explained more fully above. The first proposal that reached 50,000 votes, is now being debated in parliament, while a proposal for marriage equality reached over double the threshold number of votes (100,000 signatures), in the first day, thus making it virtually impossible for the parliament to ignore the topic.

More generally, a study carried out by Aitamurto and Landemore - which looks specifically at the case of off-road legislation initiatives on the Open Ministry site suggests that crowdsourced legislative processes allow for deliberation among participants, which occurs organically (to a degree), despite there being incentives for it. The same study also found there is a strong educative element in crowdsourced law-making process, as the participants share information and learn from each other. They purport that the peer-learning aspect could be made even stronger through the addition of design elements in the process and on the crowdsourcing hardware.

What is the role of the organisation within the DSI ecosystem?

The Open Ministry offers an interesting blueprint of how digital frameworks might be used to enhance democratic participation and deliberation, and influence policy in collaboration with existing political infrastructure. As an extraordinarily wired country (Finland was the first country to make fast Internet access a legal right, and boasts an Internet penetration rate of 89.3 percent, according to data released by the International Telecommunications Union in June 2012) more needs to be done to understand some of the potential barriers that might exist if other countries with less Internet penetration were to adopt or replicate this model.

What technological methods and tools is it using and what did technology enable that was not previously possible?

The Open Ministry website was developed using a YUI API – a free, open source JavaScript and CSS library for building interactive web applications. Demographic metrics are gathered using Quantcast. The site's source code is also available on GitHub – where anyone can fork the project, contribute to it, or use it in other countries.

As part of its aim to crowdsource legislation, the non-profit organisation had been collecting signatures for various proposals in paper since 1 March, when the citizens' initiatives came in. However in September 2012, the Finnish government approved the electronic ID mechanism that underpins the digital version of the platform which went live on 1 October. To ensure the site was compliant with security standards, the National Communications Security Authority audited the site's code, its security policies and its service/hosting providers to ensure that the details of citizens are safe and can't be hacked into. The system verifies the people's identity through the APIs offered by banks and mobile operators, so that people can sign the initiatives online with the online banking codes or their mobile phones.

What did technology enable that was not previously possible?

As mentioned above, Open Ministry's model necessitates that it facilitate its mission with low capital input, and in a way that can effectively package proposals so they can reach a large pool of people, who in turn can shape and engage with this content, within a reasonably short period of time (i.e. the six month period allowed for initiatives). Undoubtedly this would not have been possible in the absence of the Internet and the online platforms that Open Ministry has been built on.

As mentioned above, the model implemented by the Open Ministry has brought a paradigm shift in the way parliament operates. This has been the first time ever it has been possible to force parliament to tackle an issue.

Enhancing collaboration and engagement: DSI network effect

The Open Ministry aims to facilitate the crowd-sourcing process and to provide collaboration tools that enable citizens to develop their ideas into actual law proposals with the help of volunteer experts. There has been some significant overlap between Open Ministry and other relevant DSI actors. For instance, Pekkanen is a member of the Open Government Partnership committee in Finland, sitting on the Open Knowledge Finland Core Team, and more generally representatives of the Open Ministry team regularly participate in a number of open government or open knowledge events (such as the OKFest), both in Finland and beyond.

How is the organisation funded?

The Open Ministry received a one-off 30 000 euros grant from Sitra, the Finnish foundation that provides funding for social innovation projects.

In terms of the day to running of the platform Joonas Pekkanen, emphasises how Open Ministry relies very much on its voluntary members for its continued financial sustainability, just as volunteers make up a body of relevant experts who can offer consultative campaign and legal advice to transform potentially good ideas into viable proposals to be debated on in parliament.

What are the main barriers to innovate?

Despite certain commentators suggesting the Finnish banks and operators were providing the use of their strong verification APIs for free, as part of their social responsibility policies, it seems this has not been uniform across all banks. Part of the functionality of the website has had to be discontinued because not all banks were enabling Open Ministry to use their ID verification for users. This meant that certain users were

able to use the site for free to sign particular initiatives, whilst others from a different bank were not. It was thus not possible to continue this feature. Instead users can now use the website to sandbox ideas, find support amongst the community of users, and collaborate in partnership with voluntary legal and campaign experts. The Open Ministry also encourages users to sign and support existing initiatives on the official Ministry of Justice website, which is where approved initiatives are hosted.

Technological Literacy: While Finland is a highly networked country, not everyone has the same technical capacity. For this reason Open Ministry started collection of signatures for particular proposals in paper forms, in collaboration with libraries, to provide easy access for people not using Internet or not yet accustomed to e-Democracy.

What really helps achieve goals?

Undoubtedly the Open Ministry's success can be understood also in the context of the Citizens' Initiative Act, passed on March 1st 2012, which allows any citizen to present a law to Parliament providing they can get the support of 50,000 citizens.

Open Ministry has relied heavily on the generosity of its voluntary legal and campaign teams for its continued sustainability.

In summary success factors were:

The Citizens' Initiative Act (passed on March 1st 2012) was central to the Open Ministry being able to penetrate the parliament.

Supporting legal framework and political support

Broad support from the public (Pekkanen has noted the perceived degree of mistrust of political representatives following the 2008 financial crisis)

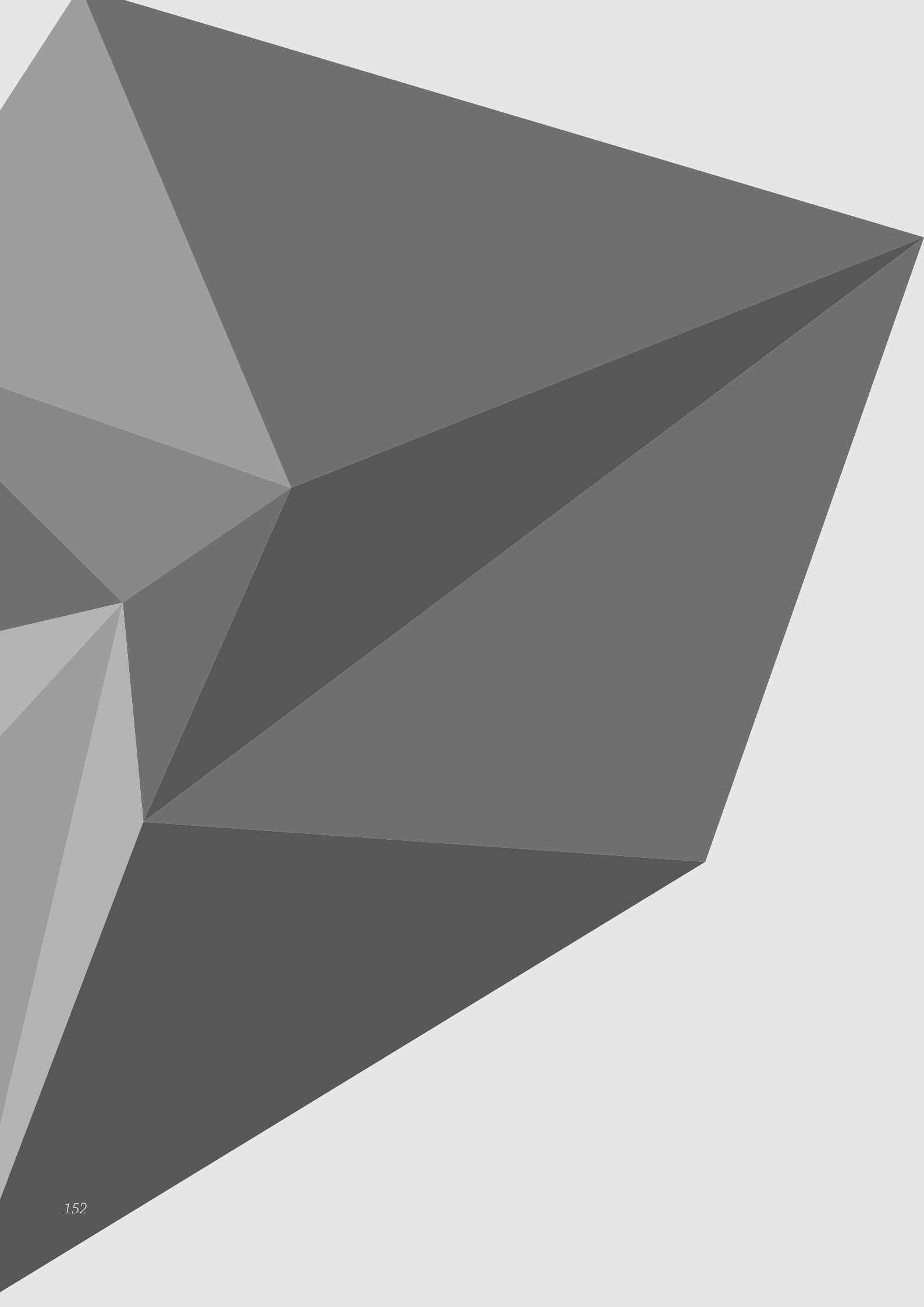
Development funding from Sitra

A highly networked country

Use of existing DSI resources, such as the Github platform, that could be used in the development of Open Ministry.

How to achieve better European collaboration?

Open Ministry is looking to expand in a number of avenues. It aims to take its federal model and apply it to Finnish municipalities. It is exploring moving laterally by applying the Open Ministry to both Slovakia and Italy, which both have existing laws for petition-supported proposals for legislation, but do not have the infrastructure to support discussion, campaigning and lobbying. Furthermore, Open Ministry is also a presently looking into the possibility of an Open Commission which will use similar approaches at the European Commission level.



Open Corporates

At a glance:

Type of Organisation:	Private business
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open data, Open Knowledge
DSI activities:	Operating a web service
Key facts:	Created open data sets with more than 60 million companies registered
Website:	http://opencorporates.com/

Organisation Name

OpenCorporates

Short description

OpenCorporates is the largest open database of companies in the world. It is a website which shares data on corporate entities as open data under the share-alike attribution Open Database Licence. It aims at creating a URL with such data for every corporate entity in the world, as well as importing government data relating to companies and matching it to specific companies. The site also shows groups of companies that are legally part of the same conglomerate, which helps provide transparency on networks of corporate subsidiaries and holding companies spread around multiple jurisdictions. Basic company information is available as open data in XML or JSON format. Today the site has grown from 3 territories and a few million companies to over 75 jurisdictions and 60 million companies, and is working with the open data community to add more each week.

Type of organisation

OpenCorporates is a for-profit company, based in the UK.

History and mission

OpenCorporates was created by Chris Taggart and Rob McKinnon, under the auspices of their company, Chrinon Ltd, and launched on 20 December 2010.

The mission of OpenCorporates is to make information about companies and the corporate world more accessible, more discoverable, and more usable, and thus give citizens, community groups, journalists, other companies, and society as a whole the ability to understand, monitor and regulate them. OpenCorporates seeks to do this through opening up data and providing tools for analysing it. To do this, OpenCorporates is not only creating a general database, but also a database that has certain focuses, and an open data community, to make the open information sharing more open, and thus effective.

What does it do, and how does this activity enhance social innovation?

The core business of OpenCorporates is to collect data on companies through web scraping tools and then visualize the data.

Web scraping data: The main activity within OpenCorporates is to collaborate with ScraperWiki, a platform for doing data science on the web, to help get the company data. The basics that are needed in order to create a company record at OpenCorporates are the company number, the jurisdiction and the company's name. People only need to write a scraper for a country if there is not standard data available for this already.

The OpenCorporates database has been built by the open data community, under a bounty scheme in conjunction with ScraperWiki, by offering a small fee for new jurisdictions opened up (explained in more detail below). Web scraping (web harvesting or web data extraction) is a computer software technique of extracting information from websites. The site also has a Google Refine reconciliation function that matches legal entities to company names.

"A bounty scheme": OpenCorporates offered a small fee for new jurisdictions opened up, in order to encourage people around the world helping them open up data sets. It offered £100 for any jurisdiction that had not yet been done and £250 for those territories that OpenCorporates saw as a priority (such as Australia, France, Spain). There's an initial cap of £2500 on the bounty pot. According to ScraperWiki, the scrapers can often be written in a couple of hours, and neither the code nor the data will belong to OpenCorporates, but to the open data community.

Data Visualisation: The main output from OpenCorporates work on capturing data is searchable maps and visualisations of complex corporate structures with multiple layers of control below the headquarter of the organisation and it in some cases thousands of subsidiaries. One example of this is how OpenCorporates visualised the complex corporate structure of Goldman Sachs's based on data from public filings and company registrations in the U.S., New Zealand, the Cayman Islands, Luxembourg and the UK. This helped visualise how Goldman has 1,475 subsidiaries registered in the U.S. and 739 in the Caymans alone . Chris Taggart, one of the founders of OpenCorporates has described the benefits of this, noting that "by visualising it by country, it shows particularly in the cases of Goldman Sachs and Morgan Stanley, just how critical the Cayman Islands is to those networks, That's the sort of thing you could have done as an academic study based on this data, but maybe half a dozen people would have read it. This is an almost automatic by-product of putting this into a single open dataset'.

What is the social impact it is seeking, including any evidence of impact to date?

When OpenCorporates was started it was to solve a real need that the founders and a number of other people in the open data community had around access to data, whether it's Government spending, subsidy info or court cases. As Chris Taggart has explained it in an interview with Wired Magazine 'Knowing what a modern corporation is an how it's all connected is absolutely critical for regulators, journalists, anti-corruption organisations and lawyers'.

The organisation has since its inception been lauded for its work on opening up data. In 2011 it won the 3rd prize in the EU funded open data challenge and was recognised by the vice president of the European Commission, Neelie Kroos as 'the kind of resource the (Digital) Single Market needs'.

To date Open Corporates have managed to grow an open database with information on more than 61 million companies in it.

Getting and Returning Data – Making open data more open: OpenCorporates inspires a social sharing concept to people who want to get data from it. All OpenCorporate's data where the company has the right to share it, is made openly available under the share-alike attribution Open Database Licence. In return, any product of that data must also be open for others to use. For organisations that don't want to give back data, they pay OpenCorporates a fee.

Innovating data driven journalism: As part of the development of their offer OpenCorporates is making a new open database of corporate officers and directors available to the world. This will enable journalists to be able to search not just all the companies with directors for a given name in a given state, but across multiple states.

What it the role of the organisation within the DSI ecosystem?

Not applicable

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open data: Open data sit at the core of all OpenCorporates work. This is both a tool to scrape, capture and analyse data, as well as a way for the organisation to release data to a community of collaborators.

Open source: OpenCorporates wants to make its product and the database accessible and scalable. It would not be possible without a huge number of open source programmes, tools and resources, such as Twitter Bootstrap and Linux. It is mostly feasible to have the open data database as well as the community accessible online. Within five years the database has expanded to over 61 million companies, without the Internet and the participation through Internet, this would not have happened.

Technical specs behind the website: OpenCorporates is built on the RubyOnRails framework, uses the MySQL and Neo4j databases, on servers running Linux. Famfamfam icons and flags, Twitter Bootstrap, and JustVector icons are also used. The ScraperWiki allows people to write scrapers in Python or PHP.

How is the organisation funded?

Chris Taggart and Rob McKinnon started OpenCorporates from their existing company Chrinon Ltd in UK. The company is being incubated in the UK Open Data Institute, and has also received a grant from the Alfred P Sloan Foundation.

OpenCorporates licence the information and database under a share-alike attribution license, allowing free and open reuse even commercially. Organisations or companies that wish to use the information on a non-share-alike basis will need to pay for a non-share-alike version (for the privilege of not releasing the resultant information to the community), thus ensuring OpenCorporates has a sustainable business model and giving an incentive to release information back to the community.

What are the main barriers to innovate?

Access to data: The main driver behind OpenCorporates is access to data on the businesses whose corporate structures they want to capture and release data on. However, accessibility to good data varies significantly from country to country, depending on governments' willingness and capability to release this. New Zealand as an example have easily accessible data sets which OpenCorporates with very simple coding can integrate into their data base, where as others release data in pdf files, which makes scraping and accessing the data significantly harder.

Linked to this is the varying quality of data available. When mapping US companies data from The Federal Reserve System is for example more granular, structured and detailed than data from the Securities and Exchange Commission. To address issues around quality of OpenCorporates assing data confidences" to links, with higher or lower confidence depending on data they were able to access.

What helps to reach goals and overcome barriers?

Just as lack of access to data can be a barrier, the easy access to open data sets from countries like New Zealand has helped OpenCorporates grow their database.

Building on this it can be argued that the ability to access a global open data community who as part of the bounty scheme helped OpenCorporates scrape data from countries around the world has played a big role in their growth of the dataset.

Finally, the incubation within the Open Data Institute helped OpenCorporates grow their business model and receive expert support from open data peers.

How does it achieve better European collaboration?

Not applicable

Open Garden

At a glance:

Type of Organisation:	Private business
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open Knowledge
DSI activities:	Operating a web service
Key facts:	3 million users in 2013, which is tripled from 1 million a year before registered
Website:	http://opengarden.com

Organisation Name

Open Garden

Short description

Open Garden is a San Francisco based start up, focusing on innovating in Internet use, through its mobile app and network building, and creating new ways to grow the Internet. The simple mobile app enables users to connect to each other seamlessly and share their Internet connection. With the largest scale implementation of a mobile Mesh Network, Open Garden is pioneering work on exploring ubiquitous connectivity.

Type of organisation

Open Garden is a San Francisco-based for-profit start-up.

History and mission

The Open Garden Mesh app was launched in Beta on May 21st 2012 during TechCrunch Disrupt in New York City.

Open Garden aims to change the way mobile users are using and sharing the Internet. The business is based on an understanding that with the ubiquitous mobile Internet, mobile consumers have become data users, and data transfer activities are constantly taking place among mobile users. Skyrocketing consumption of mobile data is becoming curbed by a finite amount of licensed spectrum and the capacity limitations of cellular networks. Capacity and spectrum limitations can impact the user experience in very important – and very negative – ways. They can result in slower or incomplete downloads for content such as games or music, and video chat sessions that are intolerable due to poor quality or incessant buffering. They can produce inconsistent data services that leave consumers wondering when and where they can access the network, and

how fast their connections will be. Seeing all these limitations, entrepreneur Micha Benoliel, Internet architect Stanislav Shalunov and developer Greg Hazel, decided to make the mobile web fit that could address this challenge.

What does it do, and how does this activity enhance social innovation?

The Open Garden App, when downloaded and installed on a smartphone, laptop, tablet or other compatible device, helps turn the hardware into a router. Working with similarly equipped devices within a range of approximately 20 meters, the mesh app then discovers, shares and coordinates access to any available Internet off ramp, optimizing users' Internet access. By crowdsourcing connectivity, Open Garden enables users to connect to the mobile web more frequently and with better results.

The Open Garden App can be turned into an open network, which improves the experience of mobile Internet users, optimizes the service of wireless carriers, as well as benefits the handset and tablet manufactures.

The Open Garden app is free for anyone to install on his or her smartphone, tablet or computer, and it also licenses its technology to carriers, device manufacturers and Organisations.

For consumers this has the potential to offer:

Seamless and Free Hotspot: It enables users to access the most appropriate connection without configuring their devices or jumping through hoops. It also enables users to access the Internet as cheaply as possible.

Faster Downloads: Users can find the fastest connection and most powerful signal without checking every available network, and can move between networks seamlessly. Open Garden provides a way to access more data at faster speeds in more locations.

Stronger Coverage: Consumers actually become part of the network, sharing connections when and where they provide the best possible access. This means higher quality streaming video and audio and faster downloads.

For carriers the benefits according to Open Garden are:

Faster Downloads and Stronger Coverage: Open Garden provides a way to access more data at faster speeds in more locations.

Use of Multiple Networks at Once: 3G or 4G and Wi-Fi: It enables seamless handoffs and simultaneous use of multiple networks, providing the strongest and fastest connection available.

Multi-Hop Wi-Fi Offloading of Their Network: Its multi-hop Wi-Fi offloading solution crowd sources bandwidth via existing residential and business Wi-Fi connections. Open Garden creates an overlay mesh network using Bluetooth and Wi-Fi connections across a range of mobile devices, from smartphones to tablets to laptops and desktops. Operators can boost their offerings even as they offload traffic from their networks, particularly in urban areas where cellular coverage can be inconsistent.

What is the social impact it is seeking, including any evidence of impact to date?

Open Garden believes that everyone should be able to access the Internet easily. On the one hand, there are still places that people have poor Internet connection, on the other hand, there are also capacity and spec-

trum limitations, which requires the network provider to go beyond the traditional mobile data solution. Open Garden therefore wishes to speed up innovation from both the technology perspective and social perspective, to create a new way of Internet sharing through users installing a mobile app, and to build up a community network where more people see the need for innovation, so that it is then possible to gather wisdom from the crowds.

Open Garden believe that Internet access is a critical component in the value chain, which is why it dedicates its efforts and resources to ensure that everyone has access to it.

Open Garden's social impact consists in making mobile Internet access ubiquitous, providing everyone with a fair chance to access information regardless of where they are. With its system Open Garden can measure: number of users, shared access / karma metrics, and user stories on how it positively impacted their community.

What it the role of the organisation within the DSI ecosystem?

Its mobile app directly and practically creates an open network, where all users could share their Internet to make it much more accessible. Together with these benefits it is creating an ecosystem among consumers, wireless carriers, and manufacturers.

With its built-up community, it also functions as a central point in an open network, where it provides the access to connect knowledge and communication.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Sensor Networks: Using technologies such as Multi-Hop, Channel Bonding, Bluetooth and Wi-Fi Direct, Open Garden's technology provides an opportunity for carriers to address the shortcomings of cellular networks even as they deliver a superior experience for mobile data users. It enables faster, more efficient data transmissions without requiring users to manually sift through available networks to find the best one available. It minimizes network traffic without the use of data caps and network throttling, which consumers abhor.

How is the organisation funded?

No information available

What are the main barriers to innovate and how are they i n the domain?

Open Garden had to overcome various challenges such as educating the market and industry players, and accessing funding from partners who are aligned with the values.

In the meantime, Open Garden has also created solutions to a multitude of challenges, such as: reducing power consumption, enabling Wi-Fi offloading, channel bonding and multi-hop connectivity.

What helps to reach goals and overcome barriers?

Open Garden has built up an online forum, which with more and more active users, is forming into a community, where everyone is granted the access to knowledge and tools for communication. With more knowledge being shared there, it also enhances the value of the app and the company, to overcome other obstacles such as financial ones.

When building trust with a community of users to use the app, Open Garden benefited a lot from what they do, and from people who have the same belief as the company. Since Open Garden aims at working on providing everyone everywhere fair access to Internet it motivates all kinds of groups to join into the community and to experiment, especially, people who live or work in areas with poor connectivity, and travellers or professionals who are often on the go. There are also other relevant people becoming community users, such as mobile data costumers, makers, hackers, the DIY community, urbanites and crowds, events attendees and organizers. In addition large numbers of users are students, teachers and professors.

Open Knowledge Foundation

At a glance:

Type of Organisation:	Social enterprises, charities and foundations
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open data, Open Knowledge
DSI activities:	Participation and democracy
Key facts:	Developed CKan
Website:	http://okfn.org

Organisation Name

Open Knowledge Foundation

Short description

The Open Knowledge Foundation is a global movement to open up knowledge around the world and to see it used. The foundation unlocks knowledge to empower citizens and organisations to build fair and sustainable societies. It does this through a host of activities, from running large events such as the Open Knowledge Festival, to developing tools such as the Ckan tool for releasing open data.

Type of organisation

The Open Knowledge Foundation is a non-profit organisation founded in 2004. The foundation has five units, including Network Unit (engaging partners and organising events), Knowledge Unit (focusing on technological infrastructure and general architecture), Long Term Project Unit (managing research and projects), Services Unit (research and development) and Operations Unit (administration). The Open Knowledge Foundation is organised in autonomous 'chapters' who each are independent non-profit organisations that are officially part of the wider Open Knowledge Foundation Network.

History & Mission

Founded in 2004, The Open Knowledge Foundation is dedicated to promoting open data and open content in all their forms – including government data, publicly funded research and public domain cultural content. The Foundation is sees itself as an international leader in its field and has extensive experience in building tools and community around open material.

What does it do, and how does this activity enhance social innovation?

All activities at The Open Knowledge Foundation, whether they are to convene communities, to develop tools, to create open material, or to see it being used to effect change, connect open knowledge to open knowledge.

Web and Software Development: Through developing software OKF are trying to create tools that support a global open knowledge and open data community.

One of the most prominent of these is the Comprehensive Knowledge Archive Network (CKAN), one of the world's leading free open source data portal platforms.

CKAN is aimed at data publishers (national and regional governments, companies and organisations) wanting to make their data open and available. CKAN also has a number of built-in features catered to data users, enabling users to browse and find the data they need, and preview it using maps, graphs and tables - whether they are developers, journalists, researchers, NGOs, citizens or professionals. CKAN also offers a powerful Application Programming Interface (API) which allows third-party applications and services to be built using the published data.

It was originally developed in 2006 by the OKF to run TheDatahub.org, a public registry of open knowledge datasets. As a powerful data management system which makes data accessible, discoverable and presentable on the web by providing tools to streamline publishing, sharing, finding and using data; its obvious usefulness has been evidenced by its wider adoption. CKAN now powers more than 40 data hubs around the world, including portals for local, national and international government, such as the UK's data.gov.uk and the European Union's publicdata.eu.

Open Data Training: In addition to building software tools for open data the OKFN also seeks to build the open data skills and capacity of governments and civil society organisations, through providing a range of open data training programmes.

Challenges: In 2011 the Foundation ran the Open Data Challenge, which was Europe's biggest open data competition to date, attracting 430 entries from 24 Member States.

Events: Finally the OKFN seeks to stimulate the debate about open knowledge through events, from small scale policy workshops and coding sessions to its annual international OKFestival and OKConference events.

What is the social impact it is seeking, including any evidence of impact to date?

The OKFN overarching goal is a vibrant open knowledge commons that empowers citizens and enables fair and sustainable societies. They describe how they aim for a social impact in the four following areas:

Better governance: Openness improves governance through increased transparency and engagement.

Better culture: Openness means greater access, sharing and participation in relation to cultural material and activities.

Better research: For research to function effectively, and for society to

reap the full benefits from research activities, research outputs should be open.

Better economy: Openness permits easier and more rapid reuse of material and open data and content are the key raw ingredients for the development of new innovative tools and services.

Impact of CKAN: The impact of CKAN is probably the most tangible impact of OKFN. The open source software is used by more than 70 organisations from Berlin to Nigeria globally to release their data in to open data sets. Some of the most prominent users of CKAN include the UK's data.gov.uk website, the United States government's Data.gov and the Australian government's data.gov.au.

Members: The buy in to the OKFN principles is also evidenced by its membership. Currently the organisation has more than 8000 members spread out globally across chapters in 40 countries.

Lastly events and challenges have helped the organisation act as a pull factor for more open knowledge activity. The open data challenge, for example, helped identify more than 430 open data entries for the challenge.

What it the role of the organisation within the DSI ecosystem?

Through creating software that can be used to enhance the use of open knowledge, it supports organisations on furthering their work on, for example, open data. Just as the engagement of tens of thousands of people in Open Knowledge events help further the debate.

What technological methods and tools is it using, and what did these enable that was not previously possible?

A variety of technologies are being used in Open Knowledge Foundation, mostly web and software development related. Naturally most of its projects rely heavily on open data, open data and open source standards. Some of these, such as CKAN are developed by OKFN itself, but it also relies on open source platforms for developing and sharing the code for its projects.

Its core activities are focusing on using the web and online technologies to better open and share knowledge. None of which would have been possible without the advance of the Internet and the ability to aggregate and distribute large quantities of data.

How is the organisation funded?

The primary funding source is from grants to provide advice or develop new web services and events related to the open knowledge agenda.

What are the main barriers to innovate and how are they in the domain?

No information available

What helps to reach goals and overcome barriers?

The attitude that helps the foundation to realise its value include:

Respect and Tolerance
Respect and tolerance are the pre-conditions for all the work at Open Knowledge Foundation, and essential to working as a collaborative community. Respect others and their capabilities and capacities. Recog-

nise differences as a creative force: when discussed openly and without aggression, it allows people to find the best way forward.

Collaborative Collaboration across the network and outside it, is central to how the foundation is operated.

Pragmatic but not fanatic People at Open Knowledge Foundation are strong believers in "open" but the commitment is animated by a desire to make change, not to establish the moral superiority. Though the foundation will never create closed knowledge it must recognise that others may do, and that, for example, being most effective may sometimes involve the use of non-open tools.

Ouishare

At a glance:

Type of Organisation:	Not for profit
Aim:	Collaborative consumptions
Technology Trends:	Open knowledge
Key Facts:	120+ articles from 70+ contributors, published in French, English and Spanish under a Creative Commons license
Website	http://ouishare.net

Short description

OuiShare is a global collaborative consumption network. It aims to empower citizens, public institutions and companies to build a society in which every person has access to the resources and opportunities they need to thrive. The network is built on the belief that an economy based on sharing, collaboration and openness can solve many of the complex challenges the world faces. Founded in January 2012, as an independent, not-for-profit organisation, OuiShare has evolved from a handful of Parisian enthusiasts to a global community spread across Europe, Latin America and the Middle East.

Type of organisation

Ouishare is a not for profit organisation, which organizes the global Ouishare network. Different members of the global network have specific areas or projects they are responsible for such as our online magazine, a local community, or international events, but there is no hierarchy within the organisation.

History and mission

The overarching aim of Ouishare is to shift the focus of the economy to one that can find new ways to connect, create and share on the web. OuiShare calls this paradigm shift and the sum of these developments 'the collaborative economy'.

The network was born in January 2012 out of a Facebook group in Paris, OuiShare now counts 400+ members from 20 countries in Europe, North America and Latin America, contributing in English, French, Spanish, Italian and German. Among them, an engaged team of 30

'connectors' (i.e. members who seek to engage the public either offline or on specific online topics) is now bootstrapping OuiShare and co-designing this collective adventure with the community. Since January 2012, OuiShare has organized 40+ events in 20 European cities.

In its early stages, the OuiShare community was a Facebook group created in April 2011 to connect people who believed in the potential of the collaborative economy and were trying to make it a reality. They began to organise meetups every month in Paris to continue their discussions about the collaborative economy in person. It was then that initiator Antonin Leonard felt he was on to 'something bigger': "My intuition was that a new culture was emerging, a culture of openness, transparency, empathy and that this culture would be the foundation of what would become OuiShare."

What does it do, and how does this activity enhance social innovation?

Ouishare.net: The online community allows Ouishare members to post articles on collaborative consumption and anyone interested in the subject to take part in online conversations. People can contribute with their own ideas and projects or simply support the ideas and projects of others.

Events: OuiShare taps into a number of events and connections with the aim of promoting more online activities such as meetups, conferences and creativity workshops. To aid the spread of collaborative consumption events OuiShare offers a 'best-practice blueprint' to those who want to create OuiShare events in their own cities.

Partnership working: OuiShare does not focus only on collaboration within the community. They also look for ways to work together with other existing networked communities, for example: P2P Foundation, Open Knowledge Foundation, MakeSense, Edgeryders, Transition Network, Open Source Ecology, hackerspaces & makerspaces.

What is the social impact it is seeking, including any evidence of impact to date?

Francesca Pick, Global Connector at OuiShare, describes how 'The big picture vision, is that OuiShare becomes a crucial vehicle in facilitating the shift to a collaborative economy by growing a strong, international network of people and projects. How exactly we will achieve this aim is an evolving process.' To date the most prominent example Ouishare's impact of is the reach the network has had through its event. In Europe alone, Ouishare managed to organise 32 events in 2013. These took place in 16 European countries where the organisation successfully engaged more than 2 000 entrepreneurs.

What it the role of the organisation within the DSI ecosystem?

OuiShare is an open network 'collaborative community' based on peer governance with active communities in Paris, London, Brussels, Barcelona, Rome, Madrid, Munich, Berlin.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: OuiShare is an open knowledge network using social networking channels to promote collaborative consumption. OuiShare draws on the input and ideas from everyone to help shape the network.

In its work on collaborative consumption Ouishare is seeking to understand how advances in technology help drive collaborative consumption models, including how:

•Collaborative makers bring on a new industrial revolution, driven by digital fabrication tools like 3Dprinters, facilities like FabLabs, open source hardware designs and DIY communities.

Peer-to-Peer Finance fuels the system through crowd funding, peer-to-peer lending, while proposing alternatives for value exchange in currencies and gift economies.

Crowdsourced and open knowledge is opening up institutions such as governments, science, education and culture, while turbo-charging the overall development of all these initiatives.

How is the organisation funded?

The organisation is a network of enthusiasts, who finance all activities on a project-by-project basis. These projects are in turn supported by sponsors and funders relevant for the specific activity, and the organisation tends to work with freelancers and volunteers.

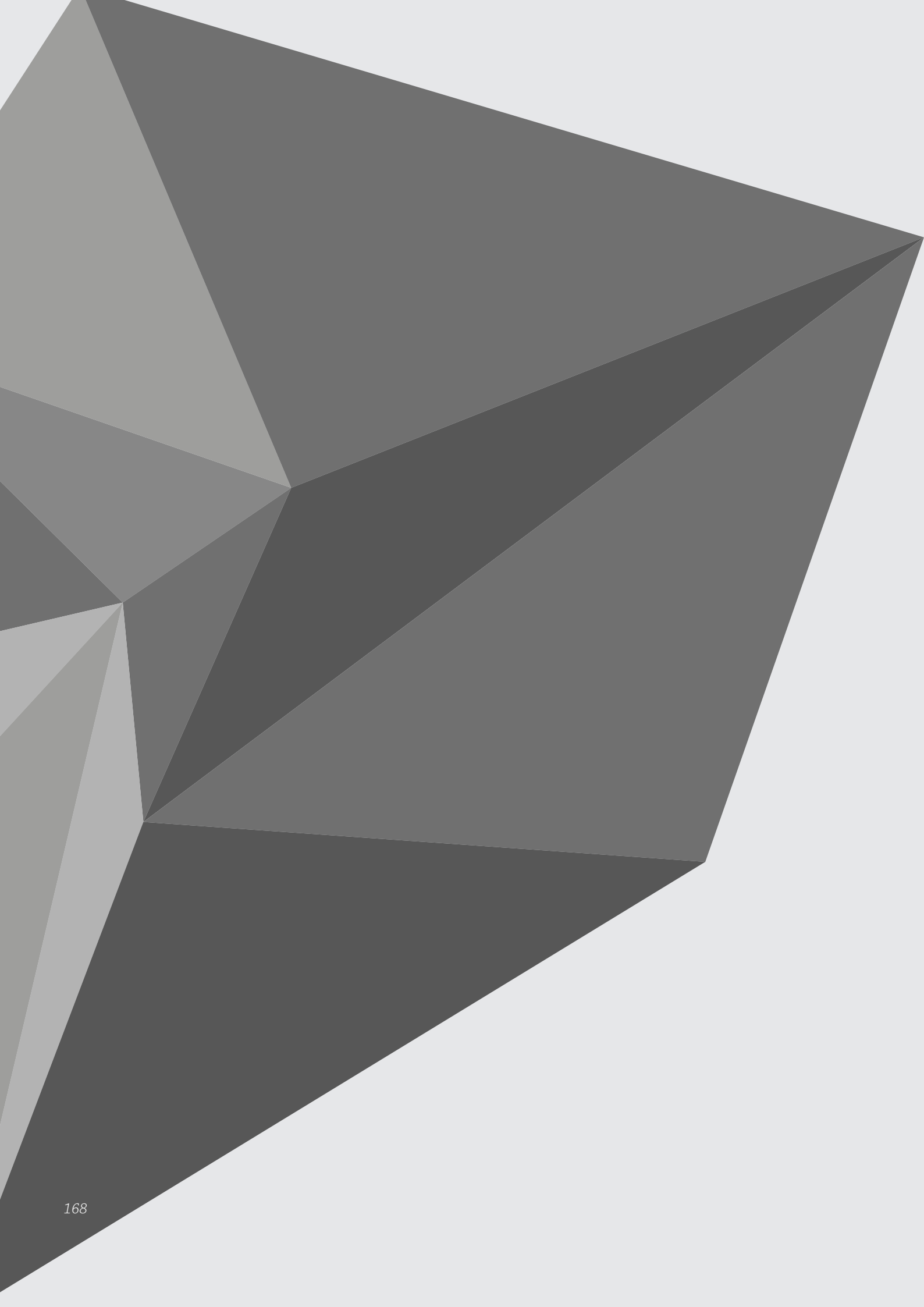
What are the main barriers t o innovate?

While Ouishare sees great 'disruptive' potential in the collaborative economy it also recognises this presents a number of challenges for the movement. Firstly, there is little knowledge about the potential impact of these new models, and little systemic vision about the change they will bring to society and the economy. Furthermore, few projects are actually collaborating; few know about each other, and a lot are still stuck in a competing mindset.

Secondly, collaborative economy needs better exposure and education, which Ouishare believes could fasten the adoption of new user practices, encourage policy-makers to support sustainable models, and drive business model reinvention by enlightened professionals. Except for a few success stories such as Airbnb and Blablacar, many collaborative consumption start-up businesses are fighting to survive or reach a critical mass of users.

What helps to reach goals and overcome barriers?

No information available



P2P Foundation

At a glance:

Type of Organisation:	Social enterprises, charities and foundations
Aim:	Sharing economy, Participation and democracy
Technology Trends:	Open Knowledge, Open Data
DSI activities:	A network, A research project, Operating a web service
Key facts:	A 'wiki' with nearly 8000 pages of information, which have been viewed over 5 million times.
Website:	http://p2pfoundation.net/

Organisation Name

P2P Foundation

Short description

The P2P Foundation is a registered institute with the aim of studying the impact of peer-to-peer technology and thought on society. A peer-to-peer (P2P) network is a type of decentralized and distributed network architecture in which individual nodes in the network (called "peers") act as both suppliers and consumers of resources, in contrast to the centralized client–server model where client nodes request access to resources provided by central servers.

Type of organisation

The P2P Foundation is a registered institute founded in Amsterdam, Netherlands. Its local registered name is: Stichting Peer to Peer Alternatives. As an organisation there are no formal operational roles, but founder Michel Bauwens produces most of the content creation and takes care of community management.

History & Mission

The aim of P2P Foundation is studying the impact of peer to peer technology and thought on society. A peer-to-peer (P2P) network is a type of decentralized and distributed network architecture in which individual nodes in the network (called "peers") act as both suppliers and consumers of resources, in contrast to the centralized client–server model where client nodes request access to resources provided by central servers. In a peer-to-peer network, tasks (such as searching for files or streaming audio/video) are shared amongst multiple interconnected peers who each

make a portion of their resources (such as processing power, disk storage or network bandwidth) directly available to other network participants, without the need for centralized coordination by servers. The foundation was founded by Michel Bauwens, a Belgian Peer-to-Peer theorist and an active writer, researcher and conference speaker on the subject of technology, culture and business innovation.

What does it do, and how does this activity enhance social innovation?

The P2P Foundation wants to be an interconnecting platform for people involved in realising the new open and free, participatory and commons-oriented paradigms in every social field. So, at the foundation people are monitoring and describing real-world initiatives, theoretical efforts, creating a library of primary and secondary material, and trying to make sense of that aggregation by developing a coherent set of concepts and principles.

The primary activity P2P foundation undertake to achive its goal is running the P2P foundation wiki, a website with with nearly 8,000 pages of information on the P2P economy. The foundation also facilitates a Ning community (Ning is an online platform for people and organisations to create custom social networks) with a few hundred members, and a number of mailing lists, of which the most active is the P2P research list, where academics and non-academics can collaboratively reach understandings. Moreover, the P2P Foundation maintains a P2P Lab based in Ioannina (Greece), a blog and a wiki in Greek, which are administered by Vasilis Kostakis.

Meet-ups: In addition to running the wiki, the foundation organises meetups between stakeholders interested in the debate around the P2P economy. To data it has organised two annual physical meet-ups in Belgium and the UK, and also have some national groups organsing meetings in Netherlands and Greece.

ChokePointProject: Finally, the P2P foundation is behind the ChokePointProject non-profit organisation and project which aims to map the entire Internet, and thereby identify vulnerable "off switches" that governments could use to pull the plug on their society's online world. The project was initiated a response to how some regimes 'turned off' the Internet during uprisings in the Middle East in 2011, thereby preventing people from communicating online.

What is the social impact it is seeking, including any evidence of impact to date?

The ultimate aim, according to the founder Michel Bauwens, is to create a powerful social movement that can support the necessary reforms for social justice, sustainability of the natural world, and opening up science and culture to open and free sharing and collaboration, so that the whole weight of the collective intelligence of humanity can be brought to bear on the grave challenges the society is facing.

The P2P Foundation addresses the following:

P2P currently exists in discrete separate movements and projects but these different movements are often unaware of the common P2P ethos that binds them, thus there is a need for a common initiative, which, 1, brings information together; 2, connects people and mutually informs them; 3, strives for integrative insights coming from the many subfields; 4, can organize events for reflection and action; 5,can educate people about critical and creative tools for world-making.

The Foundation would be a matrix or womb which would inspire the creation and linking of other nodes active in the P2P field, organized around topics and common interests, locality, and any form of identity and organisation which makes sense for the people involved

The zero node website, i.e. the site of the P2P Foundation, would have a website with directories, an electronic newsletter and blog, and a magazine. It aims to be one of the places where people can interconnect and strengthen each other, and discuss topics of common interest.

In the context of the above, the primary impact of P2P Foundation is demonstrated through traffic on the site. The wiki it self has been viewed over 5 million times, and the P2P blog alone reached about 35,000 unique users in 2012.

In addition to this the foundations work on Choke Point was recognised with a 'The Next Idea' award (previous recipients include Wikileaks) by the organisation Ars Electronica in 2011.

What it the role of the organisation within the DSI ecosystem?

In a number of ways, P2P Foundation acts as an 'interconnecting platform for people involved in realising the new open and free, participatory and commons-oriented paradigms in every social field.' For P2P Foundation, a great number of these people carry out this type of work without a full awareness that there are others who could mutually benefit from working together on these initiatives. For this reason, P2P Foundation functions as a connector within the DSI ecosystem; aggregating and compiling information that might be used by academics, non-academics and practitioners alike.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The main technologis applied directly by P2P foundation include Wiki, blog, the Ning social network platform and standard mailing list.

However, its core focus is on furthering advancements in P2P Technology - networks in which interconnected nodes ("peers") share resources amongst each other without the use of a centralized administrative system. Peer-to-peer networks underlie numerous applications. The most commonly known application is file sharing, which popularized the technology. Other applications are, such as, instant messaging systems and online chat networks for communications; Peer-to-peer-based digital currencies, electronic money that acts as alternative currency, such as Bitcoin, an open source P2P money, which uses peer-to-peer technology to operate with no central authority or banks; whose transactions and the issuing of bitcoins is managed and carried out collectively by the network.

Using P2P Technology, A peer-to-peer network is designed around the notion of equal peer nodes simultaneously functioning as both "clients" and "servers" to the other nodes on the network. This model of network arrangement differs from the client–server model where communication is usually to and from a central server.

P2P's network in practice creates a platform for 'unbounded knowledge with open sources and open access.' Thanks to technological advances, P2P Foundation has been able to make the move beyond more proprietary publishing models, with rigid intellectual property rights, to embrace Creative Commons licensing. The digital and technological aspect of Creative Commons and iCommons licensing models are significant for the reason that unlike a physical commons, digital commons are not subject to the physical constraints of scarcity.This demonstrates how the P2P Foundation has used technology to enable production and knowledge exchange in ways not conceivable prior to the advent of the Internet, and more specifically the 'digital commons.'

Enhancing collaboration and engagement: DSI network effect

No information available

How is the organisation funded?

The P2P Foundation is a registered institute founded in Amsterdam, Netherlands. Its local registered name is: Stichting Peer to Peer Alternatives, dossier nr: 34264847. Because the P2P Foundation is a volunteer-run, 'legal non-profit organisation' donations make up a significant part of the organisation's finance and business model. Users and supporters are encouraged to help support what the P2P Foundation do on a continued basis by donating in a similar way to that adopted by Wikipedia – with users being given the option to donate pre-set or other amounts through a Paypal platform.

What are the main barriers to innovate? Are they different according to different core domains?

No information available

What really helps reach goals/ how to overcome these barriers?

No information available

Patients Like Me

At a glance:

Type of Organisation:	Private business
Aim:	Health and wellbeing, Science
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	Online community with More than 220,000 members, has 2,000+ conditions, 35+ published research studies, and over 1 million treatment & symptom reports registered
Website:	http://www.patientslikeme.com/

Organisation Name

PatientsLikeMe

Short description

PatientsLikeMe is a free patient network where people can connect with each other to better understand their diseases, share condition and treatment information, and get support from peers to improve their health.

It is also a research platform. As patients report on their disease experiences, they provide real-world insight into diseases and long term conditons. Those insights are shared with companies, government organisations and others who use them to continuously develop more effective products, pharmaceuticals, services and care.

Type of organisation

Patients Like Me describes describes itself as “for-profit organisation” with a “not just for profit” attitude.

History and mission

PatientsLikeMe started with the mission of giving people answers, helping them connect with others and enabling every patient to benefit from the collective experience of all, or, as Ben Heywood, one of the sites founders has described it ‘Our goal ultimately is that every patient’s decision is informed by every patient before them’.

Inspired by the life experiences of Stephen Heywood, PatientsLikeMe was founded in 2004 by his brothers Jamie and Ben Heywood and long-time family friend Jeff Cole. Stephen was diagnosed in 1998 at the age of 29 with amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease. As his illness progressed, Stephen's family made many attempts to slow his disease and treat his symptoms, but the trial-and-error approach was time-consuming and repetitive. They believed there had to be a better way. They realised that Stephen's experience was like that of millions of patients around the world who live with life-changing and chronic diseases, who often have specific questions about their treatment options, and about what to expect which are best answered by people who have gone through a similar experience.

PatientsLikeMe launched its first online community for ALS patients in 2006. From there, the company began adding communities for other life-changing conditions, including multiple sclerosis (MS), Parkinson's disease, fibromyalgia, HIV, and many others. By October 2009, the number of registered users had grown to more than 45,000. In April 2011, the company expanded its scope and opened its doors to any patient with any condition. By June 2011, PatientsLikeMe had hit a new milestone of 100,000 members.

What does it do, and how does this activity enhance social innovation?

The primary service provided by PatientsLikeMe is a social network for people living with a long term health condition. Once they have created a profile, PatientsLikeMe allows members to input real-world data on their conditions, treatment history, side effects, hospitalizations, symptoms, disease-specific functional scores, weight, mood, quality of life and more on an ongoing basis. The result is a detailed longitudinal record – organized into charts and graphs – that allows patients to gain insight and identify patterns. Answers come in the form of shared longitudinal data from other patients with the same condition(s), thus allowing members to place their experiences in context and see what treatments have helped other patients like them.

Research: In addition to being a direct service for people living with a long term health condition, PatientsLikeMe is a clinical research platform that can provide real-world, real-time insight into thousands of diseases and conditions. Its research professionals have completed studies with real-world data that have helped refute and pre-empt traditional randomised clinical trials. On June 9, 2011, PatientsLikeMe announced that it was releasing a tool, which would show a list of trials from ClinicalTrials.gov, a US government funded site which provides access to information on publicly and privately supported clinical studies to members of their system, tailored to their condition and demographics. The list of available trials is refreshed each night from the open data from ClinicalTrials.gov, which is released in the public domain. Members of the site can search for trials for which they are eligible free of charge; the company also offers a commercial service to actively message potential participants for clinical trials.

Sharing and selling data: Both a part of PatientLikeMe's business model as well as its mission to create better treatments for its members, PatientLikeMe sells aggregated de-identified health data from patients to relevant parties such as companies that are developing or selling prod-

ucts to patients. These products may include drugs, devices, equipment, insurance or medical services. PatientsLikeMe tells members exactly what they do and do not do with their data. Memebers, PatientsLikeMe argue, are compelled to get involved as their sharing of this information, not normally accessed in conventional encounters with medical practitioners, and has the potential to advance medical research on their respective disease or health issue. Some of PatientsLikeMe's past and present partners include UCB, Novartis, Sanofi, Avanir Pharmaceuticals and Acorda Therapeutics.

What is the social impact it is seeking, including any evidence of impact to date?

As described above, PatientsLikeMe works towards a creating a platform and, in the long-term, a health care system, where information is openly shared between patients, doctors, pharmaceutical companies, researchers and the health care industry. To date the network has gone some way in achieve this, with more than 220,000 members, covering more 2,000 conditions, it has helped published more than 35 research studies based on its patient data and it has generated over 1 million treatment & symptom reports. In the United States, approximately 10 percent of newly diagnosed ALS patients register on the site each month, and 2 percent of all multiple sclerosis patients in the country participate in the community.

Improving the traditional treatment procedure: PatientsLikeMe creates a community where patients place their experiences in context and see what treatments have helped other patients like them. It means that patients and doctors can get extra information, assistant or help, which improves the quality of the treatment process.

Assists, helps, and also drives research: With its community's growth at PatientsLikeMe, the practical and individual data and information from patients becomes extremely useful for clinic research, which was difficult to generate in the past.

"Openness philosophy": PatientsLikeMe is more excited about the Openness Philosophy then its Privacy Policy. The Openness Philosophy is what drives its ground-breaking concept. At PatientsLikeMe it is believed that sharing healthcare experiences and outcomes is good, because when patients share real-world data, collaboration on a global scale becomes possible, new treatments become possible, and most importantly, change becomes possible. PatientsLikeMe is passionate about bringing people together for a greater purpose: speeding up the pace of research and fixing the healthcare system.

What it the role of the organisation within the DSI ecosystem?

Operated as a web-based community where it shares open knowledge and generates an database that is being used to return the benefit to the community.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The main technological feature of PatientsLikeMe is the creation of an online social network that specifically targets people living with a long term health condition. The team mainly code in Ruby on Rails, the platform is built with also a group of UX practitioners, to create it an environment with ease, where patients share data about their treatments, symptoms, and disease outcomes.

Internet: PatientsLikeMe has used to Internet to cooperate online and to allow for greater democratisation of patient medical data.

Social Networking and Community Power: Peer-to-peer networks are becoming the cornerstone for a new era of patient-centered health care. PatientsLikeMe allows people to directly report on their disease experiences. As patients come together to share treatments and symptoms in a structured way, they learn from each other about how to improve their care. Information flows freely so that everyone can learn from the collective. The result is that patients get support from others, come to understand their illnesses, and become empowered to work with their health care team to manage their condition.

Real-time research platform: Different online social networks involve different social contracts for participants and different sets of tools. PatientsLikeMe's tools allow people to manage their health, compare where they are against others like them, learn about new treatments, and contribute data directly to research. PatientsLikeMe also combines an enhancing collaboration with the actual measurement of medicine, which amplifies the value of the networking. So it is a patient network, but also a real-time research platform.

Enhancing collaboration and engagement: DSI network effect

PatientsLikeMe is only a valuable resource for patients and researchers, because people living with a long term health condition use it to log and share their personal health data. The more data generated from users, the more detailed insights the network can garner from the data and in return provide a higher value service for its members.

How is the organisation funded?

PatientsLikeMe has been funded by a group of philanthropic organisations and investment companies such as CommerceNet, Omidyar Network, LLC ,and Invus.

CommerceNet was an key part of PatientsLikeMe's success as they provided the seed capital, guidance, additional management experience, and key connections to help kick start PatientsLikeMe. CommerceNet's investment and support model combines the elements of a research lab, startup incubator and public interest initiative.

What are the main barriers to innovate and how are they in the domain?

Difficulty in medicine regulations: Innovation in health care is extremely hard. In addition to having a good idea, it requires to be both innovative around a business model and be able to meet the standards of medicine. It's an almost impossible set of barriers that are very hard to navigate.

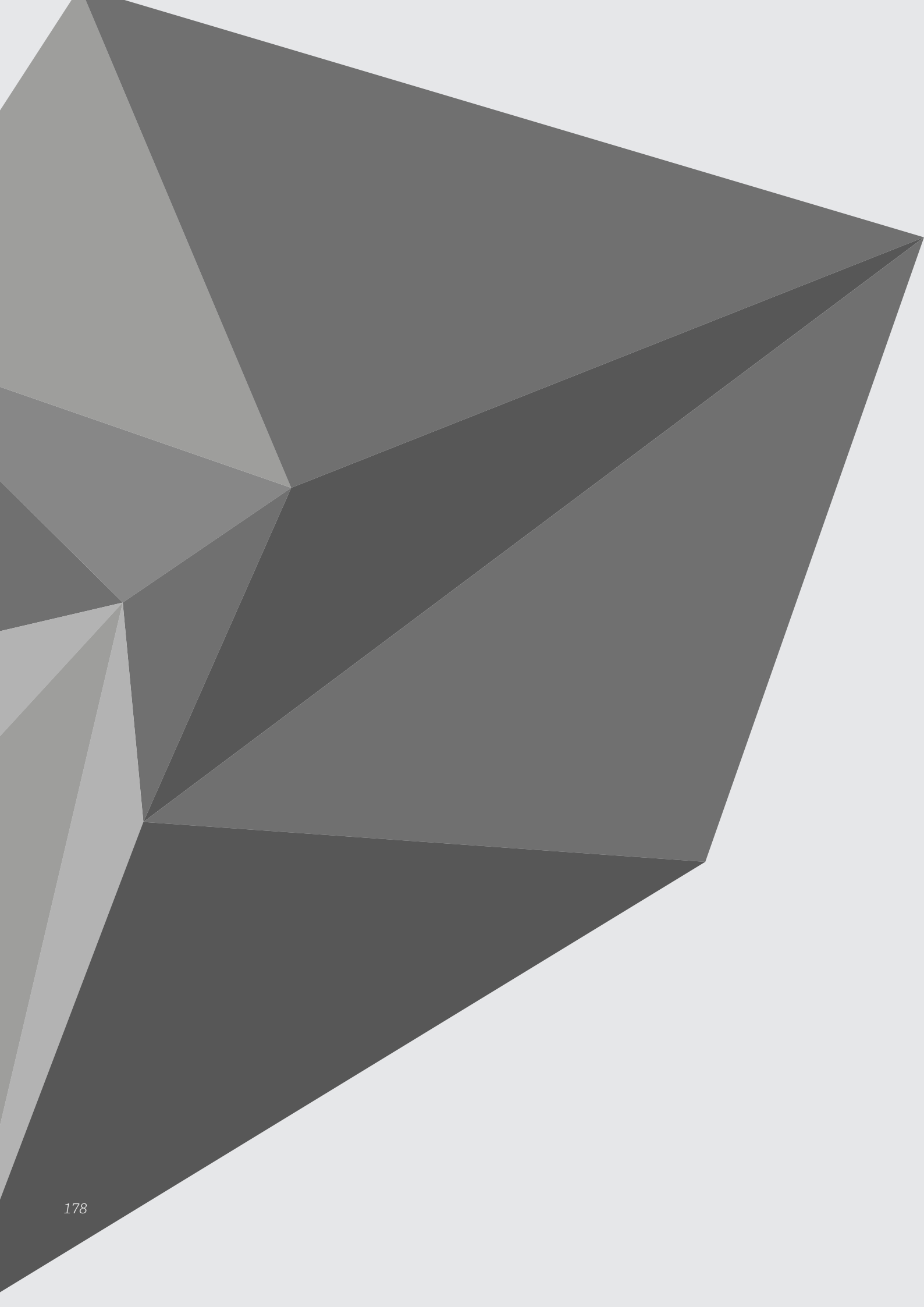
Try to make patient value drive the value of products and services in the

healthcare market: Another challenge is the healthcare market, which in the words of PatientsLikeme 'is kind of broken', as it is not a market where if you make people better you get paid for it. Most time hospitals do not have data or keep a long-time track of information from patients that they treated. Information is fundamentally different if it comes from a patient. If they bring it into the health care and medical research system, it will drive change faster.

What helps to reach goals and overcome barriers?

Currently, most healthcare data is inaccessible due to privacy regulations or proprietary tactics. As a result, research is slowed, and the development of breakthrough treatments takes decades. Patients also can't get the information they need to make important treatment decisions. PatientsLikeMe believes that it doesn't have to be like this, if people share data, and open up the healthcare system. In this way people can learn what's working for others, improve the dialogue with doctors, and best of all, help bring better treatments to the market in record time.

In spite of the structural barriers in accessing patient medical data, PatientsLikeMe's fast uptake illustrates the obvious need for services of its kind.



Peerby

At a glance:

Type of Organisation:	For-profit business
Aim:	Neighbourhood regeneration, Sharing economy
Technology Trends:	Open Data, Open Knowledge
DSI activities:	Operating a web service
Key Facts:	About 15,000 members in September 2013
Website:	https://peerby.com

Organisation Name

Peerby

Short description

Peerby is a Dutch for-profit start-up that operates a peer-to-peer sharing service for products. Users can share or request items from people in their neighbourhood online, via the Peerby website, their mobile or social media channels. The platform was launched in Beta as a service targeting people in Netherlands in August 2012, although it also has active communities of users outside in Netherlands.

History and Mission

The basic idea of Peerby is that having access to a product is more important than owning a product, as its founder, Daan Weddepohl, puts it "We strive for a future where value is no longer just defined in money". Building on this, Peerby believes that neighbourhoods should be places where the residents know and interact with each other. The goal is to re-establish this connection between neighbours, in this case with the usage of new media, and in the most comfortable and convenient way possible. This is based on a belief that people do not always know that they have the possibility to help their neighbours, which limits the chance to enable the collaborative consumption.

Peerby was founded by Daan Weddepohl in 2011. Daan is an ICT entrepreneur and actor who was looking for new opportunities. He wanted to work on something he really believed in. Daan explains how he realized that 'people' made him happy, and how he wanted to facilitate this for others by creating a website for the neighbourhood that would allow people to meet and engage with each other. His thinking behind this was inspired by Rachel Botsman and her concept of collaborative consumption, and the fact that there was no other working peer-to-peer sharing platform existing in the Netherlands. This lead to Daan to develop the prototype for the Peerby platform.

What does it do, and how does this activity enhance social innovation?

The core service of Peerby is the online platform which enables users to borrow and share anything from trumpets to laptop chargers with their neighbours.

Peerby's uniqueness lies in its proactive approach: activity on the platform begins with people posting requests for things they need, rather than people offering items they would like to share. This approach Daan has explained is based on the simple principle that that is how borrowing is most often facilitated off line 'If you borrow a cup of sugar, you knock on your neighbour's door and ask for it. The neighbour doesn't come to you and say 'Hey, here's a bag of sugar, do you need some?'. Once a request has been posted using either the Peerby website or app the Peerby seeks to further encourage the matching between people looking for an item and people who might have this. Using a smart search algorithm the platform immediately asks the 100 closest Peerby neighbours if they have the item right after a request has been logged. This Peerby argues, is the reason why the platform can achieve a higher success rate than any other sharing platform - Peerby claims that over 80 percent of its requests are fulfilled by Peerby members within 30 minutes of their posting.

While it currently focuses primarily on growing in the Netherlands, the platform also has active communities using the platform in London, Berlin, Spain and New York.

What is the social impact it is seeking, including any evidence of impact to date?

Since its birth in 2011, Peerby has demonstrated the popularity of its service through attracting 15,000 plus platform members.

There are two overarching social purposes behind Peerby. Firstly, the platform seeks to create a more sustainable environment, where people instead of purchasing products borrow or share products already bought by people in their local area, and thereby help to decrease CO_2 emissions. As an example Peerby describe how an electric drill is used for 13 minutes during its lifespan, making it an ideal item for collaborative rather than individual consumption.

Secondly the platform seeks to create more social cohesion and trust in neighbourhoods. Daan explains how most people feel an attachment to the place where they live, but not always to the people who live nearby. For Peerby, encouraging sharing and establishing contact with neighbours, is therefore not just about helping people save time, money, and storage space, but also about creating a fun way for people to explore their neighbourhood and meet their neighbours.

What it the role of the organisation within the DSI ecosystem?

Peerby started its service in Amsterdam, the Netherlands and is expanding to other cities in the country, as well as across Europe. At this moment active cities include Berlin, Germany and London, UK.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The primary technology in Peerby is the P2P renting platform. Peer-to-peer renting refers to the process of an individual renting an owned good, service, or property to another individual. It is also referred to as Person-to-Person rental, P2P renting, Collaborative Consumption, the sharing economy and Product Service System.

The fast development of this market is due to a combination of the following trends:

Networking infrastructure and high-bandwidth penetration reaching a level allowing Social Networks and Consumer-to-consumer marketplaces,

Limited storage space in dense urban environment preventing consumers to keep all the goods they occasionally use,

Increasing environmental concerns of consumers leading towards limitations of waste of resources and overconsumption,

Evolution of consuming behaviours from owners to users.

In the P2P model, which is also being used by Peerby, individuals transact directly with other individuals on a two-sided marketplace platform maintained by a third party. In two-sided marketplaces, the development, maintenance and policies of the platform are maintained by the third party, which can be an organisation, a business or a government. These are not strictly P2P systems in the technical sense as there is generally a central market platform that enables the transactions.

The service is based on Internet and the principles of open knowledge and the sharing economy. Thanks to the social web, people can now share anything with anyone in the world. Individuals have been renting from each other for decades, particularly in the real estate domain, however, with the Internet acting as a facilitator, there is a growing trend of websites that offer to facilitate peer-to-peer rental transactions. All of these sites are encouraging something academics call collaborative consumption, in other words, peer-to-peer sharing or renting.

Enhancing collaboration and engagement: DSI network effect

The value of Peerby increases as more people are using the platform to borrow and exchange products.

How is the organisation funded?

Peerby has received investment from a number of philanthropic as well as private investors including Stichting Doen, Agentschap NL, Sanoma Media and Green Challenge. Peerby decided to find financial support via investors rather than subsidies. Subsidies require too much reporting, Peerby would rather spend the time on research and development. Besides that, according to Peerby once a subsidy has been granted, the proposal is often already out-dated. The experience is that the subsidy requirements are too binding, whereas Peerby need to be flexible to be able to continue.

What helps to reach goals?

Incubation and mentoring: To be able to grow Peerby benefitted from a number of different incubation and mentorships schemes they got to take part in, including the Founders Institute (this was also the place where Daan met two of his companions), and the incubators Rockstart and TechStars. In these accelerator/incubator programmes for start-ups they learned how to build a company, how to pitch, and how to convince financial investors. Daan believes that further access to a network of peers where he and his colleague could receive further business mentoring could help them substantially in the further development of the platform.

The innovative development process and long-term scalability thinking: Peerby carried out several pilot studies and prototypes before launching the platform, which helped Daan and his team develop strong evidence that the platform was credible and the principles behind it worked. The first members helped Peerby show potential investors that the concept worked.

Although Peerby believes it has great potential, Daan describes how starting up a company is extremely time-consuming at the start and quite an investment that doesn't pay off immediately (in salary). Almost all employees of Peerby own a piece of the company through stock options and through these have a direct stake in its successes and failures, which incentives the team to invest much of their time and effort in to the platform.

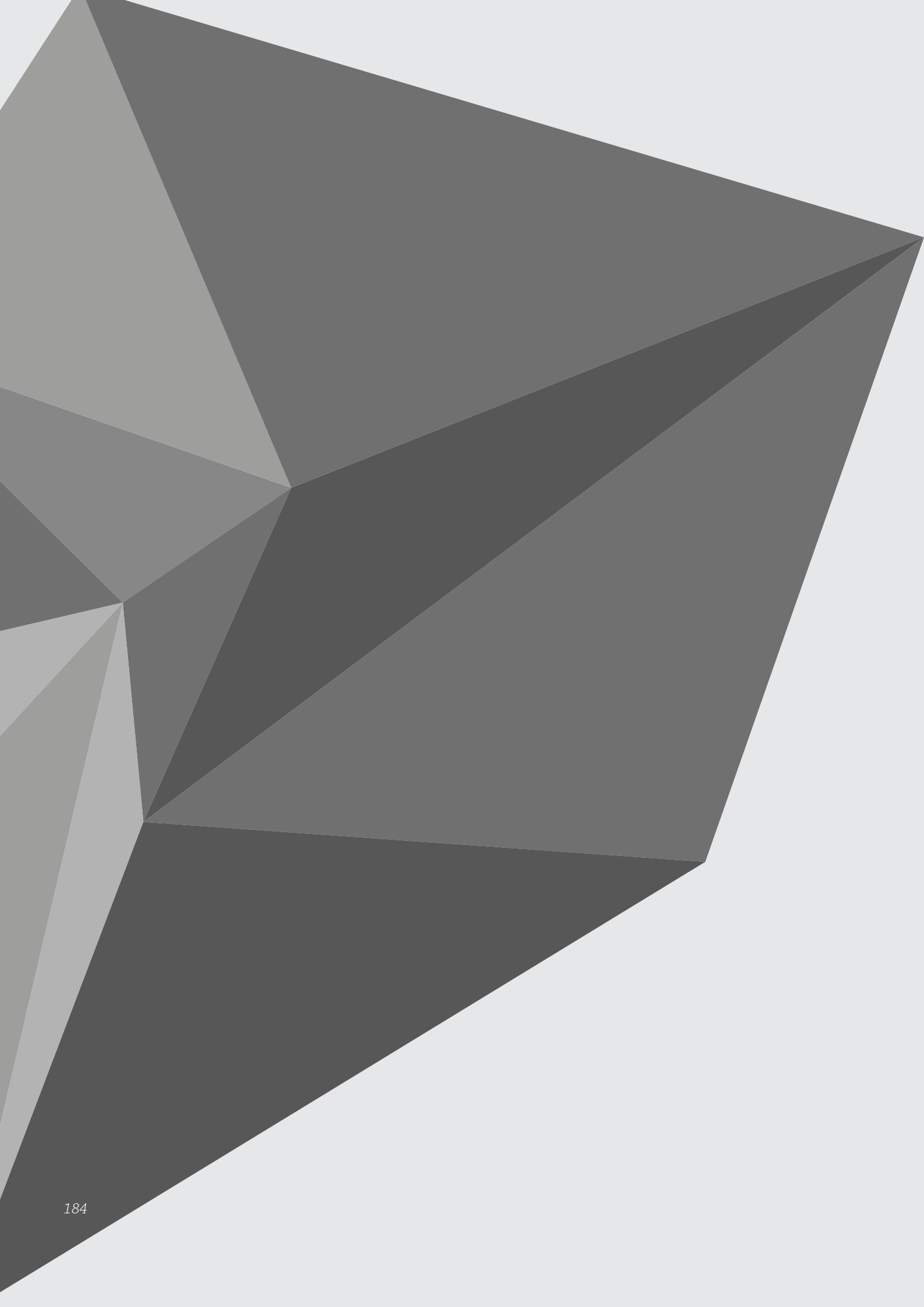
What are the main barriers to innovate and how are they in the domain?

In addition to the obvious challenge of getting engagement in the platform the two main challenges for Peerby has been developing a sustainable business model, trust in the platform and developing the right team and diverse skill sets to run and further develop the platform.

Building trust in the platform: The challenge that worries everyone in the sharing world is trust. Sharing only works when there is reputation involved. Most sharing platforms try to combat this issue by building a self-policing community. Almost all require profiles for both parties and feature a community ratings system. For Peerby, if user lent something out but do not get it back, they will work hard and try everything in their power to help. So far, Peerby has never had an issue with this, and in order to ensure that it will also not happen in the future they are developing a feedback feature, which will allow Peerby members to rate each other after a transaction. The goal of this is to ensure that people who do not treat the belongings of others with the respect and care that they should will not be able to rent something in the future.

Getting the business model and team right: Daan explains how "What we do is new, we can therefore not resort to existing business models. The funding we received through contests and investors is therefore spent on exploring new business models." Peerby's goal is to be a self-sustaining company, and they are exploring ways to make money from the platform. Crowdsourcing, a 'thank you' shop and insurance are all options they have explored. The last service seems to be most promising, although a lot of research still needs to be done in this area. Building on this Daan emphasises how a constantly evolving business and business model sets big challenges for the skills of him and his team 'We need to be flexible, since we are constantly changing. This also means that everyone needs to be multi-skilled (..) What we have experienced regularly is that in a week everything has changed. Skills should be interchangeable; what was essential the other week can be useless a week later'.

Linked to this is how to deal with the growth of the platform. Peerby is growing rapidly and have shown that the platform works on small scale. The next challenge is to understand how it could work on a larger scale; the platform is currently exploring product strategies that are scalable in existing markets.



Raspberry Pi

At a glance:

Organisation Name:	Raspberry Pi
Founded:	2006
Type of organisation:	Academia and research organisations; social enterprises, charities and foundations
Aims:	Education and skills
Tech Trends:	Open Knowledge
No. of units sold worldwide:	Over 2 Million

Organisation Name

Raspberry Pi

Short Description

Raspberry Pi is an ultra-low-cost credit card-sized fully-functioning computer. It was designed to bring about a paradigm shift in the way young people engage with computing – with the hope of transforming them from passive consumers into active creators.

Type of organisation

The RasperryPi is developed by the Raspberry Pi Foundation, a not for profit charity.

History and Mission

The Raspberry Pi Foundation was set up in 2006 by Eben Upton, Rob Mullins, Jack Lang and Alan Mycroft, a team based at the University of Cambridge's Computer Laboratory. The idea behind the RaspberryPi came about as a way to try and challenge the way kids were engaging and interacting with computers, as the team was concerned about the year-on-year decline in the numbers and skills levels of prospective undergraduates applying to study Computer Science. Upton has hypothesised that this drop in skills and interest was related to disappearance of open, common platforms and devices, which from the late 1980s had come to be replaced by fixed function devices and that this change in turn has had the effect of reducing the pipeline of potential computer programmers.

"The Maker Movement is, I think, a manifestation of a very encouraging trend towards democratisation of access to high-technology tools. By attacking economies of scale, platforms like Arduino and the Pi allow individuals, small teams and small companies to compete with large established players; this is a very positive development from the point of view of encouraging innovation, and giving users (and small businesses...) a chance to find their own destiny." Eben Upton

To remedy this shortfall of high-calibre progamming recruits, Upton and the Raspberry Pi team sought to develop a tiny, cheap computer for kids which would encourage programming experimentation and encourage a new generation of students to pursue computing science scholarship, which would become the RasperryPi.

What does it do, and how does this activity enhance social innovation?

Raspberry Pi is a simple computing device that looks like a motherboard with the mounted chips and ports exposed (something you'd expect to see only if you opened up your computer and looked at its internal boards).Although seemingly basic in design, it has all the components needed to connect input, output, and storage devices and start computing. When switched on, users are first greeted by a command line code (which in recent years has tended to remain in the background of closed software programmes), meaning that from the point of startup users are encouraged to begin tinkering and experimenting with the device. While a user's skill level will naturally vary from person to person there's a user forum on the Raspberry Pi site, and a whole host of tutorials and other materials are readily available online.

Raspberry Pi readily partners and collaborates with other relevant digital education actors. For instance, the Raspberry Pi supports MIT's Scratch platform – meaning kids can gain a deeper knowledge of computer game programming by building their own game while using their Pi. Cooperative collaboration of this sort between organisations (particularly those who might in the more proprietary business models of the past have been 'competitors') demonstrates a deep commitment to bringing about social innovation in the way educational tools are delivered.

What is the social impact it is seeking, including any evidence of impact to date?

As is suggested above Raspberry Pi seeks to inspire an emerging generation of young people to become more engaged with computer programming (and Science, Technology, Engineering and Mathematics education more generally– STEM education henceforth). Yet the impact of Raspberry Pi's vision seems to have been sensed more widely. Some commentators involved in humanitarian and development work have also noted the Raspberry Pi's application as an educational tool in developing countries for the following reasons:

Very low cost puts it into the category of "semi-disposable" device, and a ready addition to many other innovations without requiring large upfront investment.

Its robustness and low maintenance requirements make it particularly suitable for harsher environments in many developing countries.

Its small size and portability make it suitable for applications that other computers can't reach.

It has very low power consumption, so can work more easily in electrical off-grid environments.

Other than the fact that the demand for the Raspberry Pi computers have far exceeded the team's original predicted figure of 10,000 (with over 3 Million units having been sold worldwide as of 2013); Heeks and Robinson have also examined the impact of Raspberry Pi amid an emerging class of computing devices they refer to as ultra-low-cost computing (ULCC). These are defined as devices that wrap computing peripherals around a cell-phone hardware core; meaning that such devices can be produced for just a few tens of dollars.

For this reason Raspberry Pi computers have already been as used as learning tools in the context of various developing countries such as Afghanistan, Cameroon and Bhutan. While the UNDP-backed One Laptop Per Child programme demonstrates that more rigorous assessment is needed to verify that the ICT (Information and communications technology) packages like the Raspberry Pi are directly contributing to positive and measurable outcomes as a learning tool for students in developing countries. However as the case of Bolgatanga in the Upper East of Ghana, the results have reportedly been very positive when such platforms are combined with other educational materials. In 2013 a Raspberry Pi ICT learning environment was installed at Dachio Primary and JHS Schools, which included 6 Raspberry Pi's. These have been networked via a switch to a wireless router to facilitate access to RACHEL (one of the Raspberry Pi's dedicated educational servers). So far, the feedback from both teachers and pupils regarding this RACHEL material has been encouraging, and students can now access large amounts of educational content with having to rely on poor and expensive Internet connectivity.

Furthermore, the charity's continued success (financial and otherwise) has been marked by an important milestone for the organisation; On 18th of November it was announced that over 2m Raspberry Pi computers have been sold globally since going on sale for around £30 in February 2012.

What is the role of the organisation within the DSI ecosystem?

Raspberry Pi aims to promote interest in STEM education evidenced by a series of partnerships and collaborations (including a recent partnership with Wolfram Research it is already used at Khan Academy and supports MIT's Scratch platform. It actively encourages collaborative coding – for instance the open source coding for its collaborative project with Google, Code, is hosted on GitHub. Overall, Raspberry Pi aims to build an ecosystem of more engaged creator-users, and seeks to redress shortfall of computer programmers.

What technological method is it using?

The Raspberry Pi is based around a 700MHz ARM11 system on chip (SOC) with a powerful graphics co-processor. Typically this sort of processor was used in mobile phones five years ago. Apart from the graphics processor, which is propriety to Broadcom, the Raspberry Pi is completely open source, which helps to keep costs down. From the circuit schematics to the applications and the operating system, anyone can examine and contribute online. The Foundation provides a version of Debian Linux that presents users with a basic text login rather than a slick GUI

by default, with the entire operating system and user files stored on a swappable SD card.

How has technology enable that was not possible before?

With regard to Raspberry Pi's hardware, the board's low cost was made possible thanks to advances in integration that have effectively shrunk all the components of a desktop computer into a single silicon chip.

Furthermore, thanks to advances in technology, Raspberry Pi, unlike conventional PCs, has very low power consumption. This means that it work more easily in electrical off-grid environments, making it an ideal device for educational purposes in developing countries, etc.

Enhancing collaboration and engagement: DSI network effect

Due to Raspberry Pi's programmable and simple open source model, a variety of Pi projects have emerged on the Web. These range from making your own retro Pi-powered arcade machine to adapting your Raspberry Pi to log all relevant data in your own weather station. Significantly, the Pi community's focus on re-use and 'shareability' has meant that these projects are replete with comprehensive guides so that these projects can be readily adapted or developed further by anyone.

Yet collaboration does not just occur amongst the Raspberry Pi community, but rather is occurring on an organisational level too between key digital education actors. On November 23rd, 2013, Raspberry Pi Foundation announced a new partnership with Wolfram Research that will see a free copy of Mathematica and the Wolfram Language installed into future Rasbian images, making Raspberry Pi devices a first-class platform for teaching computer-based mathematics techniques to children of all ages.

Current Raspberry Pi users can also avail of this joint recent collaboration. Community members that have at least 600 MB of free space on their SD card can install both Mathematica and Wolfram Language by typing "sudo apt-get update & sudo apt-get install wolfram-engine."

Raspberry Pi has also recently collaborated with Google to deliver a new open source coding tool called Coder. With Coder, users can develop their own apps for the web and then host them on a miniature server located directly on the Raspberry Pi. The overall cost for the DIY programming project, using Google's recommended materials, is under $50 – and, importantly, all of the educational materials are free. After procuring a Raspberry Pi, eager students simply follow instructions to download information onto an SD card, plug it into the tiny computer, and connect to a shared Wi-Fi to access Coder through Chrome. The whole process, according to the developers, should take just 10 minutes.

This joint venture also situates both organisations comfortably within the DSI ecosystem –as a completely open-source project, Coder's code library is available for editing on GitHub, and comes with a few simple projects to get novices involved. Coder is also designed to work alongside instruction from other programming websites like Codeacademy and Khan Academy. When projects are complete, users can host their own websites via Raspberry Pi or zip them to share with friends.

How is the organisation funded?

Raspberry Pi founder Eben Upton has noted how in the initial phase of the foundation's establishment, he and the team were completely unable to convince any of the usual sources of loan and matched funding (banks, the old regional development agency) that they had a saleable product, and equity finance was unavailable as Raspberry Pi is a charity.

In the end the start-up of Raspberry Pi was financed by some of the organisations trustees who contributed unsecured loans totalling approximately £100,000 to get the business off the ground. The loans were repaid within a couple of months.

Currently all Raspberry Pi manufacturing is done at a Sony-owned manufacturing plant in Pencoed. The arrangement between the manufacturer and RasperryPi is a royalties-based model, where the manufacturer; RS Components and Premier Farnell oversee manufacturing and worldwide distribution, while Upton and his team benefit from a percentage on every device sold. As of October 1st 2013, Raspberry Pi has received roughly $4m of royalty income. This licensing model has been consciously adopted despite meaning Raspberry Pi has forgone potential earnings. As a business within a charity, all surplus made from royalties is re-invested back into helping Rasperry Pi achieve the organisation's key social objectives of encouraging children to programme.

Raspberry Pi is also supported via grant funding. In late January 2013, Google announced it was giving the Raspberry Pi Foundation a grant worth an estimated £670,000 to put 15,000 of the devices into UK schools and help develop educational material to go with the technology.

What are the main barriers to innovate (and how were they overcome)?

Technical Engineering Challenges: Beyond securing initial funding, there were no real challenges involved in setting the organisation up. However, in the early stages, the team had a number of technical engineering challenges bringing the product to market at the target price point, but thanks to the involvement of particularly competent engineers, these obstacles were quickly overcome.

Licensing Model: If one were considering the usual considerations of traditional business model, the licensing model of the Raspberry Pi technology might be deemed a disadvantage: a lot of other companies are making money from value that Raspberry Pi Trading has forgone. Two companies that make external cases for the device already accrue more revenue and profit than Raspberry Pi. In defence to this however, Raspberry Pi have indicated that their goals are clearly set on achieving their key (non-financial) objectives – which this licensing model has enabled them to work towards.

Offline Environments: While the Pi's design ensures it is suitable for off-grid environments, this alone does not overcome other infrastructural barriers, such as there being limited or no Internet access. For this reason Khan Academy Lite was developed as an offline version of Khan Academy's curriculum of free learning materials. With the Pi, a 64GB SD card to put all the learning materials on (which actually costs about twice what the Pi you'll need to run it on does) and a Wi-Fi dongle, allowing for the MP4 lectures that make up the core of Khan Academy's material to be brought to areas with poor Internet connectivity. This has been adopted in Bhutan; where the Internet didn't come until 1999, and coverage is still very minimal, so an offline solution like this is vital.

What really helps reach goals?

Raspberry Pi's success has been the largely the result of the board's very low price and open design (which was a conscious shift from the fixed function, commoditised products they felt had left an emerging generation as being unable to penetrate the system's interface to experiment with programming.)

Safecast

At a glance:

Type of Organisation:	Grassroots communities
Aim:	Health and wellbeing, Energy and environment, Participation and democracy
Technology Trends:	Open Networks, Open Hardware, Open Data, Open Knowledge
DSI activities:	An event, A network, Running/hosting maker spaces and hackerspaces, Operating a web service
Key Facts:	In 2013 over 10,000,000 individual data points collected.
Website:	http://blog.safecast.org/

Organisation Name

Safecast

Short description

Safecast is both the name of a Geiger counter built by the open source community as well as a global sensor network where Safecast owners can map and freely share their radiation measurements in open data sets. The overarching aim of Safecast is to encourage people to actively contribute to the generation of a body of data that might alleviate environmental problems. The original impetus for the Geiger counter and network was the lack of good and open hard and software solutions for citizens to contribute to the mapping of radiation levels in Japan following the accident at the Fukushima Daiichi nuclear power plant in 2011.

Type of organisation

Safecast is a joint project between Tokyo Hackerspace, CrashSpace LA, MIT Media Lab and Keio University, and is set up as a private non-profit organisation.

History & Mission

Safecast was founded by Sean Bonner, Joi Ito and Pieter Franken after March 11th, 2011, when a 9.0 earthquake hit Japan, and triggered a destructive tsunami which hit the Fukushima Daiichi nuclear power plant. In an effort to help, the partnership decided to take part in surfacing data on radiation levels across Japan, caused by the meltdown at the power plant. However, the Safecast team quickly realised that most of the devices used by the public to map radiation were of poor quality and there were massive holes in the public radiation data sets available. As a response to this, the team developed the bGiegie Geiger counter, imme-

diately after the disaster. The team turned to the crowds via crowdfunding platform, Kickstarter, to finance the device and help launch a sensor network where bGiegie owners could share the data they were collecting. Safecast then worked with Hackerspaces and used grant funding to update the counter, which amongst others enabled users to mount the counter on the outside of a car and use GPS technology to timestamp the data and log the location.

Harnessing the power of collective intelligence: The history of Safecast is very much one of global network of people using social media and open tools to come together around a common cause. The team behind Safecast initially connected on Twitter, and have in interviews described how they managed to connect with people through social networks whenever they were trying to address a new challenge in the development of Safecast. For example, Dan Sythe, who ran International Medcom - a high quality geiger counter manufacturer, and people at the Tokyo Hackerspace took part in the initial twitter discussion about building the device. Later on Ray Ozzie a data expert based in Boston joined the conversation when the question of how to release and analyse the data arose.

Looking beyond Japan: While Safecast was initially focused on mapping radiation levels in Japan the network has now gone global. In 2012 the network was rewarded a $399,999 grant from the US based Knight Foundation to build a network of low-cost air quality monitoring devices and data collection in Los Angeles and Detroit, and scale radiation monitoring globally.

Spread information via Social Media: While Geiger counters make it possible to produce narratives of nuclear risk as numbers, measurement data per se cannot be a useful resource for nuclear risk knowledge production. Volunteer Geiger counter users and social media users among others are necessary to produce specific type of nuclear risk knowledge. To date, Safecast volunteers have mapped radiation levels of over 11 million data points, providing a comprehensive and accurate dataset that was inconceivable before the Safecast project.

What does it do, and how does this activity enhance social innovation?

Safecast can be described as consisting of three main components.

A low cost Geiger counter: At the heart of Safecast is the physical Geiger counter which helps volunteers map radiation levels. The functionality of the Geiger counter has since been expanded to also map air pollution. The majority of data is captured through the bGeigie mobile sensor. A Geiger counter designed to be mounted on a vehicle, as one drive can help map up to 10,000 data points. However, in addition to the bGeigie the team have developed multiple other sensors with different functionalities (some are for handheld use, while other prototypes can be linked to a mobile phone). These counters are available at different costs, depending on a user's preferences. Experiments at a recent hackathon included developing future versions of the sensor, mounted on to a drone.

A Radiation Level Map: All data captured via the Geiger counters is captured and released in an open data set, and the radiation measurements are color-coded and plotted on a radiation level map which lets people easily understand the radiation level in a given geographical area. To date Safecast has captured more than 11 million data points.

A community of volunteers: While the Safecast team along with a wider open source community is providing the hard and software behind Safecast, the engine behind the success of the project is the large group of volunteers who use the Geiger counters to capture the data that makes the platform a valued resource. Safecast either send volunteers cheap Geiger counters to measure local levels of radioactivity, or they can purchase a unit anywhere from $200 to $1,000, or even build their own using a $450 kit.

What is the social impact it is seeking, including any evidence of impact to date?

Creating awareness network of "citizen help themselves" As mentioned earlier, the main drivers for Sean Bonner and his Safecast cofounders was a belief that people needed more and better radiation data, and that currently a lot of governmental data is not adequate or transparent. Building on this Safecast intends to bring the attitude of "citizen help themselves" where the government "failed". Safecast has gone some way in demonstrating this is possible by creating a process where citizens have done everything, from crowdfunding, designing and developing hardware, building a community, collecting and sharing open data, as well as educating, without input from government. To date, this has enabled Safecast volunteers to map radiation levels of over 11 million data points, providing a comprehensive and accurate dataset that was inconceivable before the Safecast project. The quality and public value of the work done by Safecast was further evidenced when, on September 15, 2012, it was announced that Safecast's radiation measurements were partially adopted by Fukushima Prefecture to create a radiation map.. As a pro-data organisation, Safecast generates nuclear risk knowledge by harnessing measurement data in multiple ways. Safecast initially claimed not to "work with any government and government agency directly" precisely because they try to "remain independent and uninfluenced by politics of any kind".

Open Data: As mentioned earlier, a cornerstone of Safecast is its commitment to open data, which means that anyone with an interest in global radiation can freely contribute to and access the large data sets created by the Safecast community.

In addition to this, the team behind Safecast also seek a social impact by conducting radiation measurements on request, conducting seminars, and developing open hardware and software.

Safecast describes itself as not being anti nuclear, or pro nuclear – but pro data. The goal is to provide more informative data where it didn't exist so that people can make more informed decisions based on facts rather than the fear and speculation that comes from uninformed sources. The goal is not to single out any individual source of data as untrustworthy, but rather to contribute to the existing measurement data and make it more robust.

What is the role of the organisation within the DSI ecosystem?

As described in more detail below, Safecast relies heavily on working on and with several open source hard and software solutions. Open hardware such as Arduino forms part of the actual build of the Geiger counter, crowdfunding platforms such as Kickstarter have been used to raise funding for developing different versions of the Geiger counter and open coding platforms such as Github have been used to develop the code behind Safecast.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The team behind Safecast has taken advantage of a broad spectrum of the free and open technological advances available to social entrepreneurs.

Open Hardware: The hardware developed by Safecast is open source and, in their own words, people who buy it are free 'to open, manipulate, hack, break and or improve anything', and it uses open hardware such as Arduino in the build of its sensors. As described earlier it has used Hackathons at Tokyo Hackerspace to design and build devices, such as the bGeigie.

Open Knowledge: Whilst it has used open hardware and open source approaches to develop the original prototype Geiger counters, Crowdfunding has been crucial in the funding and scale up of the Geiger counters. Safecast successfully ran campaigns on crowdfunding platform Kickstarter (it raised $36,900 with an original target of 33,000) to finance its first Geiger counter in 2011. It returned to Kickstarter again in 2012 to finance the Safecast, and raised $104,268, well beyond their original $4,000 target.

Following on from this Safecast has used open source platforms such as Github to develop the code that sits behind the platform.

Open data: Safecast provides an Open Application Programming Interface (API), allowing people to access raw measurement data. More importantly, Safecast presents useful information on measurement data such as geo-location information and time of upload. Such information not only makes it possible to locate when and where each datum was captured and uploaded, but also allows people to process the huge volume of raw measurement data for their own ends.

Social Media: Social media has helped Safecast in two main ways. It was through Twitter that many of the first connections were made between the original founders and developers of Safecast. Building on this, it is through social media channels such as Twitter that Safecast publish their findings.

Engagement through visualisation and apps: Finally, Safecast visualizes measurement data on the Safecast Map in six coloured layers. This provides information for people on the level of nuclear radiation in areas across Japan.

None of the activity described above would have been possible without the advance in technology, and in open technologies. Building on this, one case study of Safecast from researchers at University of Southern California describe how the collaboration around Safecast through

social media and open source platforms in many ways can be seen as an example of digitally enabled collective intelligence. As it relies primarily on volunteer engagement and contributions, Safecast needed low cost platforms and tools that could help them easily engage and manage a global community of Safecast makers and doers. The web-based online platform also enabled a sharing of data collected by citizens, to citizens, at a scale not possible before the advance of the Internet.

Enhancing collaboration and engagement: DSI network effect

As described throughout, the Safecast community is one large global network. The richness of radiation data grows as people use and share radiation data. Equally, the variations and development of different Geiger counters grows, adding value to the overall service, as DIY makers develop new types of counters which can be used by the network.

How is the organisation funded?

As mentioned earlier, Safecast has used two rounds of crowdfunding on Kickstarter to fund the development of its devices. In addition to this the project has also been funded by several private donations, which were given to the project in the aftermath of the Fukushima disaster.

Safecast has received a number of grants to fund the development of the platform. The most significant of these is a $400,000 grant from the US based Philanthropic foundation the Knight Foundation, to develop a real-time map of air quality in U.S. cities.

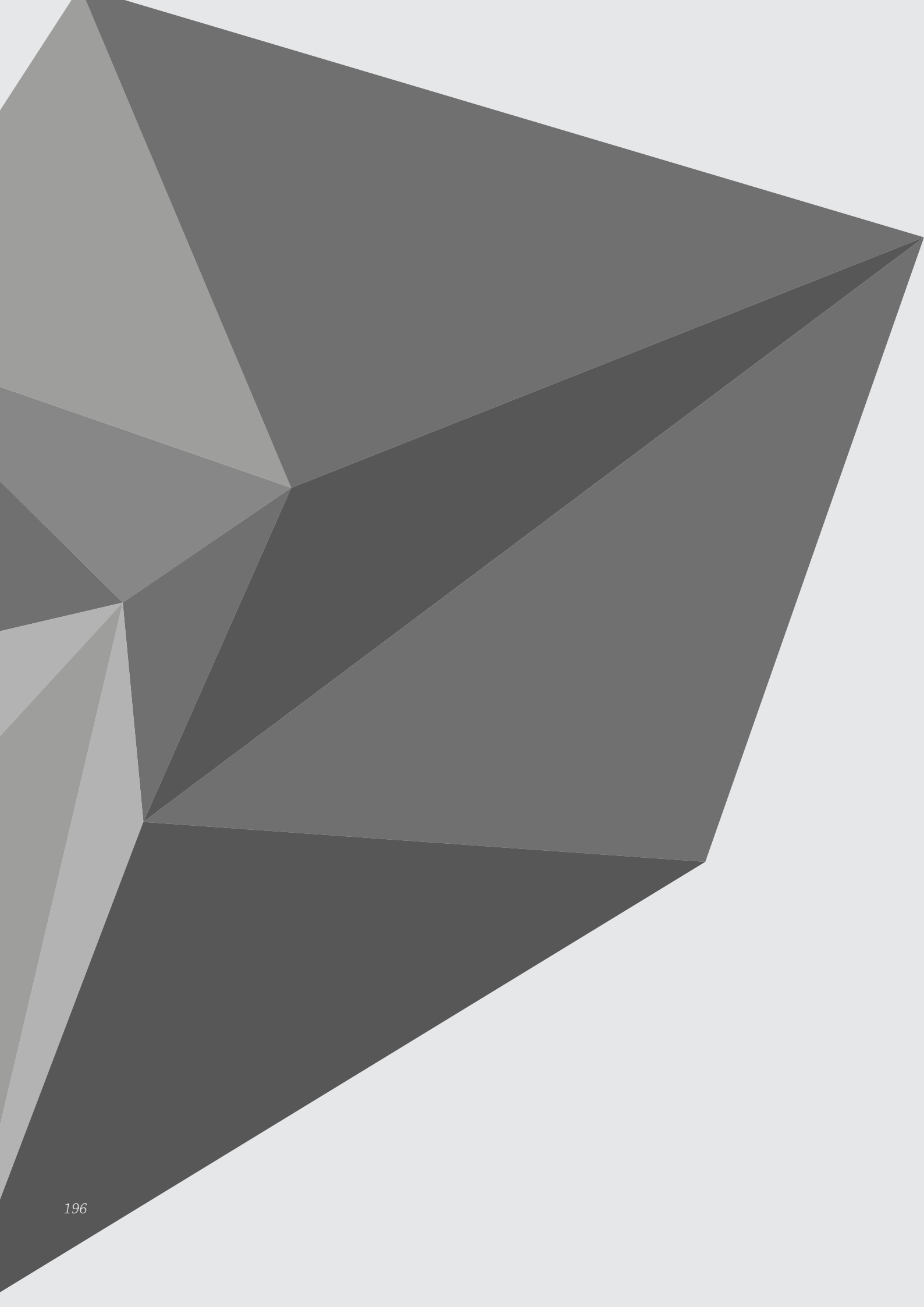
In addition to this Safecast collaborates with, and receives nonfinancial support from, other institutions such as Scanning Earth Project at Keio University, Uncorked Studios, and Global Survey Corp, among others.

What are the main barriers to innovate?

Safecast does not work with the Japanese national government due to a lack of the transparency of the information provided by them.. This provides a barrier in access to public data as well as distribution of data through public channels. However, while this one hand can be seen as a barrier it was this challenge that lead to the development of the Safecast approach.

What helps to reach goals and overcome barriers?

Needless to say the access to open soft and hardware as well as social media has been instrumental in the success of Safecast. In addition to this, it can be argued that the success of the network was a combination of the identified unmet need, a lack of open and accurate measurement data, combined with intense media attention in the wake of the Fukushima disaster. This helped 'get the word out' and mobilise a large community of backers and volunteers around a common cause.



Smart Citizen Kit

At a glance:

Type of Organisation:	Academia and Research Organisations
Aim:	Health and wellbeing, Energy and environment
Technology Trends:	Open Networks, Open Data, Open Knowledge, Open Hardware
DSI activities:	A network, operating a web service
Key facts:	More than 400 active users and more backers
Website:	http://smartcitizen.me/

Organisation Name

Fablab Barcelona

Short description

The Smart Citizen Kit is a set of tools (mostly sensors) built on an Arduino open hardware platform. These tools enable anyone who purchases the kit to contribute to the collection of environmental data, which it is hoped can be used to generate useful research and analysis.

The Smart Citizen Kit project creates a platform to generate participatory processes of people who own the kit. Through connecting data, people and knowledge, the objective of the platform is to serve as a node for building productive and open indicators, and distributed tools, and thereafter the collective construction of the city for its own inhabitants.

Type of organisation

Smart Citizen Kit is a research organisation. The project is born within Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia, both focused centres on the impact of new technologies at different scales of human habitat, from the bits to geography. It was developed in collaboration with Hangar, an AAVC (Association of Visual Artists from Catalonia) initiative that legally belongs to the AAVC Private Foundation.

History and mission

There are two core aims of the SmartCitizen projects. Firstly, it wants to produce new types of data and information which people previously couldn't get good access to. For example what are the real levels of air pollution around your home or business? Or what are levels of noise pollution and humidity? Secondly, the projects aims to empower citizens to participate in making the city better environmentally.

Organized by the FabLab Barcelona, based at the Institute for Advanced Architecture of Catalonia (IAAC), an international team of scientists, architects, and engineers are experimenting with ways to humanize environmental monitoring, and bringing the capture and analysis of city data as close to the public as possible. Tomas Diez, who directs Fab Lab Barcelona, and faculty at IAAC, who initiated the Smart Citizen project, is an urbanist specialized in digital fabrication and its implications on future cities' models. His research focuses on the use of digital tools for the transformation of physical reality to find a more fluid relation between machines and humans. Therefore he has always been interested in different data that is around the city, as well as how citizens interact with it. Believing that citizens can interact with the city data more often and in an easier way, Tomas and a group of people started to look into the existing products sensors and devices, but couldn't find solutions on the market that were both good and cheap. As a result they decided to build the devices to collect and share data themselves, and make this a tool that could be used by citizens. At the IAAC Tomas met a group of people who were working on similar project prototype. Together they formed the initial team of project Smart Citizen Kit.

What does it do, and how does this activity enhance social innovation?

The Smart Citizen Kit is based on two core components; the 'kit' itself and the platform used to share data between people operating a kit.

The Smart Citizen Kit itself is a an electronic board based on the open hardware solution Arduino, equipped with sensors that can capture data on air quality, temperature, noise, humidity and light. The board also contains a solar charger and a WiFi antenna that enables the direct upload data from the sensors in real time to the online platform

Anyone who has owns a kit, eventually becomes part of a wider network of users, who will capture, collate and share their data online on smartcitizen.me/pages/sck online platform. The platform is open to anyone, as is the date captured and uploaded to the platform.

The IAAC team behind the platform is very research oriented, and their aim with the kit is a focus on the use of digital technology and open hardware for the development of a citizen based platform for the city. With the sensors the team tries to make it possible for citizens to know the data, share it instantly and compare with other places in the city in real time, and thus help improve the environment quality.

What is the social impact it is seeking, including any evidence of impact to date?

Smart Citizen sees itself as acting as a bridge between more typically technical and non-technical citizens, both seeking to solve environmental challenges in unconventional ways.

Let the citizen know better of the city, motivate citizen to and to be able to participate.

The true value of the Smart Citizen effort is to provide a tool for citizens to participate in environmental monitoring.

This citizen-led approach, dubbed the Smart Citizen project, fosters participation of the general public in the process of producing open data used for the purpose of monitoring the environment. It focuses the impact of new technologies at different scales of human habitat, from the bits to geography.

While the focus is on citizen generated data, the Smart Citizen Kit has attracted the attention of cities across Europe, such as Barcelona and Amsterdam, who are interested in using the Smart Citizen Kit in the city's work on improving urban environments. The Amsterdam Smart City project is, in partnership with Waag Society, planning on deploying the kit around the city in early 2014.

What is the role of the organisation within the DSI ecosystem?

The project team researches, designs and develops open hardware, which is also open source. The team also operates an open network, where all the sensors and kit-owners can share and compare data and information in real time. On a grander scale, however, the very ideas underpinning the Smart Citizen project is one that is being readily adopted in a number of cities across Europe, such as Barcelona.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The Smart Citizen project is based on geo location, the Internet and relies on a range of open hard and software tools.

Open Hardware: The Smart Citizen Kit itself is built on the Arduino open hardware board.

Open Data and Open source: The web platform is developed with OpenStreetMap, Leaflet, Raphaël, jQuery, CakePHP, and many more. The actual project is open source and available on the open source platform Github. The fact that it is open has already led to replications of the kit for other purposes, such as the "Whale" project, where people placed the sensors in the sea to detect its condition.

Open Knowledge: As described in more detail below, the original financing of the kit happened via crowdfunding platform Goteo.

A number of technological developments have been fundamental in making the kit a reality, including:

Advances in technology which mean that there are now low economic barriers for users to purchase functional sensors

Easy capture and distribution of data

The generation of analysis and further research as a result of this open data being generated

Enhancing collaboration and engagement: DSI network effect

The Smart Citizen Kit itself is just a board with sensors attached to it. It is only when it is connected to a network of other sensors owned by people and organisations around the world that the kit and the smart citizen platform start to grow in value.

Building on this, the crowdfunding of the kit demonstrated the collective interested in a tool and service such as the kit.

How is the organisation funded?

To finance the project the Smart Citizen Kit team turned to the crowdfunding, via the Spanish Goteo crowdfunding platform. In June 2012, backers on Goteo raised 13,700 Euro for the project to make the very first 200 kits in March 2013. The project had to bootstrap in its initial phase, but was aided by the funds generated through crowdfunding platform.

The team returned to crowdfunding using platform Kickstarter in May 2013 once again, where it managed to raise $68,000 from 517 backers. The second round of crowdfunding helped the Smart Citizen team achieve their aim of purchasing bulk orders of hardware components to offer kits at the lowest possible costs, developing additional features for the smartphone app to interact with the hardware, and finalizing a 3D-printable, resilient enclosure.

What are the main barriers to innovate and how are they in the domain? What helps to reach goals and overcome barriers?

To be sustainable in working the data, motivate users to send data

Smart Citizen kit has its own community, where users collect and share the data online. But to keep users being motivated and therefore to keep the community active, is essential to what Smart Citizen Kit wants to achieve. In response to this challenge, the team is frequently designing new features and creating new activities on the online platform to engage the users.

To make the data and the technology meaningful: The team consider their Smart Citizen Kit as very effective data producers. The next step is to find how people can make use of the data and how the data can help people to participate. To achieve this, Tomas believe that it is necessary to make more and more people aware that they all can do something good with the data. “I think for Smart Citizen Kit it is important that people will feel it as a big name, like same important as IBM, otherwise it won’t work.” On one hand, the project is now slowly by slowly generating more attention, through people who are already participating. On the other hand, Tomas and his team are also working hard to get big companies and investors to support Smart Citizen Kit project, and to expose the idea to the public, letting more people know the name and be interested in becoming part of it.

Tor

At a glance:

Type of Organisation:	Non-profit
Aim:	Internet freedom and security
Technology Trends:	Open networks
DSI activities:	Operating a web service
Key Facts:	Tor has a staff of 30 paid developers, researchers, and advocates, plus many dozen volunteers who help out on a daily basis. In a year Tor has grown from 500,000 daily users worldwide to more than 4 million users.
Website:	https://www.torproject.org

Organisation Name

The Tor Project

Short description

The Tor project is a non-profit organisation that conducts research and development into online privacy and anonymity. It has developed software tools designed to stop people – including government agencies and corporations – learning web users location or tracking their browsing habits. It offers a technology that bounces Internet users' and websites' traffic through "relays" run by thousands of volunteers around the world, making it extremely hard for anyone to identify the source of the information or the location of the user. The software – the Tor browser bundle – can be downloaded and used to take advantage of that technology, with a separate version available for Android smartphones.

Type of organisation

The Tor Project is a US 501(c)(3) non-profit dedicated to research, development, and education about online anonymity and privacy.

History and Mission

Tor's strategic agenda is positioned to meet the privacy needs of the global online community, whilst continuing to leverage research and academic advancements in circumvention tools.

Tor, or The Onion Router, is a cryptographic technique first implemented by US Navy research to permit intelligence agents to use the Internet without being traced, by encrypting and routing communications through many different Internet servers. Subsequently, Tor has been developed by the US University MIT and by the California Internet rights watchdog the Electronic Frontier Foundation. Today, it is used every day

for a wide variety of purposes by normal people, the military, journalists, law enforcement officers, activists, and many others.

When it launched in 2002, the Tor project's emphasis was on protecting Internet users' privacy from corporations rather than governments. "We were increasingly concerned about all these websites - in the 2000/01 dotcom bubble, everyone was offering free services, and by free they meant 'we take all your information and sell it as many times as possible'," executive director Andrew Lewman told the Guardian in April 2012. "We wanted a way to give the control over your information to you, the user, not to have all these companies take it by default. And let you take decisions about do you trust Google, do you trust Amazon, do you trust the BBC, whatever."

The Tor project team explain how its users fall into a few main groups: normal people who want to keep their Internet activities private from websites and advertisers; those concerned about cyberspying; and users evading censorship in certain parts of the world. Tor notes that its technology is also used by military professionals – the US navy is still a key user – as well as activists and journalists in countries with strict censorship of media and the Internet. Campaigning body Reporters Without Borders advises journalists to use Tor, for example. Tor also cites bloggers, business executives, IT professionals and law enforcement officers as key users, with the latter including police needing to mask their IP addresses when working undercover online, or investigating "questionable web sites and services". For more mainstream users, it could mean running Tor so that your children's location can't be identified when they are online, or could mean a political activist in China, Russia or Syria could protect their identity.

After the NSA surveillance revelations in 2013, a new wave of users joined the service. Between 19 August and 27 August alone the number of people using Tor more than doubled to 2.25 million, according to Tor's own figures, before peaking at nearly 6 million in mid-September. It has since slipped back to just over 4 million.

What does it do, and how does this activity enhance social innovation?

Tor is a network of virtual tunnels that allows people and groups to improve their privacy and security on the Internet. It also enables software developers to create new communication tools with built-in privacy features. Tor provides the foundation for a range of applications that allow organisations and individuals to share information over public networks without compromising their privacy. The Tor network's 3000 volunteer relays carry 16 Gbps for upwards of half a million daily users.

Building on this, the team behind Tor describes themselves as undertaking four main activities:

Advancements in Tor's core technologies including real-time voice and video over the Tor network, improving usability, security and anonymity, stronger cryptography capabilities and exciting new tools designed to probe for censorship on the Internet. Supporting these technologies is the ongoing expansion of the Tor help desk volunteer pool, capabilities and languages to serve an even wider community.

Research that expands the understanding and challenges in privacy, censorship and freedom of expression online while creating state-of-the-art technology solutions.

Increasing awareness and understanding of privacy in an online world. Tor's team actively seeks out opportunities to attend conferences, facilitate conversations and provide teaching tools on the importance of information sharing in safe, productive environments.

Growth in Tor relays and bridges resulting in improved capacity, span and reliability of the Tor network. Tor is instituting several initiatives to expand the current pool of relay volunteers; with the goal of reaching more than 4,000 relay operators by the end of 2013.

What is the social impact it is seeking, including any evidence of impact to date?

Internet freedom and anonymity: The Internet offers exciting new opportunities for individuals to express their views, parody politicians, celebrate their favourite movie stars, or criticize businesses. Not everyone feels the same way though. Anecdotal evidence suggests that some individuals and corporations are using intellectual property and other laws to silence other online users. Ongoing trends in law, policy, and technology threaten anonymity as never before, undermining our ability to speak and read freely online. These trends also undermine national security and critical infrastructure by making communication among individuals, organisations, corporations, and governments more vulnerable to analysis. Using Tor protects you against a common form of Internet surveillance known as "traffic analysis." Traffic analysis can be used to infer who is talking to whom over a public network. Knowing the source and destination of your Internet traffic allows others to track your behaviour and interests. This can impact your chequebook if, for example, an e-commerce site uses price discrimination based on your country or institution of origin. It can even threaten your job and physical safety by revealing who and where you are.

For example, if you're travelling abroad and you connect to your employer's computers to check or send mail, you can inadvertently reveal your national origin and professional affiliation to anyone observing the network, even if the connection is encrypted.

The strongest evidence of the impact of Tor to date, is the fact that it has gone from around 500,000 daily users worldwide to more than 4 million users in 2013 and more than 3000 volunteers support the rerouting traffic which is fundamental to service.

What it the role of the organisation within the DSI ecosystem?

Recent revelations of the NSA's expansive surveillance programmes harm user trust in the digital ecosystem, stifle innovation, and lead to a harmful balkanization of the Internet. Internet users around the world must be able to trust that their information, communications and documents are safe and secure. The alternative is a race to the bottom where only those users who seek out complex, bolt-on security tools get protected communications, or worse yet become reluctant to use digital communications and avoid services that both improve their lives and drive commerce. Those of us in the technology sector, citizens at home, and constituents globally are asking what can be done to regain user trust.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Sensor Networks: "Onion routing" refers to the layers of the encryption used. The original data, including its destination, are encrypted and re-encrypted multiple times, and are sent through a virtual circuit comprising successive, randomly selected Tor relays. Each relay decrypts a "layer" of encryption to reveal only the next relay in the circuit, in order to pass the remaining encrypted data on to it. The final relay decrypts the last layer of encryption and sends the original data, without revealing or even knowing its sender, to the destination. This method reduces the chance of the original data being understood in transit and, more notably, conceals the routing of it. Needless to say, the connection between a global network of volunteers who help reroute traffic would not have been possible with technological advances in sensor networks and the development of the web itself.

Open source: The Tor software itself is open source and free for anyone to download and use.

Enhancing collaboration and engagement: DSI network effect

The strength of the Tor network relies on being able to relay traffic through a large network of routers owned by a global network of volunteers. As more routers are connected the strength of the network and its ability to provide privacy grows.

How is the organisation funded?

Tor's success is in large part thanks to the funding partners, including the Knight Foundation, The Broadcasting Board of Governors, SRI International, The United States Department of State, the Swedish International Development Agency and many individual donors. In addition to this Tor received support from research partners at the University of Waterloo (Canada), the University of Cambridge (United Kingdom), Georgia Institute of Technology and many others around the globe. Tor is able to leverage research and academic advancements to develop circumvention and privacy solutions.

What are the main barriers to innovate?

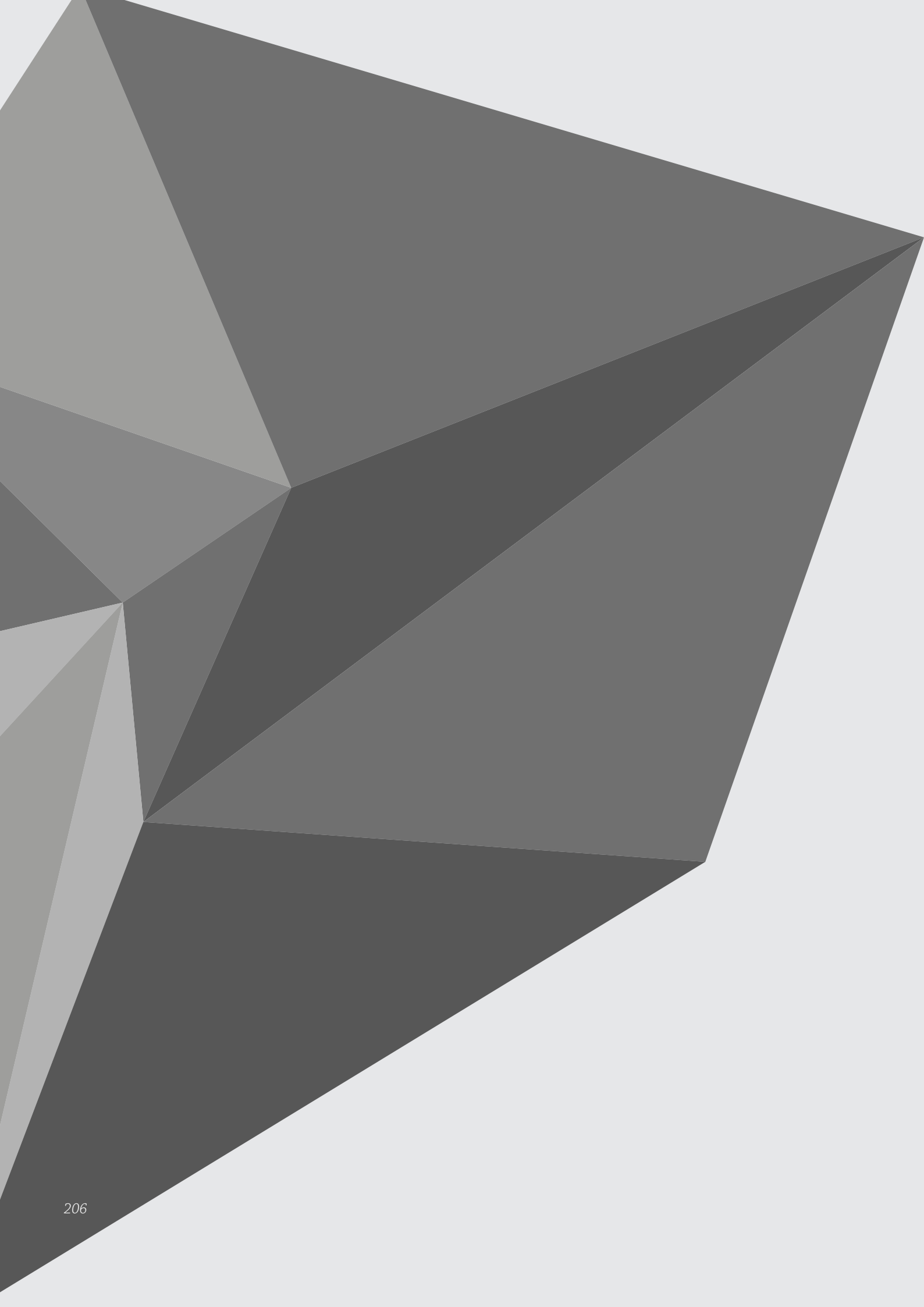
Naïveté: The majority of people using Tor are citizens who may simply want to stop advertisers from following them around the web. It's an issue that people are just beginning to think about now – especially in the context of sites like Facebook that attract advertisers with personal data that people opt to share.

Dark web: The cloak of anonymity provided by Tor makes it an attractive and powerful for criminals. Tor can mask users' identities, but also host their websites via its "hidden services" capabilities, which mean sites can only be accessed by people on the Tor network. This is the so-called "dark web" element, and it's not unusual to see Tor pop up in stories about a range of criminal sites. "We work with law enforcement a lot," Lewman told the Guardian. "They are fully aware of bad guys on Tor. However, the criminals already have all the privacy they could ever need, because they're willing to break the laws: they're willing to steal identities, they're willing to hack into machines, they're willing to run botnets." In a recent blogpost responding to the Freedom Hosting news, Tor also pointed out that hidden services aren't just used by criminals, pointing to organisa-

tions using the technology to "protect dissidents, activists, and protect the anonymity of users trying to find help for suicide prevention, domestic violence, and abuse-recovery."

What helps to reach goals and overcome barriers?

The main enabler behind Tor is the access to a global network of volunteers who make the out the network, that is the backbone of the service.



Ushahidi

At a glance:

Organisation Name:	Ushahidi
Type of organisation:	Grassroots communities; Businesses; Social enterprises, charities and foundations
Key Aims:	Participation and democracy; Other
Technology Trends:	Open data*; Open Knowledge

Organisation Name

Ushahidi

Short description

Ushahidi is a non-profit tech company that specializes in developing free and open source software for the collection, visualisation and interactive mapping of information. Some of its product offerings such as Crowdmap enable users to operate outside of traditional communication barriers to potentially monitor elections, map crisis information or curate local resources.

What type of organisation is it?

Ushahidi is a non-profit tech company.

History and mission

"Ushahidi", which means "testimony" in Swahili, is a website that was initially developed to map reports of violence in Kenya after the post-election fallout at the beginning of 2008. Since then, the name "Ushahidi" has come to represent the people behind the "Ushahidi Platform". In the aftermath of the election the Ushahidi was used to collect eyewitness reports from 'citizen journalist' of violence reported by email and text message and placed them on Google Maps. This website had 45,000 users in Kenya, and was the central to the Ushahidi team realising there was a need for a platform based on it, which could be used by others around the world.

Since early 2008 it has grown from an ad hoc group of volunteers to a focused organisation. The current team (of 22 full-time staff) is comprised of individuals with a wide span of experience ranging from human rights

work to software development. It has also built a strong team of volunteer developers primarily in Africa, but also Europe, South America and the U.S. Ushahidi describe itself as a 'disruptive organisation' willing 'to take risks in the pursuit of changing the traditional way that information flows.' To this end, Ushahidi builds technological tools for democratising information, increasing transparency and lowering the barriers for individuals to share their stories.

What does it do, and how does this activity enhance social innovation?

The main services provided by Ushahidi are three free software products that enable social activism and public accountability, through crowdsourcing of information from citizen observers by mobile phones or the Internet. The three Ushahidi products are:

The Ushahidi Platform: The Ushahidi platform was built as a tool to easily crowdsource information using multiple channels, including SMS, email, Twitter and the web

The SwiftRiver Platform: SwiftRiver is an open source platform that aims to democratize access to tools for filtering & making sense of real-time information

Crowdmap: When you need to get the Ushahidi platform up in two minutes to crowdsource information, Crowdmap will do it for you. It's the hosted version of the Ushahidi platform.

Ushahidi's platforms gather information from a variety of locations (and for various purposes), which is then verified by administrators and visualised on a map or a timeline. Previous applications of the technology range from monitoring elections in the Congo, India, and Mexico to tracking the availability of medical supplies in Kenya, Uganda, Malawi, and Zambia, as well as assisting the coordination of disaster responses in Haiti, Chile, Palestine and Russia.

What is the social impact it is seeking, including any evidence of impact to date?

After a devastating earthquake hit Haiti in 2010, the Ushahidi platform was used to report locations of collapsed structures, damaged schools and roads in the nation's capital, Port-Au-Prince. Alongside this the platform allowed people to highlights fires, contaminated water supplies and trapped people.

In an evaluation of the Ushahidi Project Haiti (UHP), involved stakeholders described how lives were saved as a result of the platform. In terms of figures gathered in this regard, upwards of 40,000 reports were processed through the platform, and 3,584 events have been mapped in Haiti. Of these, 80% were mapped in the first month and 72% of all points were mapped in Port Au Prince.

Other examples that illustrate its relevance during the Haiti crisis include:

The Department of State analysts for the USG interagency task force used Ushahidi in at least one case to help triangulate conclusions about the situation on the ground

US military organisations used Ushahidi data feeds along with other sources in a similar manner to inform their early situational assessments

There is also some evidence of the information being used for specific operational and tactical actions targeting specific communities (and to a much lesser extent, individuals).

US marines used the information to identify "centres of gravity" for deployment of field teams to areas of need, for example.

The organisation NYC Medics were able to identify the Albert Schweizer Hosptial as an institution with capacity to use the doctors and supplies that the organisation was able to mobilise.

There is also evidence that the volunteer geo-location services offered by the UHP core team were useful for SAR efforts, for example through the resourceful geo-coding efforts of Anna Schultz at Tufts University, among others.

What is the role of the organisation within the DSI ecosystem?

Ushahidi seeks to enhance good governance (through greater transparency around elections, etc.); democratise the dissemination of information in real-time, and allow for greater efficiency in disaster response.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: At the heart of Ushahidi is the use of online map services to crowdsource the mapping of local information. The site allows the use of OpenStreetMap maps in its user interface, but requires the Google Maps API for geocoding. Ushahidi is often set up using a local SMS gateway created by a local FrontlineSMS , a free open source software that can be used to distribute and collect information via text messages.

The case of the Ushahidi Project Haiti offers an interesting illustration of the potential of collaborative technology in instances of human disaster. The UHP information was used primarily because it was the only map aggregator of information coming from the affected area during the early days after the earth quake. The credibility of the project and project team was often cited as a reason for the continued use of the information, and high levels of trust built through common graduate academic programmes and pre-existing professional networks such as the International Network of Crisis Mappers cannot be underestimated.

Enhancing collaboration and engagement: DSI network effect

Collaboration through digital technology is critical to the sustainability of the Ushahidi's mission, as the organisation relies wholly upon the collaboration of 'citizen journalists', with the digital infrastructure built by the Ushahidi team enhancing their information-sharing mission.

How is the organisation funded?

Ushahidi relies on grants and donations from foundations, other charitable organisations and individuals who share a belief in the company's mission. Donations can be in cash or in kind – for example, people can volunteer to assist with various aspects of Ushahidi's operation. Volunteers with "coding chops" are particularly highly prized by the company.

In 2009, Omidyar Network invested $1,400,000 to enable Ushahidi to establish a Nairobi base with an expanded team; develop new technologies to enhance its platform; and grow its partnerships with media organisations and NGOs.

On December 1st 2011, Ushahidi has also received funding from the Ford Foundation. The Ford Foundation provided a $500,000 grant to Ushahidi over 2 years. This funding was secured to help Ushahidi to increase their community engagement capacity, scale the Crowdmap platform and provide operational support in 2011 and 2012.

Consulting Services

As a result of the extensive experience the organisation has gained in customising their platform for multiple purposes worldwide, Ushahidi have adapted their business model to offer new opportunities for collaboration through information-sharing – offering technology customisation and strategic consulting services to a wide range of clients (including Al-jazeera, the World Bank and the United Nations).

What really helps achieve these goals?

Ushahidi has announced the development of a USSD (unstructured supplementary services data) app to reduce the time it takes to process reports and manage the flood of SMSs coming through its platform to allow for greater efficiency in their management of information. According to Ushahidi, this USSD app could go a long way in reducing the amount of time it takes to process reports that come in via SMS, through the simple structure it provides.

Sustainability

In the case of Haiti, the UHP has made a great effort to transition the work they started, and continues to be a resource to the emergency response community there. A Haitian partner, Solutions, was identified to take over the website including overall management of the call/SMS centre function, and a micro-tasking NGO called Samasource that focuses on providing jobs in poor and disaster-affected communities through micro-tasking continues to support the project from a centre near PaP.

At an international level, the UHP experience has propelled crisis mapping and the International Network of Crisis Mappers to a larger response community and has resulted in dramatic growth in the crisis mapping community. Furthermore, evidence of sustainability can also be found in the deployment of similar but improved crisis mapping activities in more recent disasters, such as the quake in Chile and floods in Pakistan later in 2010. The sustainability of the crisis mapping community has also been enhanced by the strong links that Ushahidi and the crisis mappers have established with academia, and it should also be noted that a Standby Volunteer Task Force was launched at the International Conference on Crisis mapping (ICCM) 2010 precisely to aid in sustainability and preparedness.

What are the main barriers to innovate?

Detailed research has been carried out on the deployment of Ushahidi in the case of Haiti. For this reason it will be used to illustrate some of the challenges encountered by the organisation:

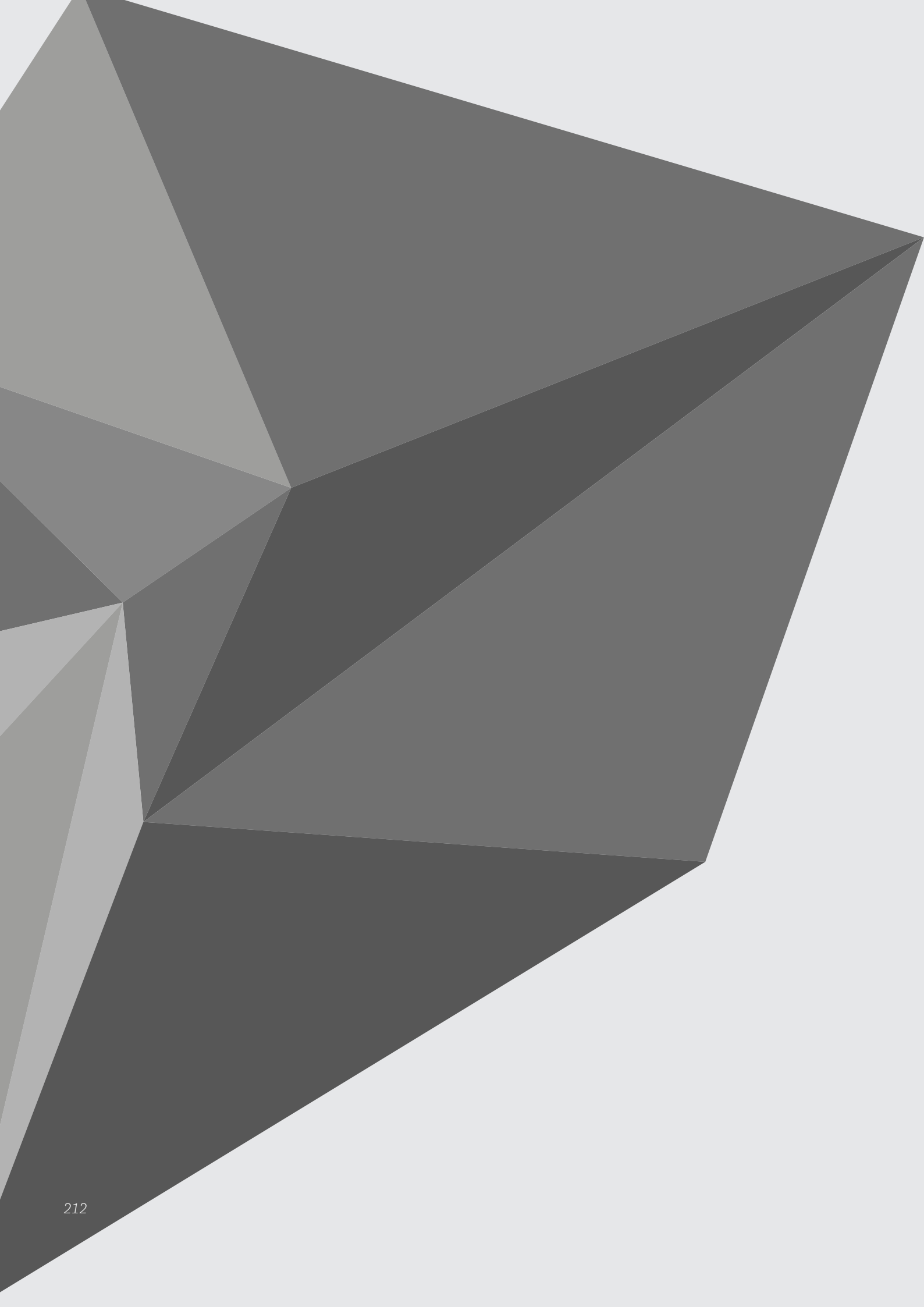
In the initial stages, "event data" generated by UHP did not meet the rigid requirements of traditional crisis response organisations. The UHP team indeed made efforts to adapt to these requirements but it is still cited as a significant obstacle to use throughout the early response. Information overload remains an issue in general for these responders (USSD app should allay this problem somewhat)

Use was also limited due to apparent low awareness of the project within the humanitarian community in Haiti, along with low knowledge of and capacity to use the crowdsourced information and the indistinct "corporate identity" of the organisation.

Interviews also revealed some general "suspicion of the crowd" and related questions about the representativeness and quality of the data.

Several technological limitations to information use. USG staff cited outdated computers, browsers as well as Internet communication security policy as significant obstacles to accessing the UHP website and data streams. Limited bandwidth was cited by organisations on the ground in Haiti.

Finally, lack of Internet connection and mobile phone networks that are down (which was the case in parts of Haiti after the earthquake) has also been cited as a barrier to using the platform in rural areas and areas hit by a natural catastrophe.



Zooniverse (citizen science web portal of CSA)

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Education and skills
Technology Trends:	Open knowledge
Key Facts:	More than 878, 000 of Community Members Worldwide (as of 30/10/13)

Organisation Name

Citizen Science Alliance

Short description

The Citizen Science Alliance is a collaboration of scientists, software developers and educators, who collectively develop, manage and utilise Internet-based 'citizen science projects' in order to further science itself, and the public understanding of both science and of the scientific process. These projects use the time, abilities and energies of a distributed community of citizen scientists who act as collaborators. CSA's projects are housed on Zooniverse – the 'home of Citizen Science on the web.'

Type of organisation

Zooniverse is a project of the run by the Citizen Science Alliance (CSA) via its web portal. The CSA is a collaboration of scientists, software developers and educators primarily coming from universities and public institutions.

History and mission

Zooniverse grew from the original Galaxy Zoo project first launched in July 2007. Galaxy Zoo set out the blueprint used throughout Zooniverse's applications, by crowdsourcing the analysis of astrological datasets to the public. Following Galaxy Zoo's visible success, the applicability of this 'open knowledge' model is evidenced by the fact that the Zooniverse site now hosts more than a dozen projects which allow volunteers to participate in scientific research. Unlike many early Internet-based citizen science projects (such as SETI@home) which used spare computer processing power to analyse data, known as volunteer computing, Zooniverse projects require the active participation of human volunteers to complete research tasks. Projects have been drawn from a diverse range of disciplines including astronomy, climate science, ecology, humanities and cell biology.

What does it do, and how does this activity enhance social innovation?

The Citizen Science Alliance's mission is principally to create online citizen science projects to involve the public in academic research. Yet looking to the circumstances that gave rise to the project's launch, it is clear that Galaxy Zoo (Zooniverse's pilot project) first came about as a means of handling the enormous volumes of data by enlisting the help of public volunteers.

Over-burdened academic departments very often have neither the time nor the resources to dedicate to processing this backlog of data. Similarly, a growing challenge for scientists is analysing large datasets – tens or hundreds of thousands of images, records, or pieces of information that together make up a major research project. Some of the most important data is in forms that computers still can't process, but that human beings can.

This is where the uniting of 'citizen science' and open data forms a powerful synergy; using the web to provide a means of reaching a much larger audience willing to devote their free time to collaborative projects through crowdsourcing initiatives like Zooniverse. Here volunteers give their time to help with a range of scientific projects, such as the formations of galaxies, patterns of climate change and the classification of cancer cells.

In recent times, Zooniverse has adapted its design model somewhat. With the launch of Zoo Tools (discussed more fully below) volunteers who seek to interact with the data in a deeper way are given a greater platform to do so. Likewise, with the shift to an open source development model (as of February 2013) it is hoped that a community of volunteer developers will be able to assist in the localisation support of the site (translating the content into other languages) – thereby having a positive impact on the outreach of the Zooniverse projects.

The Cell Slider project exemplifies the potential of Zooniverse's citizens science projects to be used for positive social outcomes. Cell Slider, which is a collaboration between Zooniverse and Cancer Research UK, aims to harness the collaborative force of crowdsourcing to help advance cancer research, which has been restricted in recent years by the sheer abundance of 'big data.' Volunteers are presented with a series of image or 'slides'. Each of these images is a tiny tumour sample from a huge dataset. By identifying and classifying the coloured sections of the image

using prompts, volunteers are directly assisting cancer research scientists to accelerate the analysis of this data and 'bring forward the cures for cancers.' The palpable social impact of this project has certainly been a factor in its wide uptake: almost 2 million images have already analysed.

What is the role of the organisation within the DSI ecosystem?

Zooniverse partners with a number of other academic and research organisations to customise citizen science projects, and advance research through open knowledge and open data.

What technological methods and tools is it using, and what did these enable that was not previously possible?

In the Zooniverse there's a clear separation between the API (Ouroboros) and the citizen science projects that the community interact with. Ouroboros is a custom-built, highly scalable application built in Ruby on Rails that runs on Amazon Web Services and uses MongoDB, Redis and a few other technologies.

Scalability: Pretty much all of the site's requirements point to having a shared API (Ouroboros) that serves a large number of projects. Running a core API that serves many projects relies very much upon the maintenance and health of that application. Should Ouroboros encounter technical difficulty, then the API would currently take out about 10 Zooniverse projects at once – and this is only set to increase. This in turn necessitates a lot of thinking about how to scale the application for times when the site is busy while also spending significant amounts of time monitoring the application performance and tuning code where necessary. The cost of running such an operation has been cited as a factor – running a central API means that when the Zooniverse is quiet and there aren't many people about, the number of servers they're running can be scaled back to a minimal level ('automagically' on Amazon Web Services).

The actual citizen science projects that people interact with are these days all pure JavaScript applications that are hosted on Amazon S3 and they're pretty much all open source. They're generally still bespoke applications each time but share common code for talking to Ouroboros.

The case of Galaxy Zoo offers an interesting anecdote of how technology might be used to tap into previously overlooked resources (i.e. opening up data analysis to the public) to process big data sets quicker, while simultaneously advancing scientific research. As mentioned above, the project was launched in 2007 to help process a data set made up of a million galaxies imaged by the Sloan Digital Sky Survey, who still provide some of the images in the site today. With so many galaxies, it was assumed it would take years for visitors to the site to work through them all, but within 24 hours of launch the site received almost 70,000 classifications an hour. In the end, more than 50 million classifications were received by the project during its first year, contributed by more than 150,000 people.

Furthermore, data analysed through crowdsourcing in this way provides quantitative estimates of error thanks to multiple independent interactions with the data.

Enhancing collaboration and engagement: DSI network effect

The very success of Zooniverse's projects relies upon the time, abilities and energies of a distributed community of citizen scientists who act as collaborators. It is this collaboration of 'citizen scientists' (i.e. voluntary public users) with research institutions (academic and otherwise e.g. CRUK) that allows the massive volumes of data to be processed through a platform of open data.

Yet since the very first days of Galaxy Zoo, projects have seen volunteers go well beyond the main classification tasks to offer amazing contributions to their respective fields. For instance, the data collected from the various projects has led to the publication of dozens of scientific papers. With the launch of Zoo Tools users have been given yet another platform to collaborate with the data generated even further. This application will offer community members tools of analysis to enable them to interact more deeply with the data generated.

In addition to this, the decision February 2013 to start making Zooniverse "officially" open source has allowed for new avenues for collaboration to be pursued other than the analysis of data. While Zooniverse had not made the move to open source a priority (because behind the scenes they had been willing to share their coding with anyone who had approached them –"often talking them through the thought process that led [them] to design our software in a particular way") – the decision to move to an entirely open source paradigm was made so as to broaden the tools available to enable people to start projects of their own.

This open source development model allows a community of developers to flag any bugs to the Zooniverse developers; to contribute towards the creation of new projects; but also to assist in the site's localisation support (translating sites into multiple languages). This latter point demonstrates how this process of collaboration can aid in the scaling up and doing outreach on the organisation's mission.

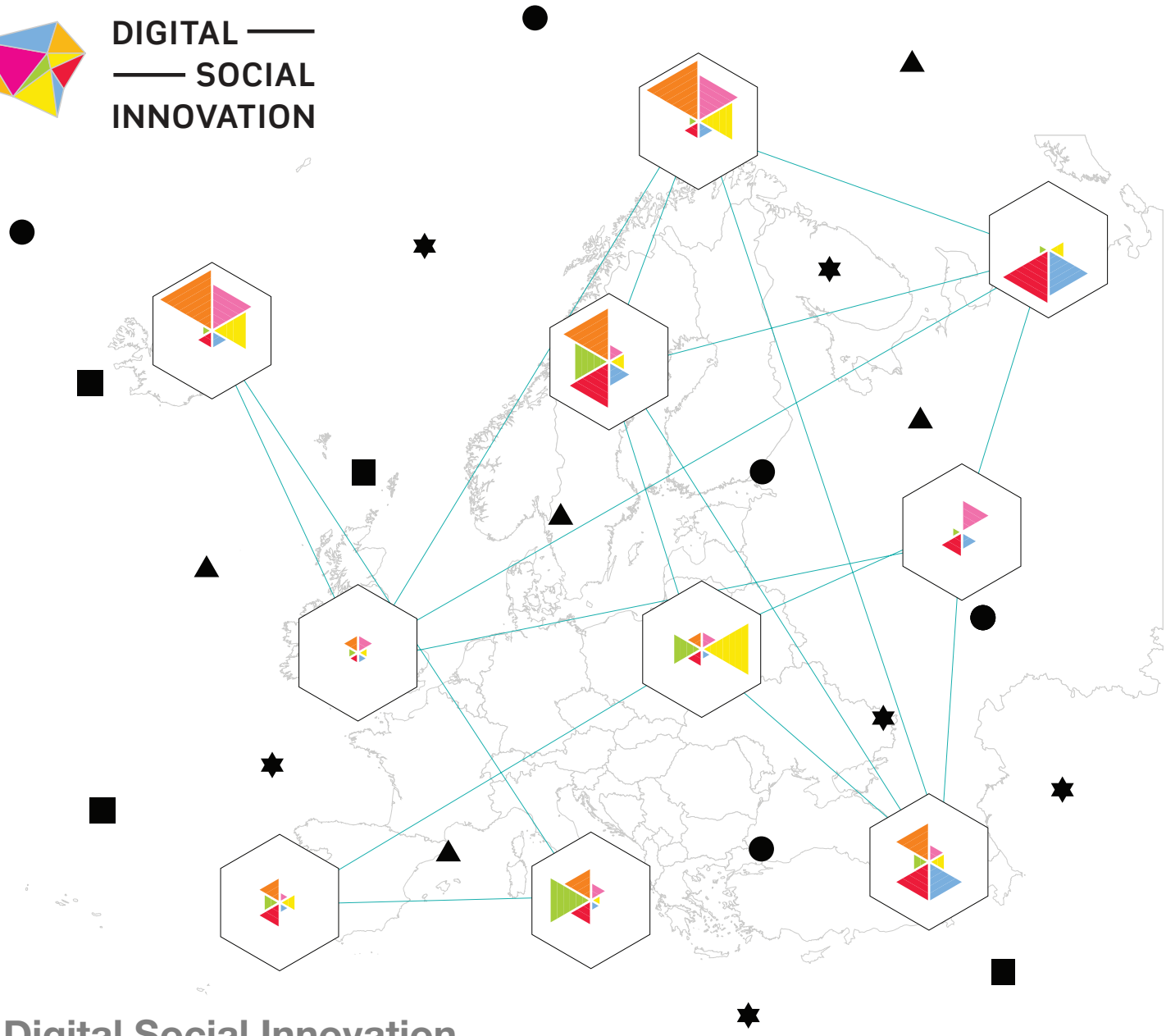
What really helps achieve goals?

Presenting the public with the opportunity to play a part in scientific research seems an integral part of Zooniverse's overall success. Take for instance the case of Galaxy Zoo. While it the origins of the initiative might be principally thought of as a means of handling huge volumes of data, a survey carried out with Galaxy Zoo volunteers in 2009 revealed that of the 10,000 respondents surveyed the primary self-reported motivation was to contribute to research. This suggests that there is a latent desire to help with scientific research, and indeed public response to these projects can be enormous; (an estimation offered by Zooniverse suggested that while it was a team of two alone employed at Galaxy Zoo throughout a period of 14 months, the total power offered up by volunteers was the equivalent of employing a single classifier for more than 110 years.

Appendix 2 – Matrix of Case Studies grouped by technology trend and domain

	Health, well-being and inclusion	Sustainable socio-economic models	Energy and environment	Participative open government	Pioneering science, culture & education	Smart public services
Open Networks	Confine	Opengarden.net Freecoin	Everyaware	Commons 4EU	Tor Project	Make Sense Smart Santander
Open Data	Wikipro-gress	Open Corporates	Ushahidi Crisis-commons	OHM Festival	Cell slider CKAN	Vienna Open CitySDK
Open Knowledge	Patients-LikeMe Zooniverse (Cellslider)	Goteo GitHub Peerby Ouishare Provenance	Desis Network Landshare	Avaaz Liquid Feedback Open Ministry Your Priorities Meiraha	Communia Open Knowledge Foundation	P2P Foundation mySociety
Open Hardware	Safecast	Raspberry Pi Fairphone	Fablab Amsterdam	IoT Council	Arduino Makerfaire	Smart Citizen Kit

DIGITAL —— SOCIAL INNOVATION



Digital Social Innovation

Second Interim Study report

Contract no: 30-CE-0531673/00-86

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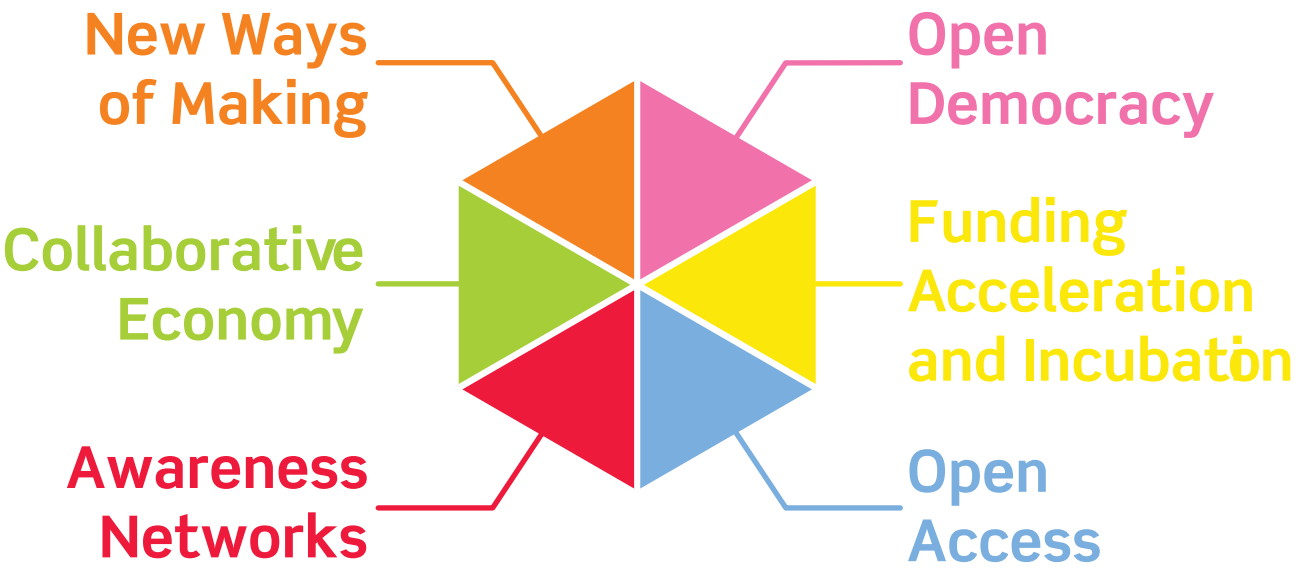
DIGITAL SOCIAL INNOVATION

Second Interim Study report

Contract no. 30-CE-0531673/00-86

Learn about digital social innovation



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Executive Summary

Innovation policy and the need to reinvent policy to foster Digital Social Innovation in Europe
The Study on Social Innovation in a Digital Agenda focuses on mapping and assessing Digital Social Innovation (DSI) activities, *"a type of social and collaborative innovation in which final users and communities collaborate through digital platforms to produce solutions for a wide range of social needs and at a scale that was unimaginable before the rise of Internet-enabled networking platforms"*.
This report is mainly focused on the output of WP3. The objective of work package 3 is to identify, compare, and evaluate the most salient innovation strategies in the field of digital social innovation. While digital social innovation is growing rapidly, there is little collected public knowledge around what best practice looks like, how networks of innovators might work together in order to amplify the impact of DSI, and what policies, funding models, and strategic approaches can best enable DSI to scale.

The nature of innovation has changed dramatically over the past decade due to globalisation, the widespread diffusion of ICT, the Internet and the rise of social media, the emergence of new global innovators such as China, Brazil and India, and the pressure to engage in open and interactive innovation processes. In light of these transformations, there is the need to rethink policies designed to nurture and orchestrate innovation. The challenge is to exploit the collaborative power of open networks (networks of people, of knowledge, and connected things) and to harness the collective intelligence of communities in order to tackle big social challenges.

In order to assess DSI policy strategies the report has adopted an open innovation philosophy that takes into account the interplay of different policy and research domains, while analysing experiences and best practices within the European Union and around the world. Also, the report has adopted an innovation ecosystem approach by addressing six different constituencies that represent the views of the different actors involved: (1) the open hardware and free software communities, (2) the community of developers, (3) innovation labs, including Fab labs, Living Labs, Hackerspaces and Makerspaces (4) the open data and open knowledge community, (5) smart citizens, and (6) the open democracy community, including civil society and new social movements.

Innovation is no longer seen as a linear step-by-step process in which R&D activities automatically lead to innovation and commercialisation of new products, but as a complex, dynamic, and interdependent process of many organisations and stakeholders: Policy (at all levels) can play a key role in creating coordinated strategies, common governance frameworks, and new instruments to enable an innovative response to challenges in specific domains. Although European Union interventions in the innovation field have been considerable and diverse, their potentially powerful effect on producing change and encouraging innovation has been limited. Edler et al (2013), who summarise the Compendium of Evidence on the Effectiveness of Innovation Policy Intervention Project, led by the Manchester Institute of Innovation Research (University of Manchester) and funded by Nesta, conclude that there is not much evidence of impact and, although the effects of innovation policies and programmes show variations across policy domains and within specific areas, there is still a need to make sure that innovation policy will support societal challenges and economic growth better in the future. **In summary, there is a need to reinvent European innovation public policies to guarantee transformational impact.**

The advent of new connecting technologies has opened up new perspectives for policy making. Though digital networks can give rise to new forms of collective intelligence and can increase democratic participation into policy debates, the actual influence they exert on policy decisions remains unclear. The reality of policymaking can often be laborious, lengthy and involve lots of compromises along the way. But inclusive policymaking should begin with **engagement with those who are likely to be affected by the end policies.** Thus, in formulating new policies ideas for Digital Social Innovation for the Digital Agenda and Europe 2020, we adopted a participatory methodology trialled by Digital Futures, a DG Connect project developed to addresses key policy issues by piloting a new approach to policy making; namely Policy Making 3.0.

Research that has happened to date

This section provides an overview of research that has happened on the project to date. The research has four main outputs, the 1st interim study report (published in December 2013), the 2nd interim study report (this report), the final study report (to be delivered in November 2014,) and the DSI dynamic mapping shown on the www.digitalsocial.eu website, which engages, builds and maps the DSI community.

The project's most substantial challenge is to develop a crowdmapping facility based on open and linked data with visual identity functionalities that the that attract the DSI community and increase the engagement in the network from the 640 current organisations to between 800 – 1000 organisations (see section below on mapping platform). Tanks to the open data mapping facility, in combination with our hybrid iterative strategy of case study interviews, workshops, and events relevant to the communities, we believe we can map DSI organisations and explore the DSI Network effect in a way that has hitherto not been possible. In order to analyse the relationship data from the mapping, we are adopting **social network analysis** to detect patterns of relations and argue that the causal success of DSI located in the social structure. By studying behaviours as embedded in social network structures, we will be able to explain macro and meso-level patterns that show the dynamics in which DSI organisations and their initiatives create scalable results and what DSI organizations are in need of help.

1st interim study report

The first interim study report, published in December 2013, described our work on defining digital social innovation through investigating more than 250 case studies of digital social innovation services, support organisations and activities. We provided in-depth case studies of 36 organisations/projects. The report presented interim findings and conclusions and highlighted next steps for the research project. The report showed that civil society organisations, non-profit NGOs, social movements, and civic innovators (developers, hackers, designers) are key stake -holders in support of innovation for social good. In the research we distinguished between innovation by non-institutional actors that are not taken into account in traditional innovation analysis, and innovation by institutional organisations and the public sector that supports and enables them to scale. The 1st Interim Study Report also investigated how this process can lead Europe to embrace new innovation models and experimentation, as too often in the past civil society organisations were ignored or left behind in the top-down technology pushes or large top-down innovation programmes.
The analysis of practice enabled us to develop the framework which has been used to capture data on DSI organisation via www.digitalsocial.eu . We highlighted 6 areas that capture key dimensions of the phenomenon under investigation: **(i) New ways of making ; (ii) Open democracy; (iii)The collabporative economy; (iv) Awareness networks enabling sustainable behaviours and lifestyles; (v) Open Access; and (vi) funding, acceleration and incubation.** Data is aslo categorised by:

- **A typology of organisations** (e.g. Government and public sector organisations, businesses, academia and research organisations, social enterprises, charities and foundations; and grassroots communities);

- **The way these organisations are supporting DSI** (e.g. such as undertaking research, delivering a service, organising networking events and festivals etc.);

- **The main technological trends** the organisations and their activities fit under (open data, open networks, open knowledge, open hardware);

- **The area of society the organisations and their activities operate and seek an impact in:** The DSI field does not have fixed boundaries; it cuts across all sectors (the public sector, private sector, third sector and social movements) and cuts across domains as diverse as (1) health, wellbeing and inclusion; (2) innovative socio-economic models (3) energy and environment; (3) participation and open governance, (4) science, culture and education; (5) public services.

Finally, the 1st interim study report demonstrated the prototype method for undertaking a network analysis of strong and weak DSI network in Europe, based on the open data set on organisations captured on www.digitalsocial.eu

Mapping and Engaging the DSI community

As outline in more details in the engagement summary an ongoing focus has been to engage with and understand the DSI community through events, workshops, social media blogs and articles. Highlights of activities include 640 organisations with 695 projects mapped on www.digitalsocial.eu; 590+ followers of the @Digi_Si twitter account; 15+ events and workshop on DSI including workhops at the international Fablab Conference in Barcelona and Participation Practitioners Forum in Warsaw and more than 25 blogs and articles written on DSI including articles in The Guardian (UK) and Empodera (annual Spanish publication on ICT and social innovation).

Co-designing DSI policies

We have been experimenting participatory methodology to engage practicioners, experts and policy makers in the generation of DSI policy policy ideas, issuse and future scenarios. We created a Toolkit to run bottom-up policy workshops (p.54), and used the open democracy platform Your Priority to debate online DSI key policy ideas: https://dsi-workshop-2014.yrpri.org
An experimental policy workshop was held in Brussels at DG Connect premises on February 3rd 2014. This experimental format encouraged policy-makers to go beyond the more standard approach of deploying consultation documents and showed how policy-related events that do happen can be much more participative in the generation of potential ideas through a more user-centred approach to policy-making. The workshop brought together over 70 DSI practitioners, experts, and policy makers from different European countries. As main outcome of the workshop, **9 DSI policy areas** were identified and over **30 DSI policy ideas** emerged. Crowdsourced ideas were clustered together according to key common themes, and generated some of the main policy issues and potential areas for intervention, such as **Distributed architectures** (including the need for open data distributed repositories, distributed cloud, distributed search, and distributed social networking); **The Future of privacy, data protection, trust & ethics,** emphasising the need for privacy-aware technologies; **Open & Big data for the Social Good**, by defining sensible governance modalities for big data thorugh a large collaboration between public and private actors; **Public federated identity management for the entire EU; Open access, open standards, and Copyright reform;** and finally **Mobilising Collective Intelligence to grow a new Digital Commons.**

Finally, after reviewing the literature on open innovation, defining what an innovation ecosystem is and analysing the different communities of such ecosystem, and after running partecipatory policy idea generation experiments, some preliminary recommandations have been identified to improve innovation policies in Europe. There is room at all levels to support digital social innovation. Each administrative level may play different roles. Innovators act locally but they may belong to wider and transversal networks. Local governments should, for example, offer local (economic) incentives for local innovators belonging to local communities. At the other end, European policy makers could strengthen the link among communities, support local and national governments, or coordinate transnational actions. But action is needed at all levels.

Next steps

The key priority for the project is to deliver a successful high impact final study report, culminating with our final DSI event with more than 400 DSI policy makers, experts and practitioners in Brussels, December 16, 2014. To do this our key focus over the next three months will be to, continue our social network analysis to better understand the needs and opportunities to nourish and scale DSI in Europe. We will also deepen our research in to policies and strategies that can support DSI in Europe, building on the work presented in this report. Finally, we will continue our work on engaging and mapping the DSI community, with the aim of having minimum 800+ organisations mapped by the end of the project.

1. Introduction

An overview of the Study on Social Innovation in a Digital Agenda

The Study on Social Innovation in a Digital Agenda focuses on mapping and assessing Digital Social Innovation (DSI) activities, *"a type of social and collaborative innovation in which final users and communities collaborate through digital platforms to produce solutions for a wide range of social needs and at a scale that was unimaginable before the rise of Internet-enabled networking platforms".*

The potential in using digital technologies to enable better and more social innovation is an area that presents significant opportunities to leverage the power of European talent by fully engaging stakeholders, citizens, civil society, and communities (including non-institutional actors such as "geeks" and "hackers") in the innovation process, taking advantage of the "network effect" caused by the spread of the Internet and the Web throughout society.

The DSI study's objective is to analyse, experiment and pioneer evidence on the economic and societal potential for, and impact of, Digital Social Innovation for Europe. This is in the context of rapid ICT and societal transformations, and the importance of driving open digital ecosystems that can foster and scale DSI initiatives as a strategic choice in future research and policy programmes. The study will do so through the following steps:

- **Defining and understanding the potential in Digital Social Innovation (WP1)**. This has been done in Interim Report 1

- **Crowdmapping DSI organisations and projects to engage stakeholders while experimenting and pioneering (WP2)** via new online mechanisms that can enhance the collaboration between DSI organisations, making visible their relational networks and their practices. This is on-going. The Project is documenting practical evidence of the economic and societal impact of DSI from in-depth case studies of digital social innovation implementations. This was reported in Interim Report 1 As stated earlier, many of these actors are difficult to identify using traditional means due to the tendency of the Internet to be used for much wider and diffuse innovation by civil society actors, many of whom operate outside traditional institutional frameworks.

- **Assessing grassroots innovation strategies (WP3)** to identify and compare different research and policy strategies in European Research programmes. This analysis is presented in this report.

- **Providing policy recommendations (WP5)** on research, strategy and policy aspects of DSI – such as governance models, business model innovation and collective incentives, stakeholders' engagement models, research instruments and impact assessment methodologies – in relation to the Digital Agenda and Horizons 2020. This will be presented in the Final study report.

An overview of this report

This report is mainly focused on the output of WP3. The objective of work package 3 is to identify, compare, and evaluate the most salient innovation strategies in the field of digital social innovation.

While digital social innovation is growing rapidly, there is little collected public knowledge around what best practice looks like, how networks of innovators might work together in order to amplify the impact of DSI, and what policies, funding models, and strategic approaches can best enable DSI to scale. There is great potential to exploit digital network effects both in social innovation activity and in new services and approaches that generate social value;but much of this potential isn't yet being realised.

The nature of innovation has changed dramatically over the past decade due to globalisation, the widespread diffusion of ICT, the Internet and the rise of social media, the emergence of new global innovators such as China, Brazil and India, and the pressure to engage in open and interactive innovation processes. In light of these transformations, there is the need to rethink policies designed to nurture and orchestrate innovation. The challenge is to exploit the collaborative power of networks (networks of people, of knowledge, and connected things) and to harness the collective intelligence of communities in order to tackle big social challenges.

The development of open data infrastructures, knowledge co-creation platforms, wireless sensor networks, decentralised social networking, and open hardware, can potentially serve collective action and awareness.

However, to date it has failed to deliver anticipated solutions to tackle large-scale problems, and the growth of digital services has resulted in an imbalance between the dramatic scale and reach of commercial Internet models and the relative weakness of alternatives. These alternatives mainly fill marginal niches and are unable to gather a critical mass of users that can adopt the services.

The main question is, therefore, whether digital social innovation can provide fundamentally new forms of power that are capable of tackling large-scale social, and even global crises, while empowering citizens and allowing democratic participation.

In order to assess DSI policy strategies the report has adopted an open innovation philosophy that takes into account the interplay of different policy and research domains, while analysing experiences and best practices within the European Union and around the world. Also, the report has adopted an innovation ecosystem approach by addressing six different constituencies that represent the views of the different actors involved: (1) the open hardware and free software communities, (2) the community of developers, (3) innovation labs, (4) the open data and open knowledge community, (5) smart citizens, and (6) the open democracy community, including civil society and new social movements.

The analysis of this report is divided into the following seven sections:

- **Crowdmapping platform for the DSI community**: A description of the latest development of the DSI open data mapping website

- **Engaging the DSI community:** an overview of the engagement strategies to involve the DSI community, outreach and communitcation activities.

- **Innovation policy and the need to reinvent policy:** In this section we address the need Europe has for innovation and we emphasise the role public administrations play when it comes to promoting innovation in Europe. We refer to the changes around innovation policies and innovation frameworks.

- **The concept of innovation ecosystems:** In this section we analyse in-depth the concept of open innovation. We refer to its usefulness back in 2000. We also refer to the current change of context and, therefore, to the need to "adjust/adapt" this open innovation concept to capture grassroots communities. We then introduce the concept of innovation ecosystems, which we argue is much more appropriate nowadays.

- **Communities in the innovation ecosystem:** The innovation ecosystem does not only involve companies and does not only aim to generate profit; it is a concept that is about maintaining communities and enabling processes in a continuous way. In this section, we briefly describe six important communities/ constituencies that are part of the European innovation ecosystem: the open source community, the developers' community, the innovation labs community, the open/big data community, the smart citizen/ civic society community, and the open democracy community.

- **Macro analysis of communities:** In this section we conduct a macro analysis of the identified communities. Our aim is to understand how they function and how they work. We are particularly interested in their weaknesses for these could turn into areas to focus public policy on. In particular, for each of the communities, we refer to focal actors, enablers, governance, and failures.

- **Micro analysis of communities:** In this section we conduct a micro analysis of the identified communities. We refer to instruments, motivations, and incentives. These will be able to feed directly into policy making
.
- **Bottom-up participatory policy development:** In this section we present the results of the participatory DSI policy workshop we ran in Brussels in February 2014, together with a preliminary analysis on the main DSI policy ideas and themes. We created a Toolkit to run bottom-up policy workshops.

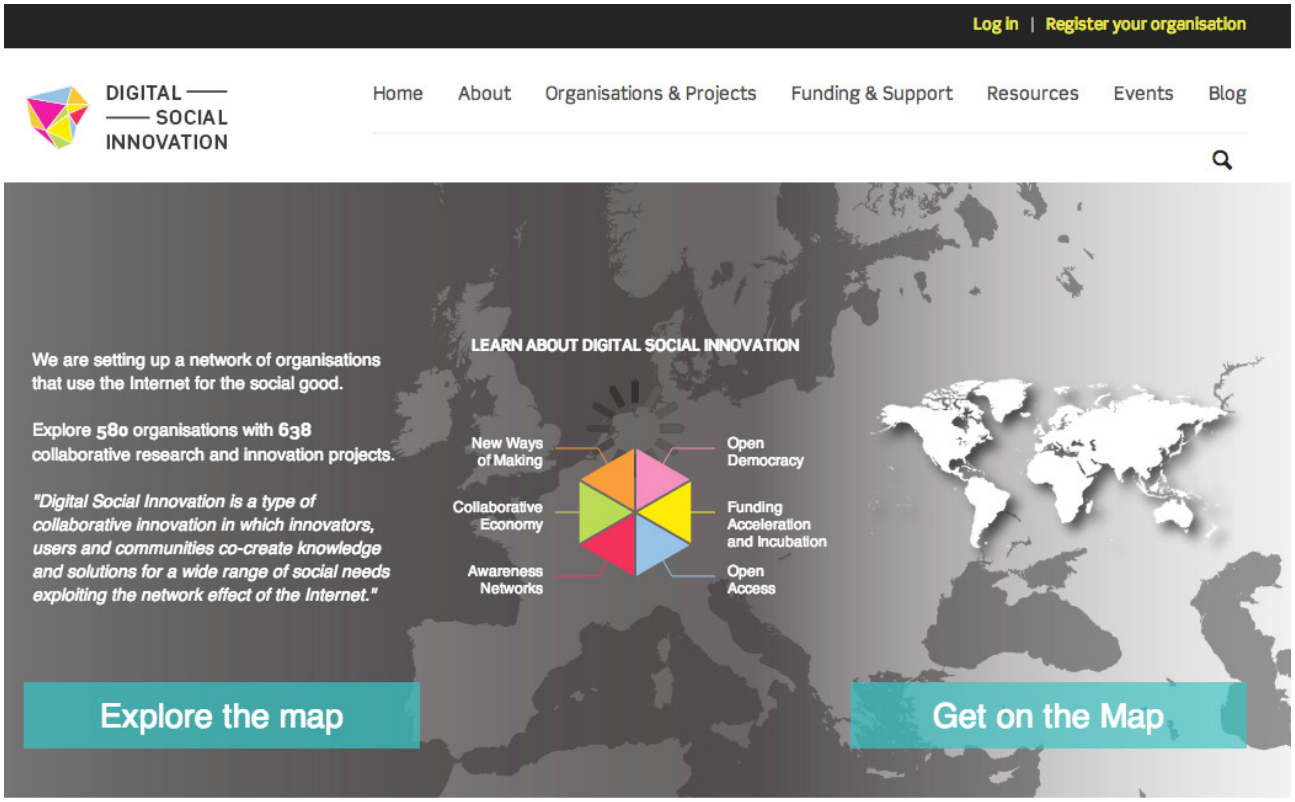
- **Exploring the DSI network effect:** A emergent analysis of the network data, looking at the type of DSi communities, the distribution of DSI in Europe, and the conditions for scaling DSI.

- **Recommendations on innovation policies:** After comparing the two analyses conducted, gaps between what is happening and what should be happening are identified. As a result, in this last section, we come up with ideas of new tools and policies addressed to cover such gaps.

2. Dynamic crowdmapping of the DSI community

We have redesigned the crowdmapping website and increased the numbers involved in the DSI network. At the heart of the DSI research is www.digitalsocial.eu, a dynamic and crowdsourced map of organisations that work on digital social innovation. In the DSI Network Data-Set, there are a total of 590 organisations with 645 projects as of August 2014. Most, if not all, of the case studies mapped on digitalsocial.eu take place via the Internet or are highly enabled by new technology trends such as open networks, open hardware and open data infrastructures.

The new front page has been redesigned to inspire visitors to learn about DSI and join the map.. It now looks like this:



The main purposes of the DSI site are to:

- **Learn about DSI and get inspired**. Showing citizens and the general audience the potential of DSI, being able to explore projects and organisations in the field, learn about new technology trends, learn about emerging digital social innovation areas, and explore case studies examples.
- **Discover funding opportunities and support** that are available from investors, incubators, accelerators or policy makers. Funders can also discover great DSI projects on the living map that they might want to invest in
- **Find potential partners** to collaborate with or interact with and discover other interesting DSI projects.
- **To enable members of the DSI community to enhance and visualise their networks** of collaborators and to raise their visibility.

The dynamic map below shows the working connections between the various digital social innovators and will enable both practitioners and policymakers to understand what services, standards or digital projects are being developed, and what is the density of DSI activities in Europe. In time, the site will be an open database of relational links between DSI organisations and projects, case studies and potential funding opportunities.

In the new redesign, we focused on communicating the meaning of DSI, and enabling people to explore the mapping facility in a user-friendly way, through the improved UI and visualisation interface. We also clearly highlighted the 6 DSI areas that capture key dimensions of the phenomenon under investigation (new ways of making; open democracy; collaborative economy, awareness networks; open access, and funding, accelerating and incubating).

We then created a new visual layout for the 36 DSI case studies that are showcased in on the website and also directly on the DSI map. Users are able to filter organisations, projects and case studies with a new improved and easy to visualise filtering interface. DSI organisations can create their own profile, and are able to visualise their organisation network, their projects, and their collaborators across Europe. We also created statistical visualisations showing all the relevant dimensions in the data, such as EU countries with most DSI projects; a matrix with the number of projects by technology focus and DSI areas, the number of DSI projects in each European City; emerging technology trends and methods; organisation type; project type; and area of society where DSI projects have an impact.

We agreed that we will notdevelop a Recommendation Engine for now (a tool to help people identify potential organisations for collaboration and funding opportunities) as this is outside the scope of what we can do within our current resources. This development to turn digitalsocial.eu to a fully functional networking and crowdmapping platform for the DSI community will be discussed in detail in the final report as part of the DSI sustainability plan.

We also discussed the need to have the survey/joining form translated in to French and Spanish. However, as we don't have the resources to do get the developer to do a translated version of the survey on the site, we provided French and Spanish organisations the opportunity to take the survey in French or Spanish with a link to the translated survey. We will then create a profile on the site for the French or Spanish organisation using the survey data.

Figure 1. A view of the European section of the map. At this scale organisations are clustered to show how many exist in the vicinity. Case studies are clearly visable as different icons.

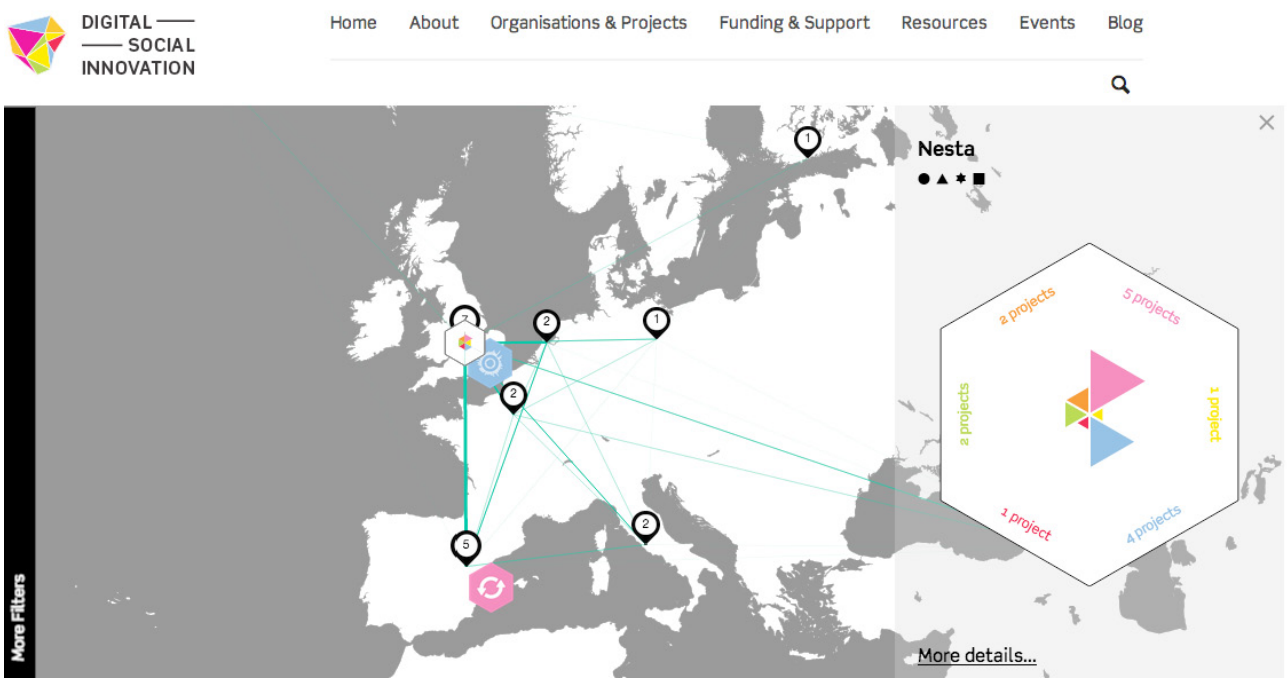
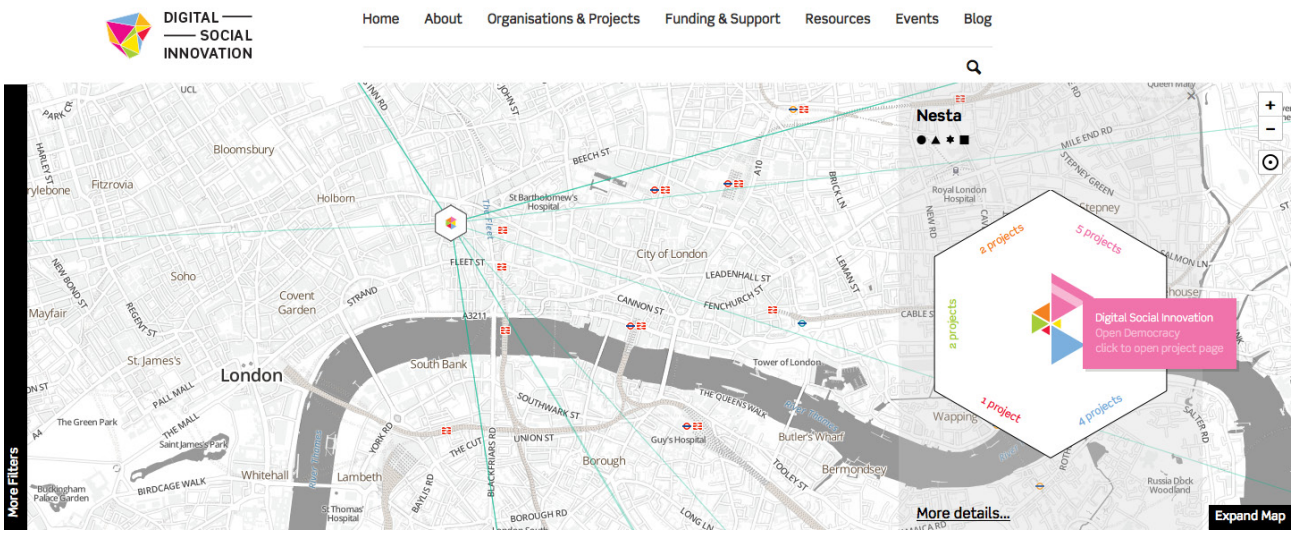


Figure 2. View of the map when an organisation has been selected. A pop-up box appers on the right hand side of the screen which contains a visualisation of the organisations DSI activities and the organisations network is dsplayed on the map.



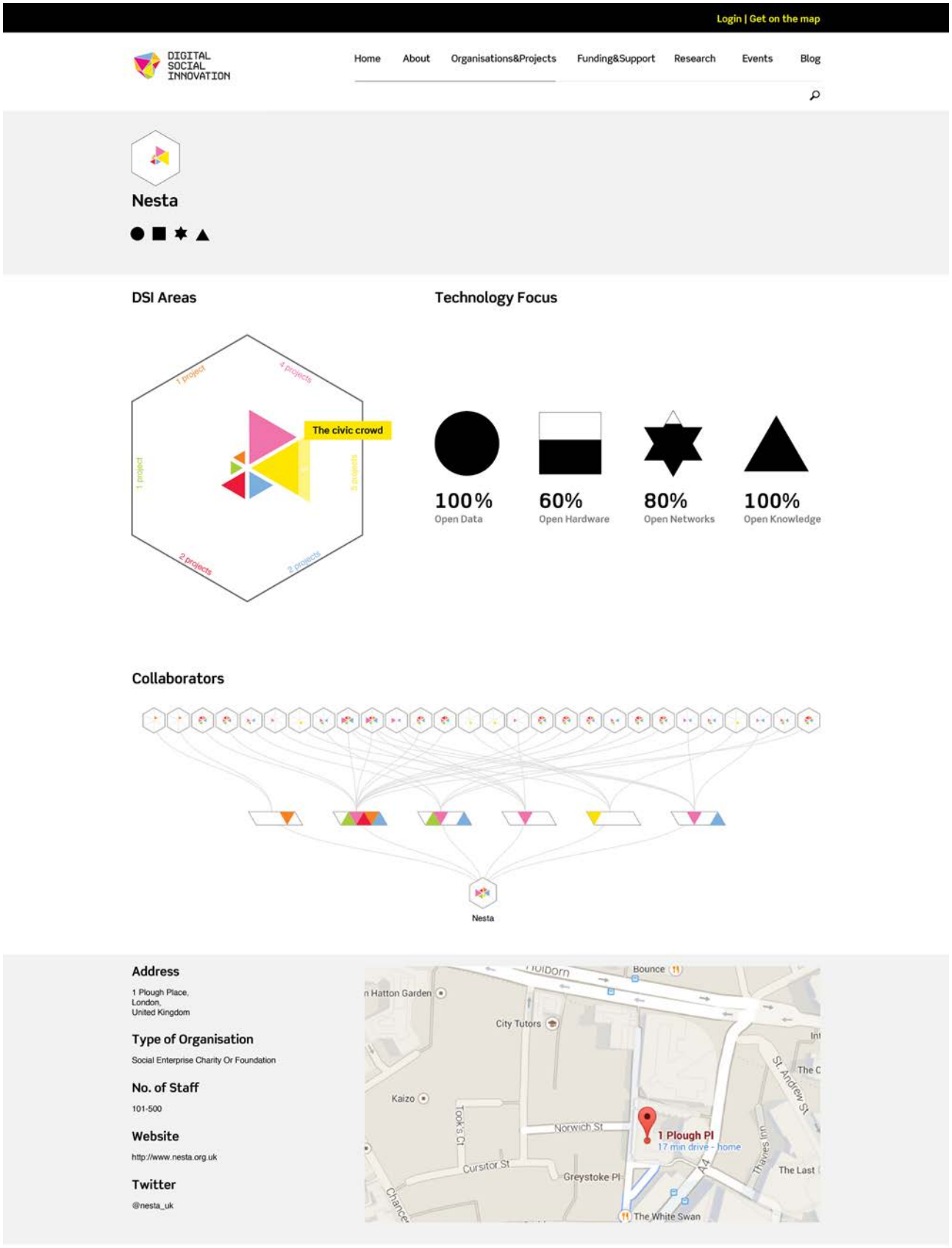
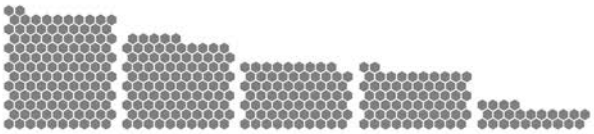


Figure 4 An org profile contains basic information on the organization and the DSI project its involved in.

Statistical info graphic of the DSI organizations on the Map **Statistical info graphic of the DSI organizations on the Map**

OrganizationType



122	95	69	62	24
Enterprise Charity or Foundation	Business	Organization or Community Network	Academia and Research	Government and Public Sector

ProjectType

83	41	40	33	21	19	18	14
Delivering a Web Service	Education and Training	Research Project	Network	Event	Advocating and Campaigning	Incubators and Accelerators	Advisory or Expert Body

9	9	6
Maker and Hacker Spaces	Others	Investment and Funding

Cities

Total: 253

Technology Method

Total: 160

171	135	109	98	74	68	60	53
Social networks	Social media	Crowdsourcing	Open Data	Mobile apps	Open source	Online peer support	2P - distributed exchange networks

53	52	50	49	43	36	34	34

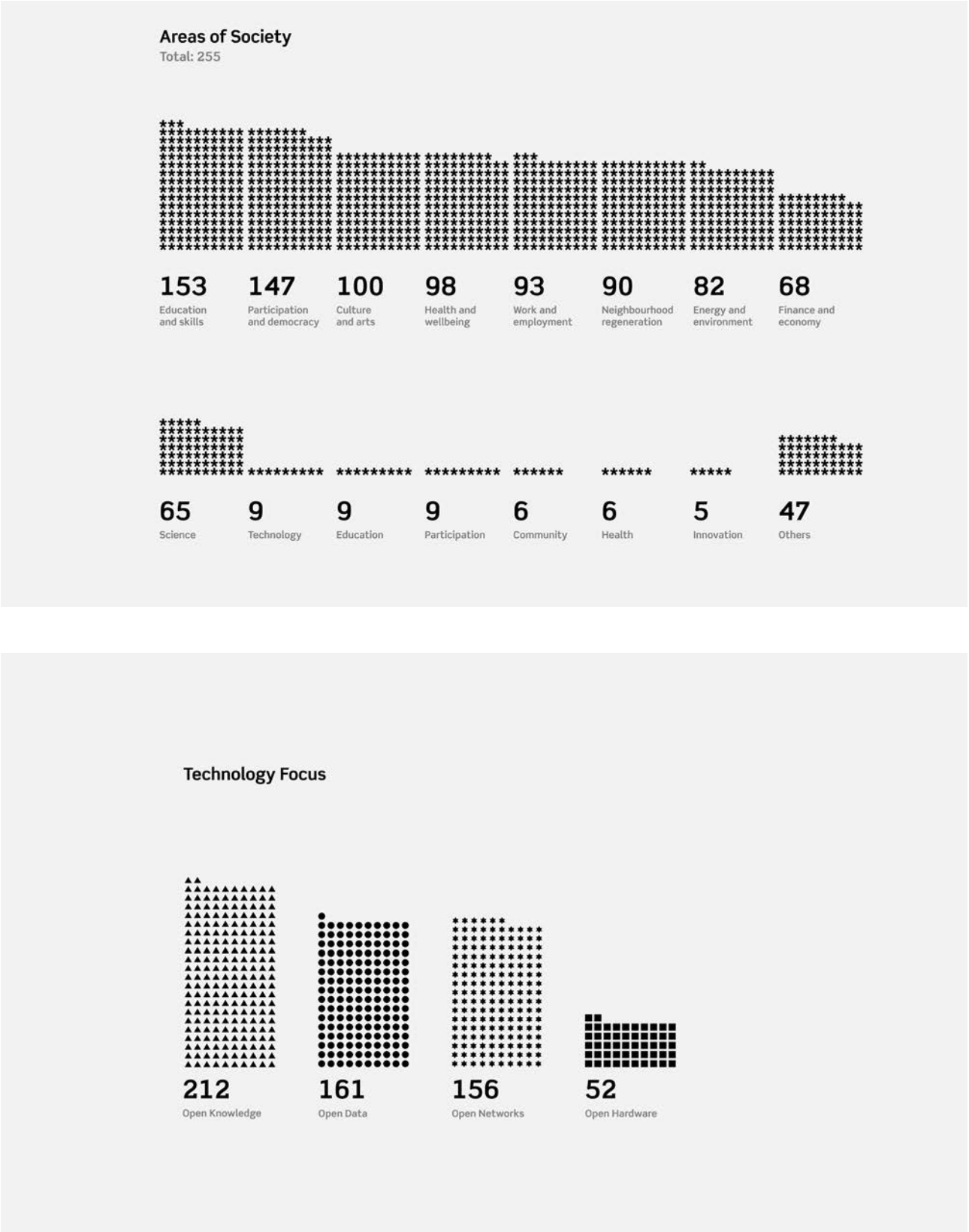


Figure 4 A range of dynamic visualisations display various statistical information about the dataset.

3. Engaging the DSI community

Below we summarise the primary activities that have been undertaken to date to engage the EU DSI community and encourage people and organisations to map their organisations and activities on www.digitalsocial.eu.

Disseminating the research

The primary way in which we have sought to spread the word about DSI and www.digitalsocial.eu is writing content that outlines the purpose of the research, what we are trying to achieve and why we would like DSI organisations to engage with the project.

One way of doing that has been through guest blogs and articles - where we have placed a DSI related blog on another network's or organisation's blog:

- Samfundsagenda (DK) - **Realising the Potential in Digital Social Innovation**
- Social Innovation Europe (EU wide) - **What happened at the Digital Social Innovation Workshop, Brussels, 3rd February & Put your organisation on the Digital Social Innovation map**
- EUCLID (EU Wide) - **Crowdmapping digital social innovation activities in Europe**
- TEPSIE (unpublished) – To be published blog for the Tepsie social innovation research project on mapping the DSI community.
- A short chapter on DSI in the upcoming publication on ICT enabled social innovation by the **Spanish Empodera network.** They are currently translating a editing the book with an aim to publish in July 2014.
- Ouishare (EU wide) **New funding and Research to support grassroots innovation** (also published on Nesta and D-CENT website.

In addition to the guest blogs we have done a large number of blogs, communicating the project on the Nesta blog and digitalsocial.eu blog. A sample of these include

- **Digital social innovation: ground-up policy making** 1.000+ readers to date
- How to run a "bottom-up" policy development workshop
- Are you a digital social innovator? Come join our new network and get on the map
- We need your help understanding digital social innovation across Europe

Lists have proved the best way of getting a lot of attention around the project and our crowd map with a general audience. We have done two of these to date.

- Digital Social Innovation - 11 trends you should know about - from crowdsourcing to open hardware. (published on Nesta website) 6.000+ readers to date
- **10 Digital Social Innovators to Watch** (published in the Guardian) 8.000+ readers to date

The 1st interim study report has been well received and recognised as a valuable contribution to defining and understanding digital social innovation. To date the interim study report has had more than 10,000 readers on web / Isuu (combined figures from www.waag.org and www.digitalsocial.eu sites)

Social Media + other Media outreach

Twitter

- To date we have done the majority of our engagement with the DSI community via the DSI twitter account @Digi_Si. The twitter account has proven an effective channel for both engaging new organisations and projects to join the map and communicate new events and calls. As the number of followers grow the effect of this will increase accordingly.

- The account now has more than 500+ followers with new followers joining every day.

- In addition to @Digi_So we have also continuously promoted the project via the Nesta (50.000+ followers) and Waag (8.000+ followers) twitter accounts.

Your Priorities Platform

- To support the further development of policy ideas for DSI following the outcome of the DSI policy workshop in Brussels, February 3 (see below) we partnered with the Citizens Foundation team behind the Iceland Your Priorities platform for crowdsourcing policy ideas to develop a bespoke platform for crowdsourcing DSI policy ideas - https://dsi-workshop-2014.yrpri.org/.

Direct email and newsletter mentions

- **Newsletter mentions:** We have promoted the project and project content through the Nesta (44.000 readers) and Waag society newsletters. Building on this we have had a number of external organisations with extensive social innovation networks mention the research in their newsletter, including Social Innovation Europe, Social Innovation Exchange and the EUCLID network - the European network of civil society leaders.

- **Identifying and reaching new DSI networks and communities**
  Though looking at the www.digitalsocial.eu network map we identified a number of European countries with little or no representation on the map. These included the Czech Republic, Germany, Greece, Lithuania, Poland and Slovakia. Through desk-based research, and using the criteria set out in the report, we identified a list of key DSI actors and network nodes that working on DSI in these particular regions. The make-up of these actors was diverse, consisting of digital makers, educational institutions with digital collaboration programmes, etc. but each reflecting the typologies of digital social innovation referenced in the report. After identifying contacts at these organisations, we reached out to them, sending out an email to offer an insight into the project's objectives and inviting them to map their organisation at DigitalSocial.eu, and to join the DSI network. Where possible we connected also by telephone or via social media. Given the focus on digital collaboration, invitees were requested to refer our details on to any partners or other actors known to them, and we requested they keep us informed of any project and event updates or funding opportunities that might be of interest to the larger community.

Events

Throughout the project the project partners have done a number of workshops presentations and other events on digital social innovation. Participating in and contributing to the events where the different DSI communities meet, such as the Open Data community at the Open Knowledge Conference and the Maker community at the Fab10, has helped us test our research findings and recommendations as well as engage DSI organisations in the crowdmapping on digitalsocial.eu

- **Open Knowledge Conference, Geneva, Switzerland. 16-18 September 2013**
  Afternoon session themed '*Digital Social Innovation in Europe: crowdmapping actors and networks'* with presentations and panel discussion from European DSI experts. The primary focus of the session was to engage the DSI community in kicking off the DSI research and get their views and inputs to the big questions the research project is trying to answer. For this purpose the afternoon was split in to three sessions focusing on *1) The potential in digital social innovation 2) Who are the digital social innovators?*

and 3) Supporting and growing digital social innovation in Europe, what needs to change?

- **Digital Agenda Assembly 2013, Lithuania - 6-8 November 2013**
  Participated at ICT2013 in Vilnius, which was attended by more than 6000 top ICT professionals from industry, academia, research as well as policy makers and EC official with the purpose of discovering the latest advances in EU funded ICT research and discuss the future of ICT funding. The DSI team took part in panel session and presented project ambitions with the aim to engage the ICT community in the research.

- **CCC Congress, Hamburg - December 2013**
  CCC Congress, Hamburg - December 27-30th 2013
  This event was one of Europe's largest gatherings of hackers and makers, with over 8,000 people in attendance. There was a strong focus on privacy, decentralization, and data protection. Harry Halpin (IRI) presented a lightning talk on Digital Social Innovation to an audience of nearly one hundred, which encouraged a number of German organizations who were not on the map to join and started a discussion over the possible support that could be provided by the European Commission with organizations such as the Wau Holland Foundation and the Tor Project. Also, two hundred flyers, created by IRI for the event, were given out.

- **DSI policy Workshop Brussels, Belgium. February 3 2014**
  One day workshop at the European Commission which brought together 75+ DSI policy makers, experts and practitioners from across Europe to discuss and develop policy ideas for supporting digital social innovation. The main outcome of the workshop was a set of clusters of policy ideas which were fed in to the projects work package three, focusing on developing policies for DSI.

- **Smart City Expo, Barcelona - 19-21 November 2013**
  Presentation on '*civic hacking and the nature of digital social innovation*' which to an audience of policy makers, practitioners and big telecommunications companies made the case for embracing the smart citizen and highlighted how DSI can address current issues with the top down driven Smart Cities agenda. Suggested several lines of action for city officials to become smarter in their use of technology to solve the cities problems inspired by the DSI research.

- **Personal Democracy Forum - 13-14 March 2014**
  Personal Democracy Forum Conference, Warsaw, Poland. March 14, 2014. Attended Personal Democracy Forum Warsaw and promoted the Digital Social Innovation mapping to hacker communities and regional organisations including sponsors of the festival 'Tech Soup' who promoted the map to their regional network. Discussions focused on how to support the particular challenges of the region when it comes to open data and also in encouraging more women to participate in learning to code through open workshops and support networks.

- **Future Everything Festival, Manchester, UK. 31 March 2014**
  Workshop with DSI practitioners on how to achieve and demonstrate lasting impact. The workshop revolved around the social innovation toolkit developed by Nesta which is designed to enhance the impact of (digital) social innovation. Through a demo of the toolkit the workshop explored how to help practitioners demonstrate impact and sought feedback on how to further develop toolkit to meet the needs of the DSI community.

- **Ouishare Fest: The Age of Communities, Paris, May 5-7th 2014**
  Ouishare is the largest conference in France focussing on the collaborative economy. Francesca Bria participated in a workshop on Collective Awareness Platforms and the collaborative economy in Horizons 2020, together with the European Commission. The DSI mapping website and the overall research was presented during a dynamic debate about policy and funding instruments for bottom up innovation. Harry Halpin (IRI) gave a 30 minute presentation of DSI to an audience of 50 people at the Mapping the Collaborative Economy session. We demonstrated how the website worked and how organisations could be added, and went over some of the high points of the final report regarding the potential of digital social innovation in Europe. Also presenting was Thomas Dönnebrink (Ouishare), Matt Scales (ZeroWaste SA),

Mira Luna (Sharing Cities Network). Over 500 copies of a specially printed postcard for DSI, translated into French by IRI, were given out at the conference. This resulted in members of the Ouishare network and Francophone community engaging with DSI.

- **Participation Practitioners Forum, Warsaw, Poland. May 29-30, 2014**
  Workshop at the Participation Practitioners Forum in Warsaw with 40 participants focusing on Digital Social Innovation and civic participation, and how best to engage the Polish DSI community. The discussion focussed on how to bridge the gap between leading digital practice and tools identified in the DSI research and the often low tech or offline activity currently used by the majority of Civic Participation Practitioners in Poland.

- **Flok / Buen Conocer Summit. Quito, Ecuador May 27 – 30 2014**
  The summit brought together 198 experts (157 domestic and 41 international) in order to generate policy proposals to boost the productive exchange matrix in Ecuador. The Summit, which was attended by community and regional leaders from around Ecuador and politicians from different administrations, aimed at finding the transition from a system based on 'finite resources' (natural resources) to one of 'infinite resources' (knowledge) economic model. The new society oriented towards the common good and based on the National Plan for Good Living, is called "Social Knowledge Economy".

- **International Conference of Social Innovation, Lodz, Poland June 17, 2014**
  Presentation to 75 people predominantly from the Eastern European Social Innovation Community on the DSI research. Discussion centred around lessons between the TEPSIE Social Innovation Research Project and findings from the DSI research and how data analysts from Lodz University of Technology could access and analyse the open data set on US DSI organisations and projects hosted on www.digitalsocial.eu.

- **FAB10 conference, Barcelona, Spain. July 3-6, 2014**
  Workshop at the Fablab community 10th anniversary gathering in Barcelona. 30 participants engaged in mapping out social action applications for makerspaces and Fab-Lab communities. Workshop exercises showed that aspirations and ideas to create social impact projects require more development and support to engage with those beyond the FabLab community more effectively if they are to become useful products and services. The discussions also highlighted the need to begin more strategic mapping of the impact created by FabLabs to inform the shape of that future support..

Liaising with other research projects and networks.

To avoid overlapping with other research projects, and to make the most of collective resources, we have engaged extensively with other related research projects to both engage their networks and access the data they have captured. This includes:

- Coordination with CAPS projects and CHEST. On 4 Feb 2014 DSI was represented at the first CAPS concertation meeting. The CAPS project representatives collaboratively mapped the synergies between the CAPs projects including involving CAPS projects in mapping their projects on www.digitalsocial.eu. Chest is considered to be the CAPs project with the strongest links to DSI. The Chest project website (www.chest-project.eu/) has a description of the DSI project along with the project logo and a link to www.digitalsocial.eu, just as we have used www.digitalsocial.eu and the @Digi_Si account to promote the Chest funding options for digital social innovation

- **TEPSIE ICT enabled social innovation research:** EU Funded research collaboration between six European institutions aimed at understanding the theoretical, empirical and policy foundations for developing the field of social innovation in Europe. One stream within this research (Work Package 8) focusses on online networks and ICT enabled social innovation.

  Shared case studies and have fed in to research through interviews and participating in events.

- **Nominet Trust 100.** Research project and website which list 100 short case studies of social innovations using digital technologies.
  Exchanged the two long lists of 300+ potential case studies developed for the NT100 research project and the DSI 1st interim study report. Ensured that all of the NT100 case studies are represented on the www.digitalsocial.eu map.

- **Young Foundation:** Research project Turning up the Dial: Digital Social Innovation in Northern Ireland which highlights ways in which the voluntary and community, private and public sectors and high-tech experts in Northern Ireland can capitalise on the potential for digital technology for social good.

  Fed in to case study selection and got support to engage DSI community in Northern Ireland.

- **Digital technologies and social innovation:** a critical perspective Research project exploring the complex interrelationship between digital technologies and social innovation. Focus on of how digital technologies act as an enabler to social innovation, and how digital technologies constraint and create the need for social innovation. Conducted as part of a research fellowship supported by Economic and Social Science Research Council, The Open University Business School, the Society for the Advancement of Management Studies and the UK Commission for Employment and Skills (UKCES).

Future engagement work planned

The engagement we have done to date and the redesign of the website has been successful in helping us map 500 organisations and establish the research project and the term Digital Social Innovation within the community. However, we are very aware that we need to continue our engagement work to increase our reach in to the DSI community.

Social Media

In addition to continuing our on-going work on engaging DSI organisations via twitter we will more actively tap in to and promote www.digitalsocial.eu in relevant LinkedIn and Facebook groups working on digital social innovation.**pcoming events**

We will be attending a number of events in the coming months:

- Open Living Labs summer school 2014. Amsterdam, Netherlands. 2 - 5 September 2014.
  Workshop on barriers to scale for digital social innovation and how these can be overcome with representatives from the international network of living labs.

- Digital Social Innovation day at Nesta, London, UK. 8 October 2014
  Half day event in London, where we with practitioners will explore what the big challenges organisations working on Open Data, Open Networks, Open Hardware and Open Knowledge need to overcome to scale their work and how they can do this.

- Crowdsourcing Week, Copenhagen, Denmark October 14 - 15, 2014
  Curating a session at the Crowdsourcing week Scandinavia event, focusing on Digital Social Innovation to an audience of corporate executives, government officials and entrepreneurs.

- SIX and TEPSIE Social Innovation final event Lisbon, November.

- Final DSI event. Brussels, Belgium, December 16th 2014
  Organised in partnership with the CAPS projects the final DSI event will present the findings from the research project to a high level audience of policy makers, practitioners and members of European Parliament.

Other media

- Short film on digital social innovation.
  We are currently in the midst of commissioning a short film (5 minutes) on Digital Social Innovation. The film will feature leading thinkers on social innovation and the practitioners we have engaged through the case studies. To overall purpose is to explain in simple terms what we mean by DSI and what the potential is in using digital technologies for social innovation. From previous experience this will really help to engage more people and get them on the map.

4. Assessing Innovation Strategy" (WP3): Innovation policy and the need to reinvent policy

4.1 Innovation Policy at a European level

Innovation is no longer seen as a linear step-by-step process in which R&D activities automatically lead to innovation and commercialisation of new products, but as a complex, dynamic, and interdependent process of many organisations and stakeholders: Policy (at all levels) can play a key role in creating coordinated strategies, common governance frameworks, and new instruments to enable an innovative response to challenges in specific domains.

Innovation policy is defined as public intervention to support the generation and diffusion of new products, processes or services. Public policy can accelerate and enable developments that are societally desirable, such as those that aim at supporting long-term R&D investment and economic growth, whilst reducing income inequalities, and increasing competitiveness. Public intervention can also happen along three pillars of 1) market failures (information and incentive asymmetries, externalities) and 2) system failures (mainly concerned with connectivity and individual and organisational capabilities) as well as the need for 3) framework conditions and public action to establish markets.

Innovation and innovation policy are not new to the European Union. The current economic and financial crisis is an opportunity to propose a new model for European innovation. Delivering on the Europe 2020 objectives of smart and inclusive growth depends on research and innovation as key drivers of social and economic development and environmental sustainability. The Digital Agenda for Europe2 [1], Innovation Union3 [2], and Horizons 2020 [3] present an integrated approach to help the EU economy become more competitive, based on sustainable and inclusive growth fuelled by energy and resource efficiency. Europe is now focused on providing an innovative response to societal challenges such as globalisation, aging population, youth unemployment, resource constraints and so forth. GDP slow-down since mid-2011, environmental disasters, climate change, an ageing population, and growing unemployment will require innovative solutions that challenge traditional ways of doing things, such as moving from closed innovation models to open and collaborative innovation that can unleash the power of social production and collective intelligence.

In the European context, innovation has been often linked to competitiveness and, in this respect, the European Union innovation message has been present during the last decade in several policy documents aimed at boosting competitiveness such as the Renewed Social Agenda, the Integrated Lisbon Guidelines for Growth and Jobs 2005-2008 and 2008-2010, the Strategic Guidelines and Regulations on Cohesion Policy (2007-2013), the second pillar of the Common Agricultural Policy, the Sustainable Development Strategy for an Enlarged EU, the 2020 Vision for the European Research Area, the Innovation Union (a Europe 2020 Initiative), the European Information Society for Growth and Employment, and the Digital Agenda (a Europe 2020 Initiative).

Many programmes and supporting schemes have been used in this period. For instance, the European Regional Development Fund to promote regional cohesion, the European Social Fund, the Open Method of Coordination, the European Agricultural Fund for Rural Development, the Framework Programmes for Research and Technological Development, the Lifelong Learning Program and other education and cultural programs (such as Youth in Action or MEDIA), and the Competitiveness and Innovation Framework Programme are only a few examples.

Generally speaking, the European Commission has supported innovation and social innovation by means of funding. But other tools have also been used. The document "Empowering people, driving change: Social Innovation in the European Union" refers to instruments which cut across various European programmes, such as:

- **Knowledge sharing and dissemination:** Some examples include building of knowledge and good practice bases and repositories, European exchange platforms, and the building of cooperation networks to share practices and develop collaborative processes. Specific initiatives include the broadband portal[4] or the ePractice portal[5].

- **Participative processes for stakeholders in the preparation and implementation of policies:** Some examples of multi-stakeholder processes that have already been implemented include the Healthy Democracy process[6] and the Thematic Networks of Twinned Towns & Citizens Meetings[7].

- **Policy coordination and capacity building:** This includes initiatives aimed at increasing the level of coherence, consistency and integration of polices carried in different regions and Member States. Some interesting examples include the organization of learning seminars, the establishment of clusters of policy makers, or the establishment of learning communities.

- **Supporting studies, research and evidence of good practice for policy planning and policy development and for advancing knowledge on social innovation:** Some initiatives regarding this tool are evidence building (such as the European Union Youth Reports - http://ec.europa.eu/youth/policy/implementation/report_en.htm) and social platforms (such as Social Polis - http://www.socialpolis.eu/).

- **Support of social experiments:** This implies the engagement of various actors and stakeholders in designing and putting in practice novel ways to tackle a social demand. Some projects that use this approach include Medlab (http://www.medlivinglab.eu/), HerO (http://urbact.eu/en/results/results/?resultid=1), or epSOS (http://www.epsos.eu/).

- **Support of social entrepreneurs and enterprises:** An example of an interesting project launched under this category is Erasmus for Young Entrepreneurs (http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/erasmus-entrepreneurs/index_en.htm).

- **Infrastructure and enabling factors:** This tool aims at contributing to developing a climate that is conducive to learning through social innovation and transnational exchange as well as the infrastructure to back it up. Several initiatives have taken place in this respect, such as investing in developing a high-speed broadband in rural areas or setting up cross-border regional projects to shorten the digital divide.

Although European Union interventions in the innovation field have been considerable and diverse, their potentially powerful effect on producing change and encouraging innovation has been limited. Edler et al (2013), who summarise the Compendium of Evidence on the Effectiveness of Innovation Policy Intervention Project, led by the Manchester Institute of Innovation Research (University of Manchester) and funded by Nesta, conclude that there is not much evidence of impact and, although the effects of innovation policies and programmes show variations across policy domains and within specific areas, there is still a need to make sure that innovation policy will support societal challenges and economic growth better in the future. In summary, there is a need to reinvent European innovation public policies to guarantee transformational impact.

The European Competitiveness Index 2013, which measures, compares and examines the competitiveness of Europe's regions and nations[8], also shows that new innovation policies are needed in Europe in order to bridge the gap among countries and to boost competitiveness in many European regions:

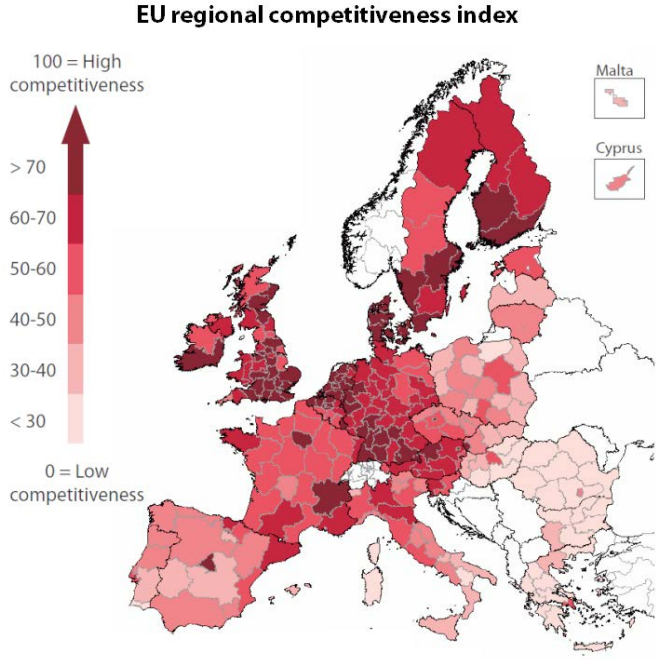


Figure 5 EU regional competitiveness index. Source: European Commission

Digital Innovation in the Digital Agenda and Horizon 2020

Europe has started down the path of making digital innovation part of its agenda. On December 2010, Neelie Kroes, Vice-President of the European Commission responsible for the Digital Agenda gave a speech named "Unlocking the digital future through Open Innovation" during the 4th pan European Intellectual Property Summit, in which she clearly stated that openness is central to success in the digital revolution and that Europe should invest in user-driven innovation.

The recently launched Open Data Strategy for Europe[9] established a level playing field for open data across the EU[10] that should encourage disruptive innovation by unlocking the value of public data. Since then, Mrs Neelie Kroes launched the "No Disconnection Strategy"[11] to support decentralised infrastructures for the Internet as a means of effectively empowering citizens and democratic participation. EC-funded research has also made many steps in the direction of distributed and citizen-centric innovation. This has been enabled by changes in policy to support the creation of innovation ecosystems and partnerships that can play a central role in the development of Future Internet platforms, thereby shaping the evolution of the Internet and of social spaces.

In recent years, new methods to foster entrepreneurship and innovation have grown rapidly across the world. For instance new methods of better supporting the growth of innovative startups have emerged, driven by investors and successful tech entrepreneurs such as accelerator and combinator programmes.[12] Early evidence suggests they have a positive impact on the economy and society, creating powerful networks and fostering better digital entrepreneurship.[13]

The real question is how these positive beginnings can scale to enable new forms of social innovation to emerge to tackle societal challenges, such as unemployment, clean and renewable energy provision, poverty, to improve public services such as education and health, and to promote new fair and sustainable economic models.

To answer these challenges the European Commission has promoted various policy and research actions, including envisioning different kinds of Internet infrastructure in the Future Internet programme.

Considering the level of complexity that the Internet Ecosystem has reached, and the potential significance of the interactions between Internet and societal developments, **a systemic, holistic and multi-disciplinary approach** is needed.[14] Only by adopting a multidisciplinary research approach that encourages researchers from various disciplines to work together, can issues such as trust and security, privacy, net neutrality, e-democracy, and e-governance be tackled. Future Internet developments should, therefore, include technologically-led research, together with business models and socially and environmentally conscious approaches, as reflected in the Internet Science Network of Excellence funded by the European Commission.[15]society in Future Internet development to achieve these goals is one of the main goals of this study.

DG CONNECT activities in this area can be summarised under two broad approaches, encompassing several initiatives:

- **Top-down and systemic approaches:** The most relevant initiatives are the European Innovation Partnerships[16], Smart Cities[17], the Future Internet Public-Private Partnership Programme (FI-PPP)[18], and the European Cloud Computing Strategy[19]. Their main goals are to promote and standardise pan-European technology platforms, as well as the integration of the relevant policy, legal, political and regulatory frameworks. As clearly outlined in the Digital Agenda for Europe, these are prerequisites for the creation of a European online **Digital Single Market** (DSM). The development of the **Future Internet** is mainly addressed through a number of mainly technical objectives and projects, such as the **FI PPP**[20] and the **5G infrastructure PPP**[21]. Other relevant activities are on ICT for health, inclusion, government, sustainable growth, energy and sustainability,[22] learning, tele-care applications and so forth. There are also a number of projects in the areas of eInclusion, eHealth, participatory planning,[23]and eGovernment[24] [25]. Furthermore, a EU Big Data strategy is becoming a priority for the competitiveness of European industries, and it presents a strong focus on fostering a European Data-driven Economy[26]. In this framework the EC is promising to launch a launch a **multi-million euro Public Private Partnership on big data** with industry towards the end of this year. The focus is business driven, with little attention to societal challenges or to the inclusion of civil society actors and bottom-up approaches. However, the call for the creation of an **open data incubator** within Horizon 2020 aims to help SMEs set up supply chains, and to get access to cloud computing and legal advice. Further support, investment advice and funding for SMEs and young companies is also available through the Commission's **Startup Europe** programme for web and tech entrepreneurs. Other activities are happening in the **Internet of Things (IoT)** arena, where the **IERC-**

Internet of Things European Research Cluster[27] coordinating the different IoT projects funded by the European research framework programmes.

- **Bottom up and grassroots approaches:** A counterpoint to the top-down strategy is the bottom-up, human-centred, grassroots approach that is characterised by emergent forms of community intelligence demonstrated by newly connected bottom-up innovation eco-systems. At a time when the Internet has become so central in our societies, it is important that bottom-up approaches (based on the involvement of users) more often complement traditional top-down approaches that can help build resilience through user empowerment;for instance in energy, mobility, government services, technology design, quality of care, education and working patterns. One of the risks of Future Internet is that big industrial players (mainly US-based) will reinforce their dominant position by implementing platform lock-in strategies, enforcing extensions of copyright and patents, and discriminating network traffic. Furthermore, by re-centralising computing, data storage and service provision according to the cloud paradigm there is a risk of closing the innovation ecosystem in favour of incumbents or dominant players, and thus eventually restricting user-driven innovation. There is tremendous potential value in the emergent Digital Social Innovation sector.[28] Relevant initiatives that employ a bottom-up approach towards SI are **The Collective Awareness Platform for Sustainability and Social Innovation (CAPS)**[29], Web entrepreneurs, young entrepreneurs in the field of active and healthy ageing, digital champions, innovation camps and so on. Many activities are also promoting and exploring the potential of open data, open Access, and the digital commons. In particular it is the forthcoming research area in DG CONNECT that addresses the need to facilitate SI processes and collective decision making through **platforms that foster collective intelligence (CAPS)**[30]. The potential for crowdsourcing, community-based innovation, or collaborative innovation in the Internet domain should be thoroughly explored. These platforms can gather and integrate information in order to allow participation and citizens' feedback, as well as integrating peer information to improve social cohesion and collective wellbeing. Furthermore, there are systemic initiatives in the areaof **Open Access**,[31] such as **Global System Science**[32], providing scientific evidence to support and civil society to collectively engage in societal actions and policy making. Another relevant initiative within the broader domain is **Digital Science**[33], which has synergies with DSI because and **Art & ICT**[34], which promotes a conscious dialogue between technology, the Arts and societal issues to expand our understanding of technology in today's societies. Finally, new initiatives launched in Horizon 2020 on **Human-centric Digital Age**[35] and **Responsible Research and Innovation**[36], aim to promote societal engagement, gender equality and gender in research and innovation content, open access, science education and ethics across all research initiatives.

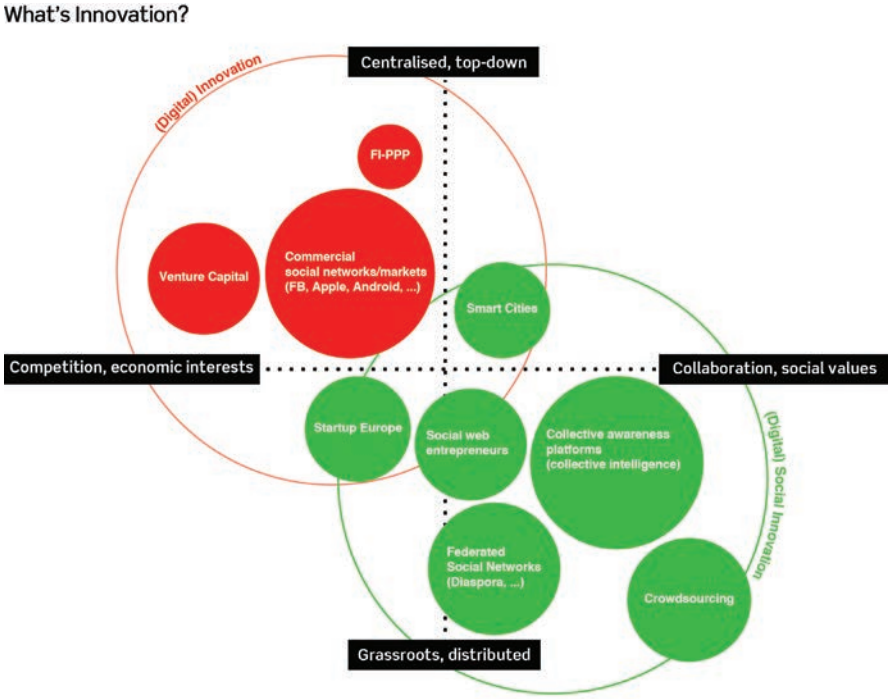


Figure 6 Grassroots Innovation in Europe: adapted from Sestini, F 2012 presentation Collective Awareness Platforms for sustainability and social innovation

4.2 The concept of innovation ecosystems

According to Chesbrough (2003), open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology. It implies innovating with partners by sharing risk and sharing rewards. Chesbrough (2003) and Forrester (2004) define the main divergences between the principles of closed and open innovation (see Table 1).

	Closed innovation	Open innovation
Corporate ethos	"Not invented here" We can do it, we will do it Creation of the best idea internally	Best from anywhere Choosing the best ideas among internal and external ideas
Role of customers	Passive recipients	Active co-innovators
Core competency	Vertically integrated product and service design	Core competitive differentiation and collaborative partner management
Innovation success metrics	Increased margins/revenues, reduced time to market, market share within existing market	R&D ROI, breakthrough product or business models
Attitude towards intellectual property	Own and protect Do not share internal intellectual property	Sharing internal intellectual property can be profitable Buy/sell: the corporation is a knowledge broker using both licensing and commercial development to monetize intellectual property
Role of R&D and operations	Internal R&D is the only way to create profit Discover, design, develop, and market in-house inventions	External R&D can also create profit and value Use the third partners for discovery, development and delivery of products Optimize performance of own assets through both in-house and external development; do enough R&D internally to recognize external significant R&D
Advantages	First movers advantage	Having better business models is more important than being a first mover
Employees	Professional employees inside the company	Working with professional within inside and outside the company

Table 3: Comparison between closed and open innovation

Despite open innovation being born in relation to the industry and the business world, several authors think this theory can be easily implemented in different fields. Today information technology is opening up new opportunities to transform governance and redefine government-citizen interactions, particularly within cities (Chan, 2013; Pyrozhenko, 2011; Almirall & Wareham, 2008).

The open innovation perspective adds value to the policy-making cycle. Open and iterative problem solving oriented models of public policy innovation are significantly different from traditional public policy innovation. Open public policy innovation implies a lifecycle-oriented perspective towards openness, which spans both the early creative stages of ideation and the latter stages of experimentation and implementation. It is not just concerned with mechanisms to source creative ideas from scientists and creative talents but is also interested in the later stages of experimentation and implementation. Brunswicker et al (forthcoming) differentiate between closed and open public policy processes (see Table 2)

	Closed public policy	Open public policy
Problem-solving process	Linear stages of solving public policy problems	Integrated and lifecycle oriented problem solving activities ranging from problem exploration to policy implementation
Problem-solving knowledge	Knowledge from inside governmental boundaries and designated experts (technocrats)	Knowledge and information from inside and outside the organizational boundaries of governments
Decision making principle	Rationale and based on traditional information sources	Behavioural, design-led and data-driven
Network structure	Centralized and hierarchical	Decentralized and digitally connected

Table 4: Closed versus open public policy innovation processes

Several policies may benefit from open public policy innovation. De Jong et al (2008) give some examples and refer to RTD policies, interaction-oriented policies, entrepreneurship policies, science policies, education policies, labor market policies, and competition policies.

However, the open innovation perspective assumes that innovation is the result of complex and intensive interactions between various actors. Thus, innovation happens in innovation ecosystems, that is, integrated and interdependent environments where companies, scientists, policymakers, governments, users, developers, citizens, and other communities can interact productively to promote radical change. Innovation in these ecosystems is usually supported by new developments in information and communication technologies.

The resources, facilities, and competences shared among the various actors form the core of ecosystems and define their innovation potential. The complexity of the innovation ecosystem is further amplified by the fact that the networks are increasingly open and cross-border by nature, and they are governed by open business models.

As the table below shows, nowadays, open innovation does not only involve companies or does not only aim at profit making; it is a concept that is about maintaining communities and enabling processes in a continuous way.

2003	2014
Dyadic relationships company to company	Multiple relationships (ecosystems)
Own the innovation	Innovation of others
Buy & license	Foster & enable
Intellectual property	Governance business models
Intermediaries for search	Intermediaries for enabling processes and maintaining communities
Incubators	Accelerators
Competing with your own products and services	Competing with the ecosystem
Governments as service providers: resources to regulate (zero-sum game)	Governments as platforms orchestrators: resources to leverage on (non zero-sum game)
Governments as service providers: developed in-house, always fall short, high cost, no sharing, local offer, fragmented	Governments as platforms orchestrators: co-developed with users and communities, free and not free, empowering entrepreneurship, driven by innovation, stimulating growth

Table 5: Open innovation 2003-2014 - Source: Almirall (2013)

4.3 Communities in the innovation ecosystem

In this section, we will refer to six specific communities that have a core role in the European innovation ecosystem. This typology of communities matches the main technology trends emerging in the grassroots innovation space (e.g. open data, open knowledge, open hardware, open networks), and identifies the key

communities that are enabling new forms of digital innovation.

The open hardware and free software communities

The open source community is a broad-reaching community of individuals who share an open source philosophy/culture, described by Wikipedia as the creative practice of appropriation and free sharing of found and created content. The open source culture is therefore one in which fixations (works entitled to copyright protection) are made openly available. Participants in the culture can modify those products and redistribute them back into the community or other organisations.

Although in the beginning of the movement, a difference between hardware and software did not exist, nowadays, we distinguish between the open source software community and the open source hardware community. The individuals who participate in the former support the use of open source licenses that make software available for anybody to use or modify as its source code is made available. The open source software community is formed by programmers who support the open source philosophy and that contribute to the community by voluntary writing and exchanging programming code for software development. There are several examples of software that have been developed under an open source philosophy. Some of them are Mozilla, Apache, OpenOffice.org, or PHP.
The open source hardware community is formed by individuals that design hardware (that is, tangible artefacts: machines, devices, or other physical things) and make it publicly available so that anyone can study, modify, distribute, make, and sell the design or hardware based on that design. Often, individuals gather around specific organisations or projects. This is the case for Arduino, an open source electronics prototyping platform based on flexible, easy-to-use hardware and software, which is intended for artists, designers, hobbyists and anyone interested in creating interacting objects or environments.

The community of developers

Developers are individuals who develop a new IT product or service. They come up with an idea of an IT-based product or service and want to commercialise it. That is why, often, this community is also considered as a community of entrepreneurs or start-ups. Because they are usually very small, developers that frequently gather around innovation clusters or events, such as Silicon Valley, the F6S network, or Fest-UP, Barcelona's start-up festival.

Innovation Labs: Living labs, Fablabs, Maker spaces

According to Almirall & Wareham (2008), living labs are commonly public-private partnerships committed to communities that contribute to their funding. Also, they provide a wide range of services and play diverse roles in the quest for articulating user involvement, from support to entrepreneurial lead users to needs-finding or user experience services. Actually, their goal could be described as the creation of "innovation arenas" where multiple actors can experiment in an open, real life environment. As a result, living labs are a great place for open innovation.

There is a large number of living labs in Europe with a variety of different characteristics. Some focus on a particular technology such as mobile communications, others focus on a particular industrial sector, others focus on groups of services to local citizens. We can therefore speak of urban labs (living labs methodologies and spaces applied in a urban context, such as Barcelona Urban Lab or the Lorraine Smart Cities Living Lab) or fablabs (technical prototyping platforms for innovation and invention, providing stimulus for local entrepreneurship, such as Ping in Nantes, Aalto FabLab, or Fabulous St. Paulis in Hamburg), just to give a couple of examples.

Also, there is a tendency nowadays for small groups of living labs in different regions of Europe to join forces by sharing knowledge, services and even developments based on win-win strategies to pave the way for co-selling developments and services on the European or global market, rather than just in their local regional market. These living labs usually set up networks around specific issues, such as rural topics, e-democracy, or energy efficiency.

The open data and open knowledge community

Torkington (2010) suggests five types of people that are interested in open data: 1) governments who want to see a win from opening their data, 2) transparency advocates who want a more efficient and honest government, 3) citizen advocates who want services and information to make their lives better, 4) open advocates who believe that governments act for the people, therefore, government data should be available for free to the people, and 5) people who are hoping that releasing datasets will deliver economic benefits to the

country.

In this report, the open/big data community refers to the set of governments, usually at the local level, that decide to open their data. Their goal is usually two-fold: on one hand, they aim at being more transparent; on the other, they pursue to increase economic value by involving developers and entrepreneurs. The commonly accepted premise underlying these objectives is that the publishing of government data in a reusable format can strengthen citizen engagement and participation and yield new innovative businesses.

There are many examples of cities that have opened their data. One of the most interesting is Helsinki, which has become the most successful open data city in the world. Through and entity called Helsinki Region Infoshare[37] Helsinki and three of its neighbouring cities publish all of their data in formats that make it easy for software developers, researchers, journalists and others to analyse, combine or turn into web-based or mobile applications that citizens may find useful. There are other local governments around the world that are successfully developing open data portals. In the United States, the cities of Chicago, San Francisco, Philadelphia, and New York are only a few examples worth mentioning. British Columbia in Canada, the region of Piedmont in Italy, and Metropolitan Rennes in France have also set up open data websites at the regional level that can be considered good practices.

Smart citizens

Crowdsourcing is an online, distributed problem-solving and production model that has grown in use in the past decade. Estellés-Arolas & González-Ladrón de Guevara (2012) specifically define it as a type of participative online activity in which an individual, an institution, a non-profit organisation, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task.

While many of the successful cases of crowdsourcing have been related to companies, cities are also beginning to benefit from crowdsourcing methods to gather input from residents and apply the information they receive to make tangible improvements to communities and neighbourhoods. Some cities participate cooperatively in initiatives led by the private sector through web-based platforms. Others are taking the initiative to license tools and apps that bring local residents into the ideation and decision-making processes that lead to developments and actions to improve communities.

Smart citizens are those individuals who take part in crowdsourcing initiatives to improve policies or to co-develop public services. These are active and engaged citizens who want to play a role in building their own city, sharing information and knowledge, creating a network and getting involved in decision-making and implementation processes. There are many examples of this collective intelligence or communities of smart citizens. One of them is Challenge.gov[38] a collection of challenge and prize competitions, all of which are run by more than 50 agencies across federal government. These include technical, scientific, ideation, and creative competitions where the US government seeks innovative solutions from the public, bringing the best ideas and talent together to solve mission-centric problems. Another pretty different one is FLOK Society in Ecuador[39] a networked participatory process and open research project to create policy proposals and political actions to transition Ecuador to a social knowledge economy.

The open democracy community

Beyond crowdsourcing (and co-producing/co-creating/co-managing g/… for that matter) public services, citizens and organiszations can also get involved in the political decision-making process (that is, in the policy-making process) or in any other established political/democratic processes. What has, in the past, traditionally be known as e-participation is now referred to as open democracy or crowdsourcing democracy. Within this framework, the open democracy community gathers individual and organisational political activists that want to contribute to the evolution of democracy in the electronic age.

There are many examples of open democracy initiatives and activists. Crowdsourcing was used in Iceland in 2010 and 2011 in the constitution reform process. Participatory budgeting is a process of democratic deliberation and decision-making, in which ordinary people decide how to allocate part of a municipal or public budget. Although originally started in Porto Alegre (Brazil), nowadays, several cities worldwide are engaged in this process. Interesting cases are those of local governments in the UK, the cities of Calgary and Toronto in Canada, or the city of Chicago in the United States. Another example is that of the 15M movement in Spain, which has been defined as a series of on-going demonstrations that started back in 2011 and that have become stronger by means of intensely using social media and civic digital platforms.

4.4 Macro analysis of communities

In this section, a macro analysis of the communities that have been identified and described in section above is conducted. Our aim is to understand how these communities function and how they work. We are particularly interested in their weaknesses, for these may turn into areas of public intervention through policy development. In particular, for each of the communities, we will refer to focal actors, enablers, governance, and failures. Table 4 summarizes the content of this section.

Communities	Focal actors	Enablers	Governance	Failures
Open source hardware and software	Open source activists	Firms supporting open source activists Communities Open source platforms	Peer governance	High entry barriers (technological skills) Lack of conflict-resolution mechanisms Tension between hierarchy and equality
Developers	Developers Entrepreneurs	Tech events Accelerators/incubators Venture capital firms Tech blogs and magazines	Decentralized Cluster governance	High entry barriers (technological skills) Lack of interconnection between developers Lack of visibility
Innovation labs	Innovation labs themselves	Networks	Networked Formal enabling/servicing structures	Lack of interconnection between different types of labs Cost of being a network member Difficulty to involve the community
Open/big data	(Local) governments	Competition organizers Networks of developers Open data evangelists	Top-down (governments decide what, when and how to open)	Lack of standardization Lack of reuse Little sharing of good practices Lack of visibility of datasets Apps' discovery problem Internal conflicts in governments
Smart citizens	Citizens	Intermediary organizations providing structure	Project-based Use of social media platforms	Lack of interconnection between citizens and between initiatives Lack of awareness Lack of skills
Open democracy	Political activists	Organizations Evangelists	Distributed Use of social media platforms	Lack of interconnection among groups

Table 6 Macro level analysis of the innovation ecosystem

The open source hardware and software communities

Within this wider community, two movements can be identified: the open source software community and the open source hardware community. In both cases, the **focal actors** are the activists: either they support the use of open source licenses that make software available for anybody to use or modify as its source code is made available (open source software activists) or they support the open source philosophy and contribute to the community by voluntary writing and exchanging programming code for software development (the open source hardware activists).

Firms, organisations, and not-for-profit communities supporting open source activists are considered **enablers** within the open source community. For example, Canonical[40] was created alongside Ubuntu to help it reach a wider market. They ensure that Ubuntu runs reliably on every platform from the PC and the smartphone to the server and the cloud. Along the same lines, the development of Arduino[41] has taken place around a community of Arduino enthusiasts that includes region-specific groups and special interest groups. The community is an excellent further source of support on all Arduino-related topics. The P2P Foundation[42] is a third example of an organisation that supports the open source community and is, therefore, an enabler. It focuses on studying, researching, documenting and promoting peer-to-peer practices in a very broad sense. Among some of its guiding ideas, the P2P Foundation supports the principles developed by the free software movement, in particular the General Public License, and the general principles behind the open source and open access movements. It believes that these principles provide for models that can be used in other areas of

social and productive life. One last example is that of the Open Source Initiative[43], a Californian public benefit corporation, founded in 1998, aimed at educating about and advocating for the benefits of open source and at building bridges among different constituencies in the open source community.

Open source platforms are also enablers within the open source community. The best example of them is GitHub[44] a web-based hosting service for software development projects that use Git, an open source version control. It is home to over 13.1 million repositories, making it the largest code host in the world. Other technological tools get developers in touch and facilitate the exchange of resources and information. It is the case of the Arduino Playground (http://playground.arduino.cc/), a wiki where all the users of Arduino can contribute and benefit from their collective research.

Regarding **governance**, the open source community works under the principles of peer governance, a bottom-up mode of participatory decision-making. According to Coffin (2006), openness, networking, participation and transparency appear as the main characteristics of peer governance. Bauwens (2005) adds equipotentiality and holoptism. The former means that everyone can potentially cooperate in a project, that no authority can pre–judge the ability to cooperate. In open source projects, equipotential participants self–select themselves to the section to which they want to contribute. The latter refers to the ability for any part to have horizontal knowledge of what is going on, but also to have the vertical knowledge concerning the aims of the project. Bruns (2008) also characterizes open source communities as heterarchies, meaning that they operate in a much looser environment, which allows for the existence of multiple teams of participants working simultaneously in a variety of possibly opposing directions.

According to Fogel (2006), the possibility to fork[45] is central to the governance of any open source community, although the author particularly refers to open source software communities. The shared ownership of open source projects allows anyone to fork a project at any time. Therefore, no one person or group has a magical hold over the Project. Since a fork involving a split of the community can hurt overall productivity, Fogel (2006) notes that the potential to fork a programme is the indispensable ingredient that binds developers together.

Finally, Stadler (2008) submits that leadership in open source projects is not egalitarian, but meritocratic. In this respect, Coffin (2006) highlights the necessity for a benevolent dictator, who is the leader of the project and the person who alone has all the power to make decisions. Often, this authority is a natural consequence of the leader being the founder of the project, such as Linus Torvalds for Linux or Jimmy Wales for Wikipedia.

Despite its many benefits, open source communities also experience some **drawbacks**. The following are some of the most significant:

- High entry barriers: anyone can be part of an open source hardware or an open source software community but in order to be actively engaged, good technological skills are needed. That is why many texts and documents refer to individual open source activists as programmers committed to the open source philosophy. The level of contributions or the type/strength of technological skills seem not to matter that much because as previously stated, there is equipotentiality in an open source community.

- Lack of conflict-resolution mechanisms: The case of Wikipedia, and its internal struggle between deletionists and inclusionists, has been widely studied and analysed as an example of an open-sourced peer project characterised by having unclear governance rules and an uncoordinated structure, as well as by lacking a functional conflict resolution process for content dispute. During conflicts, persistent, well–organised minorities can adroitly handle and dominate their opponents. The values of communal evaluation and equipotentiality are subverted by such practices. According to O'Neil (2009), these attributes challenge the sustainability of the projects.

- Tension between hierarchy and equality: Benevolent dictatorship is usually exercised over developers' contributions, which means that this type of leader has little/marginal influence over the behaviour of individual developers. For the leader's decisions to be received as legitimate, they have to be consistent with the consensus of the opinions of participating developers. In this respect, his/her role is not that of a boss or a manager in the usual sense. This results in a tension between hierarchy and equality, which has to do with the degree of control exercised by project administrators over the changes and modifications contributed by the base of developers. This tension is usually stronger in projects which, like Linux, invest one developer (or a sub-group of developers) with the authority to accept or reject contributions by the community of developers.

The community of developers

In section 5.3, developers were defined as individuals who develop a new IT product or service. They come up with an idea of an IT-based product or service and want to commercialize it. That is why, often, this community is also considered as a community of entrepreneurs or start-ups. Developers and/or entrepreneurs are, precisely, the **focal actors** of this community.

Because developers usually work alone and start-ups are typically very small, they frequently gather around innovation events or networks, which are considered **enablers** of the community. There are several examples of them. Fest-UP[46] is one of them. During one week in May, the start-up community comes together in Barcelona and participates in different activities such as workshops and competitions. Montreal International Startup Festival is another example[47] Since 2011, each year, over 2,000 founders, investors, and analysts converge on Montreal from more than a dozen countries to attend workshops and interactive how-to sessions or to listen to keynote speeches or presentations from founders.

Entrepreneurs and developers also use social networks to get in touch with one another. Some of the most popular social platforms include Entrepreneur Connect[48] and Startup Nation[49]. They read blogs and tech magazines as well. Some of them belong to entrepreneurs themselves like Steve Blank's[50], Joel Gascoigne's[51] or Ryan Carson's[52] Others are maintained by different people, organizations or companies and post interesting messages about marketing (such as Startup Marketing[53]-), venture capital (such as The Startup Lawyer[54]), or technology news (such as The Next Web[55]), to name a few examples.

Accelerators and incubators are another type of enablers. Both accept early start-ups that have a potential commercial viability and they both provide an environment that is meant to serve the needs of a start-up. However, there are a few differences between them. For instance, an accelerator is usually a fixed-term programme that provides start-ups with the network and training they need to grow their businesses. Through its Accelerator, for example, Code for America provides seed funding, office space, and mentorship to civic start-ups[56]. The incubator focuses on providing the prerequisites for a company to develop, such as housing, expertise and business contacts. Further, the costs associated with administrative functions within a company may be subsidized as well. InnoEnergy Highway[57] for example, is a European incubator with interesting attributes: it has six entry points, it is specialized in sustainable energy, and they provide value in four key axes (technology, market, people, and finance).

There are nearly 100 accelerators in Europe. Y Combinator[58] was the first of its kind when it started back in 2005 and its success inspired many others. Nowadays, the biggest names are international start-up accelerators such as TechStars[59] Seedcamp[60]or Startbootcamp[61] But there is an increasing number of big corporation-backed accelerators, such as Wayra from Telefónica[62] or Orange FAB from Orange[63], and a plethora of regional start-up acceleration programs.

Finally, venture capital can also be considered as an enabler in relation to the community of developers and entrepreneurs. Wikipedia defines it as financial capital provided to early-stage, high-potential, growth start-up companies. The venture capital fund earns money by owning equity in the companies it invests in. There are many venture capital firms, many of which usually invest in technology start-ups. Accel Partners[64], Founders Fund[65] ,and Greylock Partners[66] are only a few examples in the United States.

Regarding **governance**, entrepreneurs usually work in isolation. However,s previously stated, they might attend events or join social networks to interact with other individuals or they might gather around other enablers. Anyhow, members of the community tend to cluster round topics. For example, in his book Start-up communities, Feld (2012) refers to the five clusters the start-up community of Boulder (Colorado, United States) is divided into: tech (software/Internet), biotech, clean tech, natural foods, and lifestyles of health and sustainability. Feld (2012) states that these clusters can be considered as networks for their members do not lend themselves to a command and control system. The community is also decentralised. Entrepreneurs and developers may come together at the local level, especially when their interests converge on developments related to a specific geographic setting, such as public service-related apps for a particular city hall.

The community of developers and entrepreneurs is not exempt from failures. The following are some of the most important:

- High entry barriers: Previously, developers have been defined as individuals who develop a new IT product or service. Therefore, they need to have technological skills in order to be able to develop such product or service. People who lack these skills are not able to enter the community. Also, and very related to this issue, last March 2014, the Startup Institute[67], a career accelerator that aims to equip

individuals with the skills required to work in a start-up, revealed in a survey to 100 firms across the United States and Europe, that staffing issues are holding start-ups back and causing them to fail because they lack the skills to execute on ideas (and, particularly, they refer to technical and technological skills).

- Lack of interconnection between developers: As stated earlier, developers tend to work in isolation. Despite gathering around certain events and activities or participating in social networks, they usually are disconnected and, at any rate, they cluster round specific topics. As a consequence, products and services are the result of individuals' bright ideas and, only to a small extent, of cooperative work
- Lack of visibility: This way of working, combined with the fact of the small size these entrepreneurs have, result in a lack of visibility. Many new IT-products and services just go unnoticed. This has further consequences. One of the most important has to do with funding. Lack of visibility and knowledge usually results in lack of external investors that can make a new business grow. Actually, the Startup Institute's survey reports that the second most popular reason cited for start-up failure is a lack of funding. This lack of visibility has also consequences in terms of capturing value.

Innovation Labs: Living labs, Fablabs, Maker spaces

Living labs have already been described in section 5.3 as commonly public-private partnerships committed to communities that contribute to their funding. They provide a wide range of services and play diverse roles in the quest for articulating user involvement, from support to entrepreneurial lead users to needs-finding or user experience services. Within the innovation ecosystem, there is a wide community of living labs, which are the **focal actors** of such communities.

At the same time, this community includes several types of living labs. One of them is urban labs; living labs methodologies and spaces applied in an urban context. An urban lab is a tool to facilitate the use of public spaces in cities, to carry out tests and pilot programmes on products and services with an urban impact, which are in the pre-market stage and in line with the city government's aims, priorities and lines of action. The idea behind the urban lab is to use the city as an urban laboratory. The recourse to experimentation has become recurrent by implementing the idea of the intelligent/smart city. The city is in this way transformed into an immense "laboratory" of tests and analyses. Marres (2012) explains that, in this context, different cities are carrying out smart urban innovation experiments, linked to environmental protection, the development of new digital applications or services, or green living experiments. One interesting example is that of Barcelona[68]. Barcelona Urban Lab was created to facilitate the use of urban space in the city of Barcelona as an urban laboratory available to companies that need to test their products and services in a real environment. These pilot products and services have to respond to an unmet municipal need and must provide a new service that helps to improve people's quality of life.

Another type of living lab is the fab lab. According to Wikipedia, a fab lab (short for fabrication laboratory) is a small-scale workshop offering (personal) digital fabrication. It is generally equipped with an array of flexible computer-controlled tools that cover several different length scales and various materials with the aim to make "almost anything". There are several fab labs in different parts of the world. Again, it is worth mentioning the case of Fab Lab Barcelona[69], which is one of the most important fab labs in the world. It coordinates the global programme Fab Academy, which provides advanced digital fabrication instruction for students through a unique, hands-on curriculum as well as access to technological tools and resources. Fab Lab Barcelona also develops different types of projects such as IAAC Hyperhabitat, the Fab Lab House[70] or Smart Citizen[71]. Fab Lab Barcelona was founded by the Institute for Advanced Architecture of Catalonia[72] in collaboration with the MIT's Center for Bits and Atoms[73]

Barcelona is home to other fab labs or fabrication athenaeums, which are run by the Barcelona City Hall under the same philosophy than fab labs although with, maybe, a little more emphasis on social inclusion. The City Hall plans to have an athenaeum in each of its districts although, so far, only two have opened their doors (Les Corts - http://ateneulescorts.com/ and Ciutat Meridiana).

Living labs gather in networks, which are the enablers in this community. There are general networks and networks around specific issues. The European Network of Living Labs (ENoLL) (http://www.openlivinglabs.eu/) is an example of the former. It is a community of living labs with a sustainable strategy for enhancing innovation on a systematic basis. Its overall objective is to contribute to the creation of a dynamic European innovation system. It has a Council, which provides strategic guidance to the network. It is also responsible for the implementation of the work programme, in line with the budget. ENoLL has five operational work groups under the Council as well as several thematic subgroups. It offers different types of services to its members depending on the fee they pay: certification, communication and promotion, project development, and

learning and education activities are only a few examples. The Fab Foundation (http://www.fabfoundation.org/) is an example of the latter. It was formed in 2009 to facilitate and support the growth of the international fab lab network through the development of regional fab foundations and organizations. It offers three different programmes to its members: education, organisational capacity building and services, and business opportunities.

Governance of the community actually depends on the networks. It is them that organise the community around enabling/servicing structures, as it has just been described regarding ENoLL and the Fab Foundation. The network is, however formally centralised. For example, the ENoLL office, which is based on Brussels, serves as the contact point for its members. It also offers the basic network secretarial services in order to support the networking activities and information flow among these members. Interestingly enough, in this community, it is the living labs themselves that provide structure and governance to individual users from different communities. That is why Almirall & Wareham (2008) refer to living labs as intermediaries in the innovation process, structuring and providing governance to that participation. According to the authors: "living labs organise users in needs finding exercises contributing to ideation, support them in acting as entrepreneurs, orchestrate the innovation process, organise user contribution in incremental innovation through localisation exercises, or promote societal involvement for a certain platform, product or service. Therefore, playing a more encompassing and systemic role in the innovation process" (Almirall & Wareham, 2008: 24).

Finally, the living lab community also experiences some **failures**. In particular:

- Lack of interconnection between different types of labs: On one hand, despite the networking services offered by enabling structures such as ENoLL, living labs work very independently, serving their local communities. They usually turn to their network in search of training and advice that can help them develop locally. On the other, different networks of living labs do not interact either. They all are living labs but they are specialised and set up networks around specific issues, which are not always connected. Almirall & Wareham (2008) refer to this flaw as the inability to scale due to the limited scalability of the qualitative type of methodologies mostly used and their geographical boundaries.

- Cost of being a network member: Although networks of living labs are enabling structures, they are formal and highly formalised. Becoming part of the network is not free. Being a member and getting advantage of the services it offers depends on the resources the living lab has. Going back to one of the examples depicted in this report, ENoLL, this network has three types of membership that depend on the fees its members pay: effective members (2,500 Euros a year), associated members (5,000 Euros a year), and adherent members (administrative fee of 500 Euros a year).

- Difficulty of living labs in involving the local community: Almirall & Wareham (2008) refer to the difficulty of finding and involving lead users and to capture users' attention. They believe the living labs' business model, still heavily dependent on public funding, contributes to limiting their expansion.

The open/big data community

It has already been stated that the open/big data community includes a set of governments, usually at the local level, that decide to open their data. Governments are, therefore, the **focal actors** of this community. Their goal is usually two-fold: on one hand, they aim to be more transparent; on the other, they pursue an increase economic value by involving developers and entrepreneurs. This report will focus on the governments that mainly foster the second objective and, as a consequence, are primarily interested in yielding innovation and innovative businesses.

Because governments want citizens, businesses and individual developers to use their data, engaging with the local community is key. Innovation is the result of using the data governments open and offer for free. The open/big data community's **enablers** connect (local) governments with those who are potential users and who will boost innovation. One example is that of competitions. Particularly, competitions' organisers make sure developments and innovation takes place by means of using government open data. This is the case of the Open Data Challenge[74], one of Europe's biggest open data competitions. It was organized by the Open Knowledge Foundation, the Openforum Academy and Share-PSI.eu. It offered 20,000 Euros in prizes and received a total of 430 entries from 24 European Union member states. There were several categories: Prize Idea, Prize App, Price Visualization, Better Data Award, Open Data Award, and Talis Award for Linked data. In total, 13 awards were given. There are many other competitions, some of them organized by governments themselves. Apps4Finland[75], for example, is an open data contest that has been running since 2009. It encourages the public sector and other actors to make their data accessible to citizens and

developers. The competition has welcomed new data sources, applications, visualisations and ideas as entries. Apps4Ottawa[76] is another open data contest organised by the City of Ottawa in Canada. Apps for Amsterdam has also been widely analysed. It was an initiative, promoted by the City of Amsterdam, the Waag Society, and the Amsterdam Economic Board, to make accessible as much data of the City of Amsterdam as possible. Developers were invited to send in their applications that used at least one available source of information from the (local) government.

Networks of developers are a different type of enabler. Interaction between developers promotes the use of open data among the members of the network. It also backs up open data individual requests to governments. Usually, networks of developers are virtual. In this respect, social media networks play a significant role. They are a great place for developers to learn from colleagues, find solutions to problems, and improve their own skills. Of particular interest are also those sites devoted to developers' interaction that are embedded in open data portals. Data.gov.uk[77] the open data portal of the United Kingdom, has an "Interact" section, with blogs and forums. At the local level, the open data portal of Chicago is worth mentioning; it has a section aimed at developers[78].

Open data evangelists are also enablers within the open/big data community. There are organisations that encourage the use of open data. In the private world, Socrata[79] is one interesting example. Building on the experience of open data portals developed throughout the United States, it offers an open data field guide that is particularly aimed at government and elected officials. The Open Knowledge Foundation[80] is another example, from the non-profit field, that advocates and campaigns for the open release of key information. It has published an open data handbook that anyone can use but that is especially designed for those who are seeking to open up data. It has also developed an open data index, which assess the state of open government data around the world. Individuals can also be considered open data evangelists: Andrea Di Maio (VP Distinguished Analyst at Gartner), David Eaves (open data innovator and thought leader), Tariq Khokhar (open data evangelist at the World Bank), or Jay Nath (San Francisco's Mayor Chief Innovation Officer) are only a few examples.

Governance of the open/big data community is top down, that is, governments decide what, when and how to open. Some Governments do not interact with other stakeholders and there are many differences between them, both in terms of speed and pace and commitment. As a result, the success of open data portals regarding innovation is very diverse. This does not mean the open/big data community does not have references. There are outstanding good practices, such as the case of Helsinki, to which we have already referred in section 3, other local governments turn to and followbut there is not a formal network of local governments, connected to each other on a regular basis around open data issues. In terms of governance, therefore, we can only refer to the governance of relationships with stakeholders (users, first data providers, the information environment), such as Helbig et al (2012) do, but still in this case, it is each government which decides what governance structure it wants and how it manages stakeholders and relationships between them.

Lastly, a lot has been written on open/big data **failures**. Huijboom & Van den Broek (2012) identified several barriers for open/big data initiatives to progress. After reviewing open data strategies in several European countries, they describe a closed government culture, privacy legislation, limited quality of data, lack of standardisation (due to individual decisions), security threats, existing charging models (some government charge for the data), and uncertain economic impact (it is still not clear what the use/re-use of open data gives rise to).

Other authors have also referred to some of these pitfalls, such as data quality and lack of reuse, two topics that are very related. According to the United Kingdom Public Accounts Committee (2012), businesses and developers are being hindered in making open data products and services due to the poor quality of information being opened up. In this respect, the release of incomplete datasets such as patchy price and performance information for adult social care, plus factors such as inconsistent reporting across local authorities, mean that the data quality does not help developers. Dawes (2012) adds that data quality is generally used to mean accuracy, but that research studies identify multiple aspects of information quality that go well beyond simple accuracy of the data: intrinsic quality (it includes accuracy and objectivity, but also involves believability and the reputation of the data source), contextual quality (it refers to the context of the task for which the data will be used and includes considerations of timeliness, relevancy, completeness, sufficiency, and value-added to the user), representational quality (it relates to meaning and format), and accessibility (it comprises ease and means of access as well as access security).
Actually, according to Kitchin (2013), it is not clear that open data is leading to innovative products that create new markets. This may well be the case with high value datasets such as mapping and transport data, but much less likely with most other datasets. He mentions de Vries et al (2011), who reported that the average

apps developer made only 3,000 USD per year from apps sales, with 80% of paid Android apps being downloaded fewer than 100 times. In addition, they noted that even successful apps, such as MyCityWay[81] which had been downloaded 40 million times, were not yet generating profits. Competitions and hackatons have aimed at making datasets visible as well as at promoting apps development but these created solutions often remain at version 1.0, with little after event follow-up, maintenance or development.

Smart citizens

Smart citizens were previously defined as active and engaged citizens who want to play a role in building their own city, sharing information and knowledge, creating a network and getting involved in decision-making and implementation processes. Individuals are, therefore, the **focal actors** of the smart citizens' community.

The smart citizens' community is linked to what has been known as crowdsourcing. Coined by Jeff Howe in the June 2006 of Wired magazine, it describes a web-based business model that harnesses the creative solutions of a distributed network of individuals through what amounts to an open call for proposals. In other words, a company posts a problem online a vast number of individuals ("the crowd") offer solutions to the problem the winning ideas are awarded some form of reward, and the company mass-produces the idea for its own gain. Brabham (2008) has gone further and has argued that crowdsourcing is a problem solving model that can have profound influence in the way we solve our world's most pressing social and environmental problems. In that spirit, the business model of crowdsourcing is already being applied in non-profit and government projects. The crowd in those projects are the smart citizens.

Basically, the **enablers** of the community are those intermediary organisations, which provide structure and online platforms for citizens to participate. There are many examples. One of them is SeeClickFix, a company that runs a communications platform by the same name[82] for citizens to report non-emergency issues, and governments to track, manage, and reply. SeeClickFix is actually an example of an organisation that tasks the crowd with finding and collecting information into a common location and format. Similarly, the United States Geological Survey's Earthquake Program, a US multi-agency programmme, has a crowdsourcing site, "Did you feel it?"[83] where citizens can report feeling an earthquake.

Also, in the United States, one can find a different type of an enabling organisation, one that tasks crowds with solving empirical problems. It is the case of Innocentive[84], a Massachusetts-based open innovation company that accepts by commission research and development problems in a broad range of domains and frames them as "challenge problems" for anyone to solve.

Enabling organisations provide structure and, therefore, contribute to the **governance** of the community, as smart citizens are not connected to each other. The so-called crowd does not usually interact on a regular basis. They get in touch around projects and by using the platforms offered by the enabling organisations. As Saxton et al (2013) state, the community members are only temporarily connected to the enabling organization for a specific task or project. Thus, the role of such organisation is to define and design processes, policies and mechanisms to achieve specific project-related goals by effectively facilitating user participation. Some of the tools they use are compensation schemes, trust building systems, and voting and commenting.

Online platforms are also tools that are available to smart citizens. Crowdfunding platforms are an interesting example. They serve as an intermediary between the funder and the person or organization looking for funding. Donating, pre-financing, lending and investing are the four funding forms or underlying business models by which the crowdfunding platforms can be subdivided. One of them is Goteo[85]), a social network for crowdfunding and distributed collaboration (services, infrastructure, microtasks, and other resources) for encouraging the independent development of creative and innovative initiatives that contribute to the common good, free knowledge and open code. In this respect, Goteo supports projects with social, cultural, scientific, educational, technological, or ecological objectives that generate new opportunities for the improvement of society and the enrichment of community goods and resources. Many other crowdfunding platforms can be found at CrowdingIn[86], (a directory of crowdfunding platforms operated by Nesta that facilitates individuals or organisations in the United Kingdom raising money from the crowd.

Finally, this community also presents some **failures**, which, as with other communities, mainly have to do with the lack of linkages. Smart citizens are not connected to each other. They usually take part in crowdsourced or crowdfunded projects anonymously. Also, projects are not linked, either. Sometimes, organiations host several initiatives. Federal agencies in the United States, for example, use Challenge.gov to seek from innovative solutions from the public. Although Challenge.gov is administered by the US General Services Administrations, there are many agencies participating and the challenges are quite diverse: from giving suggestions to the

Department of the Interior on how to to improve its performance, to filming a video to prevent distracted driving.

There is also a lack of awareness about what is going on. Those who take part in crowdsourced initiatives are sensitive to this type of ideas-generation/innovative problem-solving processes. But it is hard for the population as a whole to get access to these projects and to know about them, because they are not widely publicised or disseminated. What's more, communication with the crowd is not easy for the organisation aiming to reach out to a group of people it does not know very well. According to Wargon (2014), no matter how well the problem statement is crafted, the result is still a one-sided conversation, where the organisation is pushing information out to participants, with very little actual dialogue. The result is that participants who are working to solve the problem are left to make assumptions, and these assumptions can lead to off-target and out of scope solutions, and therefore less confidence that the organisation will get the solution that it needs.

This situation may get worse as a consequence of lack of skills. For crowdsourcing to work, one needs the "right" crowd. For example, if technical or scientific knowledge is required, one needs to find a crowd of people with the requisite foundational knowledge.

The open democracy community

This last community gathers individual and organisational political activists that want to contribute to the evolution of democracy in the electronic age. It is precisely this set of political activists that are the **focal actors** of the open democracy community. They may act in isolation or as a part of a group. They may be part of informal movements or be formally constituted. But they all want to have a say in the political decision-making process or in any other established political/democratic processes.

There are several types of **enablers** in this community. One of them is organisations that do not lobby themselves but that serve as platforms for individuals and other organisations. Change.org, Inc. is a relevant example in this respect. This company runs a website[87] that provides a free petition tool for more than 70 million users around the world. Its mission is to empower people everywhere to create the change they want to see. MoveOn[88] is another interesting case. It is a non-profit educational and vocational organisation set up in 2001, which mobilises a community of more than eight million Americans who use innovative technology to lead, participate in, and win campaigns for progressive change.

Evangelists are also enablers within the open democracy community. Steven Clift is one of them[89] He keeps a website where he posts articles and news. Chris Quegley is another one. He is the co-founder of Delib[90] an e-democracy company which has been signed up by the coalition currently governing the UK to produce online crowdsourcing projects and platforms. He previously worked for Obama's team in Washington on the Recovery.org project, which monitored the United States' stimulus plan, and showed the American public in 2009 where taxpayers' cash was going and how many jobs it created.

There are different types of open democracy initiatives and **governance** of the community revolves around them. The nature of open democracy initiatives varies depending on who takes the initiative of selecting and suggesting a policy agenda discussed during citizen open democracy/participation processes. According to Lee & Kim (2014), there are government-initiated and citizen-initiated e-participation initiatives. The former tend to be more formal. They are usually planned and last a specific amount of time. The latter may be formal or informal. The might arise around a particular topic and soon die or they might last longer. For example, the 15M movement in Spain started back in May 2011 as a series of protests demanding a radical change in Spanish politics but it is nowadays still alive and growing. We also add that there is individual and collective action in terms of open democracy (Gascó, 2010). Political activists may act individually or may take part in more formalised groups of action. No matter the type of initiative, social media platforms play an outstanding role as a way of organizing and managing the process. One of them is the YouCut Citizen Platform[91], launched in 2010 where policy makers interact with citizens in the stage of evaluating different policy options. The platforms allows individuals to cast votes on upcoming legislation proposed in the United States House of Representatives and to evaluate the different programmes and their potential spending cuts.

In this respect, Coleman & Blumler (2009) refer to an interesting expression: civic commons 2.0. They define it as a way of intersecting networks, pulled together through the agency of a democratically connecting institution. Last, one of the most important **failures** of the open democracy community is the lack of interconnection. Political activism may revolve around many different issues, which may not have anything to do among them. Also, as previously stated, there might be specific participatory projects, well defined and planned, and more informal ones. There are other drawbacks regarding open democracy. The digital divide

and its implications for political equality are potential danger areas for open democracy. Also, the impact of the actions of the open democracy community is not clear. Often, there is limited reliability and acceptability of open democracy decisions. One final example is the use of social media platforms. The nature of government decision and policy making problems (that increasingly become "wicked problems") necessitate stakeholders' participation and consultation, and the web 2.0 social media can play an important role in this direction, and enable the application of crowdsourcing ideas in the public sector. However, the collection of a large amount of citizen-generated content from various social media on a particular decision or policy making problem is not easy to deal with and necessitates the development of appropriate decision support systems.

4.5 Micro analysis of communities

In this section, a micro analysis of the communities that have been identified and described in section 5.3 & 5.4 is conducted. We will refer to instruments, motivations, and incentives. These will definitely turn into areas for public intervention and, therefore, for policy making. Table 5 summarises the content of this section.

Communities	Instruments	Motivations	Incentives
Open source hardware and software	Government contracts and procurement	Creating fast growing platforms (companies) Reducing costs (companies) Capturing value (companies) Reputation/skills/signalling (developers)	Scalability Less cost Increase of profit Contracts/employability
Developers	Seed funding Events Support to entrepreneurs Incubators and accelerators/support to entrepreneurs	Building a company Developing new products/services	Solving initial support problems Exposure and capital
Innovation labs	Public funding (initial and projects)	Fostering growth Bridging the digital gap Creating innovative societies Providing support to networks and civil society	Extrinsic monetary motivation Opportunities for learning and networking Visibility and reputation
Open/big data	Organization of competitions Support for networking Knowledge sharing and dissemination	New services Generation of economic value Transparency	Political incentives (reputation) Technical support Monetary incentives
Smart citizens	Projects Platforms	Intrinsic motivations, such as personal fulfilment/satisfaction and reputation Making profit	Increase in visibility and reputation Direct payment
Open democracy	Legislation Transparency initiatives Participation projects	Increase in democracy (governments) Reputation (governments) Intrinsic motivations (citizens)	Better electoral results (governments) National and international pressure Personal fulfilment (citizens) Development of projects (citizens)

Table 8: Micro level analysis of the innovation ecosystem

The open source hardware and software communities

In terms of **instruments**, usually, open source products are free. However, related-services might not be. For example, open source software and its supporting code are generally free of cost to download, use and modify. However, individuals and for-profit businesses can charge for specialised training or for developing new extensions of the core code. For instance, R is an open source environment and programming language for statistical computing that is also free of cost. While R offers no cost access to its software and source code, Revolution R Enterprise[92], a proprietary spin-off, markets a faster version of R. The company can process very large data sets and offers, for a fee, training, consulting, and technical support services. Though the services cost money, the cost may still be smaller than what legacy commercial products charge and, if an R user does not need the additional services, then, s/he does not have to pay for them.

In this respect, governments might be interested in signing contracts with open source developers for

governments are, more and more, turning to open source. This has clearly been the case regarding open source software. In January 2011, the Australian Government released an open source software policy and guidance documentation for Australian government agencies to inform their use, modification and development of open source software. In April 2012, the United Kingdom released the second version of the document "Open source software options for government". In December 2013, the Italian government issued final rules implementing a change to procurement law that now requires all public administrations in the country to first consider re-used or free software before committing to proprietary licenses.
Open source hardware is not that popular among governments although there a few interesting examples. We have already referred to the Flok Society in Ecuador[93]. Working with an academic partner, the Government of Ecuador has launched a major strategic research project to "fundamentally re-imagine Ecuador", based on the principles of open source: networks, peer production, and commoning. Ecuador has been the first country in the world which has committed itself to the creation of an open commons knowledge based society. The Public Laboratory for Open Technology and Science (Public Lab[94]), a community which develops and applies open-source tools to environmental exploration and investigation, is another example. During 2013, they distributed 3,000 open hardware kits (the Civic Information Starter Kits), open hardware and software packages for citizen-led environmental data collection supported by a small data platform for analysis and advocacy. This tool enables civic-minded groups to empirically verify government data and inaugurating a new generation of civic information tools to hold government accountable.

In summary, because of governments' interest in open source, contracts and government procurement are important tools within this community.

A lot has been written on the **motivations** of members of the open source communities. Most literature on motivations is based on empirical surveys (Vainio & Vadén, 2006). One popular distinction is to divide the motivations in intrinsic and extrinsic motivations. Intrinsic motivations include open source politics (working on open source to limit the power of large companies, particularly software companies, and because individuals think software and hardware should not be proprietary goods), community identification (for open source development communities are not communities only in a technical sense of the word but also in terms of identity: being part of the community is sometimes part of the developer's identity), and peer-recognition and respect. Extrinsic motivations include user needs (developments take place as a result of a personal need for a tool and, then, it is shared because somebody else with a similar need will probably enhance it and fix its problems) and signalling (being a contributor to the community increases reputation and, eventually, leads to benefits such as getting a job).

Companies have different motivations to be part of the community. Bonaccorsi and Rossi (2004) state that there are significant differences between the set of motivations of individuals and those of firms. In particular, firms emphasise economic and technological reasons for entering and contributing to open source and do not subscribe to many social motivations that are, by contrast, typical of individual programmers. According to the authors, promoting innovation by and small companies seems to be the most important motivation although emancipation from the price and licensing policies of large companies matter as well. Wichmann (2002) adds that reducing costs (development, installation and administrative costs) is also key as it is having better availability of IT specialists. Vici (2008) also analyses firms' motivations to participate in the open source community and states that, at the beginning, and in general, supporting open source was merely justified by the need of answering to the increasing requests of improved quality products. Moreover, contributions and feedbacks from the open source community allow a reduction in R&D costs and an enlargement of the network size, amplifying the positive effect due to network externalities. Adopting open source principles also increases the likelihood of attracting skilled developers and thereby achieving a higher pace of technological development and quality level.

Knowing the instruments the community has interest in as well as knowing what motivates its members let us identify key **incentives** that may increase participation and engagement in the community, strengthening the possibilities for innovation. These key incentives may, therefore, turn into areas for public intervention and for policy making. Avenali et al (2010), in their study on open software and hardware innovation platforms, point to economic incentives (that may result in a increase of profit), such as the economic cost of no participation, the possibility of internalizing the research externalities through specific contracts, agreements and patents, the user's reputation effects on the leadership played in future innovation projects and his/her bargaining power in profit sharing, and the value of re-using. They also refer to the importance of all actions that lead to professional advantages for the contributor, as gaining reputation and, therefore, improving employability.

Other authors have mentioned scalability. In this respect, government attitude towards the open source community is fundamental and may have an effect in terms of scalability for governments are in a unique position in almost any industry. In the field of software, public services, organisations and territorial administrations collectively represent a major software user with great impact on the software market: when an agency adopts open software, it also forces its contractors to adopt the government's platform of choice so they are eligible to work for them.

The community of developers

The community of developers (mainly apps developers) and entrepreneurs have several **instruments** that are useful and that can improve their work. We have already referred to some of them in section 5.4 as enablers for some of them are also intermediary platforms that provide resources and offer services. That is the case of festivals, hackathons, competitions, and other related events. It is also the case of incubators and accelerators. They may be considered a tool in themselves to make start-ups and incipient businesses grow. But, at the same time they provide services to entrepreneurs that support their development. Incubators, for example, are physical locations that provide a defined set of services/tools to individuals or small companies. This may include specific types of office space, flexible lease terms, access to technology, financing, and technical assistance (such as marketing, legal, finance, human resources, and other business development services). By locating similar or complementary entities in proximity to each other, the incubator may also play a critical role in promoting knowledge transfer, both formally and informally, and, therefore, in boosting innovation.

Other supporting programmes are also important instruments for this community. There are many of them. Some are private and some are public. The European Social Fund, for example, promotes entrepreneurship through financial and business support businesses. Targeted support is provided to women entrepreneurs and disadvantaged and disabled people. Also, Erasmus for Young Entrepreneurs helps provide aspiring European entrepreneurs with the skills necessary to start and/or successfully run a small business in Europe. New entrepreneurs gather and exchange knowledge and business ideas with an experienced entrepreneur, with whom they stay and collaborate for a period of one to six months. The stay is partly financed by the European Commission. In the United States, in January 2011, the Administration Obama launched Startup America[95] harnessing public and private resources to accelerate the success of America's high-growth entrepreneurs. Also, in the United States, private initiatives to support growing businesses can be found. The Knight Foundation[96] is one of them. They have several funding programmes such as the Knight Enterprise Fund (which provides early-stage venture funding for media innovation) and the Knight Prototype Fund (which helps media makers, technologists and tinkerers take ideas from concept to demo; with grants of 35,000USD, innovators are given six months to research, test core assumptions and iterate before building out an entire project).

In India in March 2014, Vodafone launched its developer platform to empower the community of developers. It allows developers to use the Vodafone platform to offer content and customised services to users. It serves as a new monetisation channel for app developers. In the past, Gaana.com, Cleartrip, Vserv, Reverie Language Technology, App Virality, PCloudy and Betaglide have also launched their API and support developers in the app development cycle.

Seed funding is also key for app developers. According to Wikipedia, seed funding is a form of securities offering in which an investor purchases part of a business. The term seed suggests this is a very early investment, meant to support the business until it can generate cash on its own or until it is ready for further investment. Seed funding is probably the hardest money for aspiring start-up entrepreneurs to get. However, according to CB Insights (2014), 2013 was a big year of venture investments at the seed stage. Actually, 2013 saw no drop in the number of active seed venture investors from the high seen in 2012. There are several seed funds. Kickstart[97] is a seedfund that kick-starts companies in the Mountain West of the USA by aligning technology creators, industry, entrepreneurs, and capital sources behind the funding and mentoring of seed investments. Other companies organise events where start-ups are awarded with seed funding. In February 2014, at the Mobile World Congress in Barcelona, IBM promoted its Watson Mobile Developer Challenge, soliciting app developers to submit mobile app ideas based on Watson over the following three months. IBM would choose three winning teams and provide seed funding for their businesses.

Building and growing a company and developing and commercialising new products/ services are the two main **motivations** for developers. The Developer Economic Report Q1 2014[98] particularly refers to mobile apps developers and states that the explosive growth in smartphone adoption has created opportunities for

developers of every shape or form. This, and the relatively low barriers to entry into mobile development have attracted hundreds of thousands of developers to the app economy. With the exception of some developers that are not in it for the money (as indicated by 16% of the report's sample), most developers or organisations that invest in mobile are in fact looking for a return on their investment.

In this respect, the report explores the two main types of business models that are in place: 1) app as a product, which calls for direct monetisation, via paid downloads, in-app purchases, or contract development and 2) apps as a channel, which aims at indirect revenues via cross-app promotion, brand promotion and e-commerce.

However, while some developers are making it big, the majority are not seeing the returns they were expecting to, to a lower extent, intrinsic motivations also matter. The Developer Segmentation Q3 2013[99] refers to fun and creativity. In fact, it seems that engaging in app development usually arises from personal interest and pursuit of knowledge.

Instruments and motivations give us an idea of what types on incentives matter in this community. Solving initial support and capital problems is crucial. That has to do with funding (pre-seed and seed funding) and, also, with support services. Some organisations have already launched incentive programmes that provide support for entrepreneurs in their initial business developments stages. This is the case of the App.net Developer Incentive Program whose goal is to financially reward the development of App.net applications. But more needs to be done in this field.

Also, growth has to be guaranteed, which means, seed funding is very important but, also, capital throughout later stages is needed. Literature and research has shown that many start-ups fail. A study by Allman Law, conducted in 2013, concluded that 90% of all technology start-ups die about 20 months after having been born. According to John (2014), there are many reasons for this to happen (the Allman Law report refers to some of them: such as user confusion, privacy concerns, premature scaling, the competitive landscape) but the most important reason is that start-ups were not able to monetize their product/service. Thus, incentives for the community of developers and start-ups should address this need of financial and non-financial support.

Innovation Labs: Living labs, Fablabs, Maker spaces

There is quite a lot of consensus about the fact that a living lab is a user-driven open innovation arena or environment based on a business – citizens – government (public-private-people) partnership, which enables users to take an active part in the research, development and innovation process.

Public funding is an important **instrument** at the initial stage of a living lab but also when projects are developed and implemented. Innovation labs are largely dependent on public funding, despite the involvement of private partners. Actually, according to Almirall & Wareham (2008), there are only a limited number of firms willing to participate in a living lab. This business model limits its expansion. But also, access to external (public) funding may be difficult when the projects do not have a perceived value or are not financially sustainable in the short run (Farrall, 2012).

There are several examples of public funding of living labs, particularly at the regional and European level. For instance, iCity in Belgium, which is probably the largest active living lab today, is dependent of regional funding (IBBT and IWT). In the Apulia region[100]), ERDF funds are being used to promote high impact RDI carried out by living labs that effectively respond to specific requirements priory stated by the potential beneficiaries (belonging to public administration and the third sector) who are directly involved in the project partnerships with the task of managing the pilot phase. ERDF funds have also incentivized the work of other living labs, such as PACAlabs[101] and OuluLabs[102]).

National agencies also provide funding. In Finland, TEKES (Finish Funding Agency for Innovation[103]) and SITRA (the Finish Innovation Fund[104]) have already funded many living labs.

Living labs aim to boost innovation. This is their main motivation, one that results in further **motivations** such as fostering economic growth, bridging the digital gap, creating innovative societies, or providing support to networks and civil society. In this respect, it is important to underline that the motivation of a living lab usually is not to be the innovators themselves, but to help coach and facilitate the civil society's ability to innovate.

Specific living labs have specific objectives and motivations. I2cat's is a foundation established as a public-private partnership constituted by three universities, around ten firms and the Secretary for the Information Society of the Autonomous Government of Catalonia[105]. Its motivationsare two-fold. On one hand, traditional research has a prominent status, especially due to the participation of three technological universities. However, a great deal of effort is devoted to experimental innovation.

As stated, innovation labs can help anchor innovation efforts more broadly through networks that have the purpose of facilitating innovation and renewal. In Norway, for example, MindLab[106] runs an innovation agent network of 50 project managers across three government departments, including 15 agencies. Almirall & Wareham (2009) stress the important role living labs play in providing support to networks. They state that living labs establish, manage and coordinate, many times in collaboration with a "lead user", the innovation networks required to transform users' needs into real products and services.
Fostering economic growth is an important motivation as well. The Living Lab for ICT-based Financial Services[107] was created in spring 2010 by Ülemiste City AS and Mindware OÜ. The goal was to create an environment that would bring together various ideas related to ICT-based solutions in financial services, the creators and the end-users, and in co-operation increase the international competitiveness of the Estonian financial ICT solutions. The Financial Services Living Lab aims to make the city of Tallinn an innovative financial center of Estonia. In this respect, the Financial Services Living Lab gives the opportunity to its creators to better test and develop their products. It is meant to benefit the whole financial sector of the country as well as the user. One of the goals of the activity is to support the creation of new exportable products and services and, therefore, to enhance economic growth.

Living labs aim at bridging the digital gap as well. Several of their projects have this motivation. Citilab[108] in Cornellà (Spain), for example, has launched an initiative, Seniorlab, that promotes use of multimedia technology among people over the age of 50. SeniorLabs are actually quite common in living labs.

The analysis of living labs' tools and motivations results in the identification of **incentives** and, therefore, of areas for public intervention. One of the most important is the extrinsic monetary motivation, that is, motivation driven by a monetary external reward. The limitations regarding (public) funding make this incentive particularly important. In fact, European and regional funding agencies have already begun to launch living lab programmes, mostly for promoting living labs grow as a tentative but genuine European way to spur innovation (Almirall & Wareham, 2008).

But living labs also need to gain visibility and reputation in order to attract users to their buildings and platforms. According to Almirall & Wareham (2008), this is relevant because the innovative capacity of a society depends also on soft factors, including the perception of whether something is innovative and its reputation for innovation. This, influences its capacity of aan organisation's abaility to attract innovators and entrepreneurs, whilst promoting and increasing the visibility and networking of locals. This is especially significant in projects with a large amount of public funding, such as the ones where existing living labs are mostly involved.

In addition, because the reward users capture from the process is mostly explained in terms of reputation and a sense of belonging and participating in new and relevant experiments, future user participation will also be affected by the level and success of wider societal awareness. Last, living labs can also provide a clear advantage in terms of regional or city development if they manage to create momentum with real life experimentation on solutions and technologies.

Finally, opportunities for learning and networking are a significant incentive as well. As we already stated in section 4, intermediary organizations or enablers, such as ENoLL, can play a key role in this respect. This means that incentives should not only address individual living labs but also networks of living labs, which give administrative and networking support and which also invest in training and dissemination activities.

The open data and open knowledge community

As was the case with the community of developers, the open/big data community's **instruments** are very similar to the so-called enablers in section X. In particular, in this section we will refer to the organization of competitions, to support tools for networking and for knowledge sharing and dissemination. Competitions aim to bring together the data sets, made available by (local) governments, with the app developers or the community of open data users. Competitions are aimed at developers, researchers, journalists and anyone who has a keen interest in the re-use of open data, as their main goal is to promote the use/re-use of data sets.

Many open data competitions have been organised throughout the years by (local) governments themselves or by other organisations. In November 2013, for example, the Energy Department of the United States launched a competition to encourage the creation of innovative energy apps built with open data[109]. Several hackathons have been organized since them across the country. In Queensland (Australia), between February and March 2014, the Science for Solutions open data competition took place in order to encourage data visualisations, application development or other unique treatments of the science datasets provided by the Department of Science, Information Technology, Innovation and the Arts of the Queensland Government. In Europe, the City of Stockholm organized in April 2014 what is said to be one of the biggest competitions of open data in the region: the Open Stockholm Award[110].

Competitions award participants with monetary prizes but they are also an important tool for developers' to gain visibility and reputation, as well as to support dissemination of new apps, particularly when prizes are also related to attendance at related events. Tools that support networking activities are also important. In this respect, many open data portals include a section for developers.These same sites can also be an interesting tool in order to share examples of using/re-using open data. Some of them list the apps that have been developed by companies or the public administration itself by means of suing the open data sets. It is the case of Open Data Euskadi in Spain[111], Open Data Vienna[112], or Open Data Toronto[113].

Regarding **motivations**, there is a need to differentiate between (local) governments' motivations and open data users' motivations. We have already approached the latter when analysing the community of developers. Thus, we will now focus on the former. (Local) governments have three important motivations when launching open data portals. First of all, most of them aim at being more transparent. For them, open data enhances transparency because it shows what the government is doing. Increased transparency also relates to other benefits that open data could contribute to, namely increased participation in political life, stronger democracy or e-governance. Much literature and many policy reports are actually based on the assumption that open data is a tool to enhance transparency. In addition, it is often argued that transparency could lead to better accountability of the government. However, several researchers have also challenged the idea that opening data will result in transparency and the idea that transparency automatically leads to more trust in the government. Research has shown that the assumption that open data automatically results in transparency is too simple. There are at least four factors which we believe influence open data transparency: 1) the type of data opened, 2) what one can do with the opened data and how they are displayed, 3) the undesired effects of opened data and 4) the costs of open data transparency apart from the systems, resources, capabilities and other means to make sense out of data.

Offering better and new services is another motivation to engage in open data initiatives. According to Berners-Lee (2012), opening up data is fundamentally about more efficient use of resources and improving service delivery for citizens. More and more, citizens expect city services to be available online. Re-using public sector data can lead to the development of improved, more efficient online public services. Also, merging data and information digitally leads to improved collaboration between city departments and more efficient internal information sharing. This can also lead to improved e-government services being developed by public administrations. What's more, local authorities are actively pursuing open data strategies to collaborate with citizens and the private sector in developing services from this data. Co-created or co-produced public services better meet the citizens' demands. Also, local governments can use their data to provide (real time) information to address issues from traffic congestion to peak load electricity management. Other services such as reporting tools can allow citizens to report local problems to the council just by locating them on maps.

Finally, local governments are also driven by the possibility that companies produce economic value from their public data, creating services and applications from those free data. This means a new market niche, based on digital contain, what helps to create richness and the possibility to offer added value services. Additionally, it promotes the competitiveness among companies, affording the possibility of tendering this public and free information and obtaining a benefit. Indeed, according to the Eurocities Statement on Open Data, opening and re-using public sector information can potentially create economic gains of up to 40 billion Euros annually in the European Union.

Incentives for the open/big data community should take into account the instruments' flaws and the needs of the community in terms of motivations. In this respect, political incentives aimed at increasing the government's reputation are key. Thus, if it is true that opening data does not necessarily lead to more

transparency, efforts are needed to enhance the links between opening data, increasing transparency and increasing trust and legitimacy. Because reputation from a marketing/image point of view also matters, political incentives in terms of communication, diffusion and knowledge sharing are important as well.

Technical support in order to address the make the most of opened data is another incentive. There are some programmes that offer this type of support. Open Data Support, for example, is a 36-month project of the DG CONNECT of the European Commission to improve the visibility and facilitate the access to datasets published on local and national open data portals in order to increase their re-use within and across borders. To achieve its objective, the programme provides to (potential) publishers of open datasets, three types of services: 1) data and metadata preparation, transformation and publication services that will enable them to share the metadata of their datasets on the pan-European linked metadata infrastructure delivered by the project, 2) training services in the area of (linked) open data, aiming to build both theoretical and technical capacity to European Union public administrations, in particular to favour the uptake of linked open data technologies, and 3) information technology advisory and consultancy services in the areas of linked open data technologies, data and metadata licensing, and business aspects and externalities of (linked) open data.
Certainly, monetary incentives also matter. Funding open data projects may encourage the release of public data. The Cabinet Office and the Department of Business, Innovation and Skills, in the United Kingdom, are, for example, supporting organisations who want to improve their data publication. In this respect, they are helping to unlock data from public bodies by awarding 1.5 million Pounds to projects as part of the Release of Data Fund and the Breakthrough Fund.

Smart citizens

Two are the **instruments** mainly used by those citizens who want to take part in crowdsourcing initiatives: projects and platforms. Both of them are related, assome crowdsourcing platforms revolve around specific projects and others (mainly crowdfunding platforms) display a list of projects that need citizens' input. In section 5.4, we have already referred to online platforms for both crowdsourcing and crowdfunding initiatives. There are several classifications of types of platforms, although there is some overlap between them. One of them is related to the organisation that sets up the platform: a business/firm, a public sector organisation, and a non-profit sector organisation. Howe (2009) also classifies platforms depending on the crowdsourcing approach. He refers to 1) crowd-creation (leveraging the ability and insights of a crowd of people to create new products and services), 2) crowd-voting (where the community votes for their favourite idea or product), 3) crowd-wisdom (using the "collective intelligence" of people within or outside an organization to solve complex problems), and 4) crowdfunding (it offers financing to individuals or groups).

Dawson & Bynghall (2012) use a six-category classification of platforms. The authors refer to 1) distributed innovation platforms (the main concept here is that there are people outside the organisation who have the answer to the organization's challenges), 2) idea platforms (used by organisations to be able to source, gather and filter ideas that are proposed), 3) innovation prizes (increasingly used by organizations to generate ground-breaking ideas), 4) content markets (platforms where people submit their content for people to purchase), 5) prediction markets (that bring together many different opinions from a community of people to predict the future often based on "stock market-type" mechanisms), and 6) competition platforms (that are becoming more popular to source experts and expertise in different areas).

There are many examples of interesting online platforms. Crowdrise[114] is a fundraising platform for charities across the world. It allows individuals to support any charity. OpenIDEO (https://openideo.com/) is an open innovation platform, way to include a broader range of people in the design process through brainstorms, conception and evaluation. OpenIDEO partners with a non-profit to present the community with a social issue "challenge." Community members then contribute to the process by providing feedback each step of the way until a solution is created and supported by the community. A last example is Innocentive[115], which is the global leader in crowdsourcing innovation problems where people compete to provide ideas and solutions to important business, social, policy, scientific, and technical challenges.

Finding what motivates the so-called crowd is essential for success in crowdsourcing activities because it allows for the best incentives to be applied. According to Zhang (2012), there are five **motivations** in this community, including 1) the opportunity to support an attractive idea or the producer the smart citizens know, 2) the altruistic intentions for funding the project, 3) the opportunity to help others realize dreams, 4) the reward-oriented intentions of crowdfunders, and 5) the reciprocity and cross investment between project

creators and crowdfunders. Another stream of literature (Organisciak, 2008) refers to academia, charity, money, fun, community participation, forced participation, self-benefit from the product, and interest in the content. The first two relate to the goodwill factor. Some potential users will participate in a system not for any returns from the system, but simply for the sake of its success. Wikipedia[116] is the great benefactor from academic interests. The other reasons for crowds to support crowdsourcing systems are much more self-motivated. It is interesting to mention money. Money is a great motivator although there is a problem with paid-crowdsourcing: the number of people to pay. Also, self-benefit from the content created by the crowdsourced system, which may be direct (when the content created by the effort is of immediate use and value to the individual participating) or indirect.

It can be therefore concluded that, within this community, two types of motivation exist (Smith et al, 2013): intrinsic and extrinsic. Extrinsic motivation is external, or outside an individual. It provides an incentive that the task itself does not provide to the crowd member, such as money or prizes. Intrinsic motivation is internal to an individual and provides benefit to the crowd member who contributes to the actual crowdsourcing task. An example of intrinsic motivation is enjoyment.

Finally, Pilz & Gewald (2003) state that motivations are different in paid and non-profit crowdsourcing communities. Their findings show that many motivational factors apply consistently whether for-profit or for-fun. However, some factors differ significantly; especially extrinsic factors, which are of far more importance in for-profit communities.
Knowing what motivates the crowd and what tools they use give rise to the identification of **incentives** and, therefore, of areas of public intervention. Pilz & Gewald (2013), for example, suggest that one possibility is to provide financial incentives to participants. According to Mao et al (2013), this type of incentives may influence the amount of time devoted to the crowdsourced activity and the quality of work performed. The authors suggest that financial incentives may be used to control trade-off between accuracy, speed and total effort.

Crowdsourcing sites fall into one of two categories in terms of their compensation: pay-on-task or contest/prize. The pay-on-task sites offer a nominal level of compensation for a completed task. MTurk[117] is one example. This Amazon's micro-labour site offers members a chance to perform Human Intelligence Tasks (HIT) for a few pennies per completed task (for example, writing a 350+ English resource article for USD17.50). Contest/prize sites pay significantly more money or offer job contracts, product prototypes and royalties. For example, Namingforce[118] focuses on the creation of product and domain names. Prizes for submitting a winning name range from USD50-USD250. In addition to this, Oram (2010) proposes a payment scheme in crowdsourcing projects: 1) pay for professionals skills and ask for amateur contributions on a volunteer basis, 2) pay for extraordinary skills and accept more modest contributions on a volunteer basis, 3) pay for tasks that are not fun, 4) pay for critical tasks that need attention on an on-going basis.

Increase in visibility and reputation (reputational incentives) matters as well. Praise, publicity, and shame motivate action based on social norms and interactions. Actually, reputation (the social recognition for meaningful and creative work within the crowd), publicity and the sense of community in general (that is, the knowledge that one is contributing to a large project and a common goal) are important non-monetary rewards.

The open democracy community

Transparency initiatives and participation projects are two important **instruments** used by the actors of this community. The first ones are usually implemented by governments. Leaving aside portals that display public open data, previously analysed, governments use transparency portals as well, which give information about different topics, and not only raw data. Transparency portals are very popular in Spain. Local and regional governments have invested in developing such tools. Transparency gencat[119] the transparency portal of the Autonomous Government of Catalonia, and Transparència Terrassa[120] the transparency portal of the Terrassa City Council, are a couple of examples. In this country, International Transparency Spain has developed a methodology to measure the level of transparency of different public administrations. The methodology uses up to 81 indicators related to six transparency areas: 1) information about the organisation, 2) relationships with citizens and society, 3) economic and financial transparency, 4) procurement transparency, 5)

transparency in urban works, and 6) indicators related to the new Spanish Law of Transparency. The indicators aim at evaluating the data and the information public organisations publish on their transparency portals. Other countries have also introduced transparency portals. It is the case of Brazil[121] Chile[122] or the United States (at the state level, for example, interesting portals are the one from Illinois[123] and the one from Indiana[124].

Participation projects can be top-down or bottom-up. There are many different projects that require the involvement of political activists. Some may be more formal/organised (such as open consultations), some may be more informal (such as movements that revolve around different social media platforms). Also, Wikipedia refers to specific initiatives/activities such as town hall meetings, opinion polls, participatory budgeting, referenda, protests or voting. More individual engagement may take the shape of e-mails to government officials, signing an online petition or making a political contribution. Participation in such projects is usually facilitated by specific participation platforms, wikis, social media, and blogs.

Legislation is another significant tool that is used by governments. Legislation is particularly related to transparency, although there are some participation laws, particularly at the local level. According to Fumega y Scrolloni (2013), in the last two decades, more than 90 countries have passed transparency/freedom of information/access to information regulations at the national level. Sweden's Freedom of the Press Act of 1766 is the oldest in the world. In many countries, regional and local governments have local laws as well. The content and the quality of such regulations vary immensely. Also, having a law does not mean complying with it (Gascó, 2013). Thus, although a valuable tool, a lot remains to be done regarding regulation of open democracy initiatives.

In terms of **motivations**, governments pursue transparency and participation to strengthen democracy. Openness and transparency are key ingredients to build accountability and trust, which are necessary for the functioning of democracies and market economies. Actually, many studies have been developed under the premise that transparency yields to accountability. At the same time, a more accountable government is a more legitimate one (Sandóval-Almazán, 2011). Finally, legitimacy strengthens public trust in the government (Hood, 2011; Hazell & Worthy, 2010, Jaeger & Bertot, 2010). In sum, in Dror's words (n/a), increasing transparency and openness is a significant component of trying to move towards quality democracy.

Transparency and participation go hand in hand. Citizens need to be informed in order to be able to participate. Michels (2005) states that governments see participation as an instrument to strengthen and support the way representative democracy works nowadays.

Davies (2013) and Janssen et al (2012) also refer to reputation and visibility as motivations for governments to invest in transparency and participation initiatives. In a recent communication, the Government of Pakistan described its motivations to become part of the Open Government Partnership, stating that active participation in this organisation could help improve the government's reputation. In this respect, governments want to be transparent and participative but they also want to be known for being transparent and participative. Thus, motivations related to the image of the organization are also key.

Although (local) governments are important actors in the open democracy community, as stated in section 4, political activists are the focal actors. According to Stepasiuk (2014) and Lee & Kim (2012), intrinsic motivations for the focal actors are much more important than external motivations. They cite different authors who have supported this idea in their research and who have concluded that through citizen participation, citizens are able to promote self-esteem and self-fulfilment and develop the attitudes and skills of citizenship. Also, open democracy initiatives provide an opportunity to be better informed of issues in their community. In this respect, individuals and organisations gain a sense of belonging in their community. Interestingly enough, some authors have approached the topic of motivations of young political activists. Rainsford (2013), for example, discusses a wide variety of motivations, such as defending their specific interests, showing solidarity, or expressing dissatisfaction.

These ideas have been widely supported throughout the literature. Klandermans (2004), for example, formally categorizes these motivations and analytically distinguishes between instrumentality, collective identity, and ideology when analysing political activism motivations. Instrumentality points to motives directed at social and political change of an aggrieved situation or social problem. Broadly defined, instrumental motives are about

the belief that something can be changed and that participating in a demonstration is an effective means to do so. Motivations stemming from collective identity, on the other hand, emerge from a participants' feel of group belonging and in-group solidarity. Strong feelings of collective identity make collective action participation a goal in itself. Finally, ideological motivations are rooted in an expression of one's views, a search for meaning out of a sense of moral indignation. People do not solely participate to enforce political change, but also to express their anger and grievances, their feelings of injustice and other emotions about a certain issue or situation.

Finally, **incentives** also differ depending on the actor. In the end, it is the possibility of getting better electoral results which is the most important incentive governments can have. It is a virtuous circle indeed: the more transparent and participative, the more accountable, legitimate and trusted and, therefore, the more chances to get better electoral results. Related to this incentive is citizen pressure. Citizens may be demanding greater transparency and participation. Bottom up citizen pressure can play a significant role. Where democratic mechanisms are operating, then citizen pressure can provide incentives for greater transparency and participation. What's more, strengthening bodies that exercise oversight over governance, such as the Ombudsman in certain countries, may also put pressure and give incentives to governments to invest in open democracy initiatives.

Davies (2013) also mentions a different type of pressure: international pressure or funding. This might be from international agencies, as donors fund and require transparency and governance reforms, or it might be from business, and markets, as assessments of doing business in a country are affected by the degree of transparency. International organisations may also give support for governments to be more transparent and participative, providing them with different instruments, as the OECD does[125].

Since political activists mainly have intrinsic motivations, incentives need to address this fact. For example, to strengthen the feeling of belonging to a community, research shows that it is more effective to engage people around specific issues, close to them, or ideology than to promote political participation generically speaking. The real development of proposed projects and ideas is another important incentive in this respect. Noticing that one's contributions make a difference strengthens self-fulfilment and increases participation in the community.
Finally, the literature also distinguishes between collective and selective incentives (Van Stekelenburg, 2013; Samuel, 2004). The former are ends-oriented incentives, which take the form of policy goals. They are related to the desire to affect collective outcomes. The latter are incentives that derive from the activity itself, irrespective of whether it manages to provide the public good or not. Selective incentives are classified according to the different ways in which they affect people's motives and actions. Material incentives are payments or incentives for participating or coercion for not participating. Social incentives are benefits or costs of participating (or not) arising from relationships with other people, either their respect and honour, or the communal pleasures of doing things together. Moral incentives arise from the internal feeling of doing the right thing. A person acting on moral incentives can expect a sense of self-esteem, and approval or even admiration and, therefore, experience personal fulfilment.

5. Bottom-up participatory policy development: co-designing DSI policies

There is a common view that a strong public intervention at EU level is needed to properly support this area of developments which has so far been left to isolated developments, activists and hackers, despite its importance. Recognising its strong social value, besides its strategic contribution to repositioning Europe worldwide would allow a **whole new generation of industrial and social innovation to start in Europe.**

The advent of new connecting technologies has opened up new perspectives for policy making. Though digital networks can give rise to new forms of collective intelligence and can increase democratic participation into policy debates, the actual influence they exert on policy decisions remains unclear. The reality of policymaking can often be laborious, lengthy and involve lots of compromises along the way. But inclusive policymaking should begin with engagement with those who are likely to be affected by the end policies. Thus, in formulating new policies ideas for Digital Social Innovation, we adopted a participatory methodology trialled by Digital Futures, a DG Connect project developed to addresses key policy issues by piloting a new approach to policy making; namely Policy Making 3.0.

Digital Futures is a participatory visioning project aimed to co-develop long term visions (futures) and policy ideas for beyond the Digital Agenda and Europe 2020, looking at three main pillars of the frame work: visions (forecasting and back casting); policies (actions and pillars); and agents (stakeholders in a broad sense, including implementers and decision makers). The Digital Futures vision is based on the metaphor of emergent collective intelligence, according to which stakeholders and policy makers should form a bottom-up social network to co-design policies. The new approach to policy making being experimented with by digital futures supported by the Futurium online platform[126] is characterised by:

- Evidence: using the internet to gather instantaneous real world data from which knowledge is extracted and used to dynamically (re)shape policy actions.
- Participation: using digital media to establish a direct and continuous bridge within and between policy makers and external stakeholders, to gather opinions, improve and validate policy ideas, and ultimately build openness, transparency and legitimacy into the policy making processes.
- Anticipation: using foresight methodologies to embed anticipatory thinking and visioning in policy design, beyond incremental improvements and refinement of current policies.
- Agility: scientific evidence, anticipation and participation in turn enable a more rapid and future-proof development, review and adaptation of policies. Similar to the metaphor of agile development, policies are developed through a series of incremental versions which are continuously monitored, reviewed and adapted as needed, thus improving flexibility and resilience of policy making process.

This is shown in the Figure below.

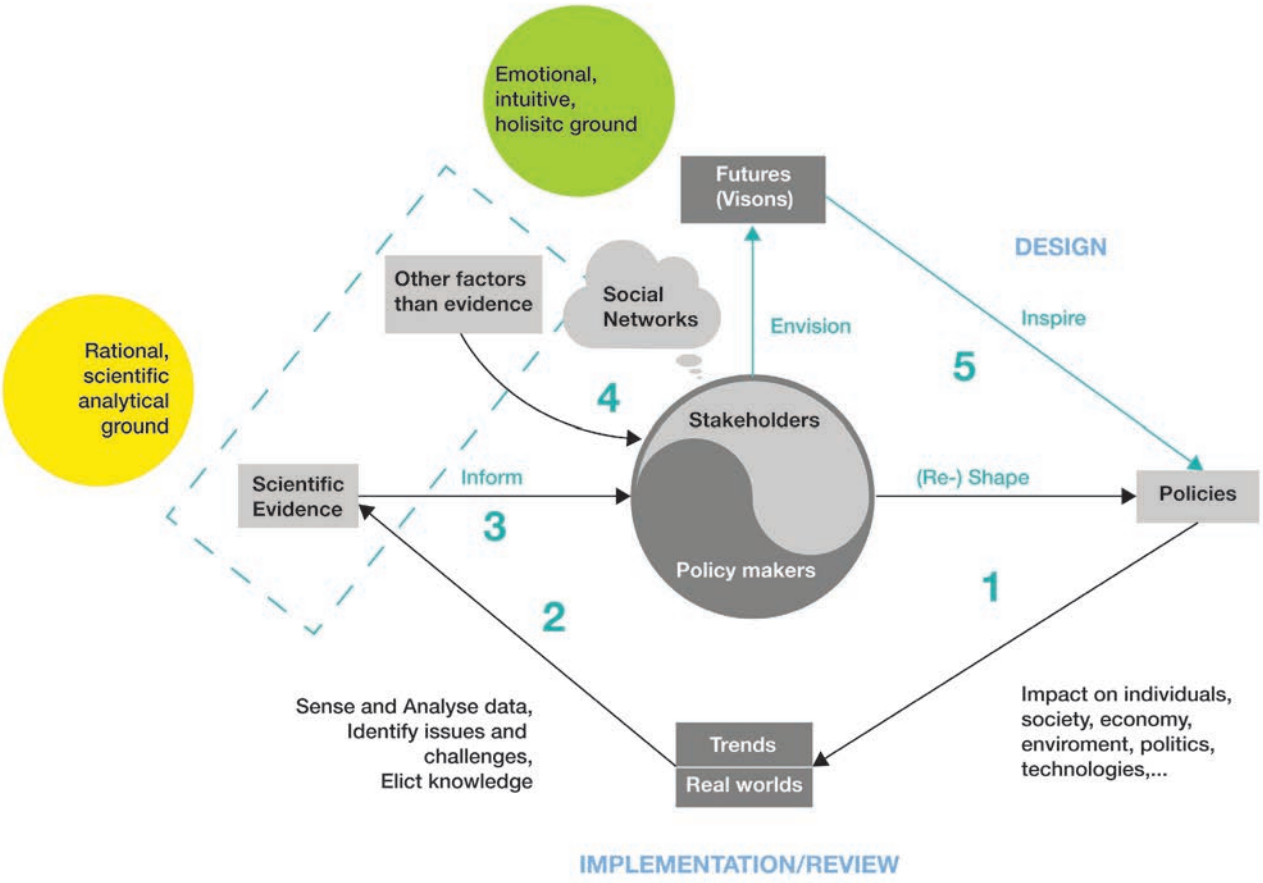


Figure 7 European Commission, Policy Making 3.0 http://ec.europa.eu/digital-agenda/en/policy-making-30-0

Following, the methodology supported by the Futurium platform, as part of the DSI policy experimentation, a participatory policy workshop was held in Brussels at DG Connect premises on February 3rd 2014. This experimental approach encouraged policy-makers to go beyond the more standard approach of deploying consultation documents and showed how policy-related events that do happen can be much more participative in the generation of potential ideas. A more user-centred approach to policy-making, if you will.

The workshop brought together over 70 DSI practitioners, researchers, experts, and policy makers from different European countries, and it was very important for the DSI research project to facilitate this kind of connections and experimentation. A high-level programme comprising presentations, discussions, idea generation workshops, and networking was delivered. The energy and enthusiasm of all participants resulted in engaging policy discussions on the emerging DSI field, ranging from topics such as open access and open standards, to new innovation and funding models and decentralised enabling digital infrastructures. Following an holistic Social Innovation framework that identifies six stages of social innovation to achieve impact (see Figure 8), the aim of the workshop was to clarify the goals of policy (see Fgigure 9), and the tools available for both the Commission and others across Europe; and to frame a more detailed discussion on how these could be implemented during brainstorming ideas sessions.

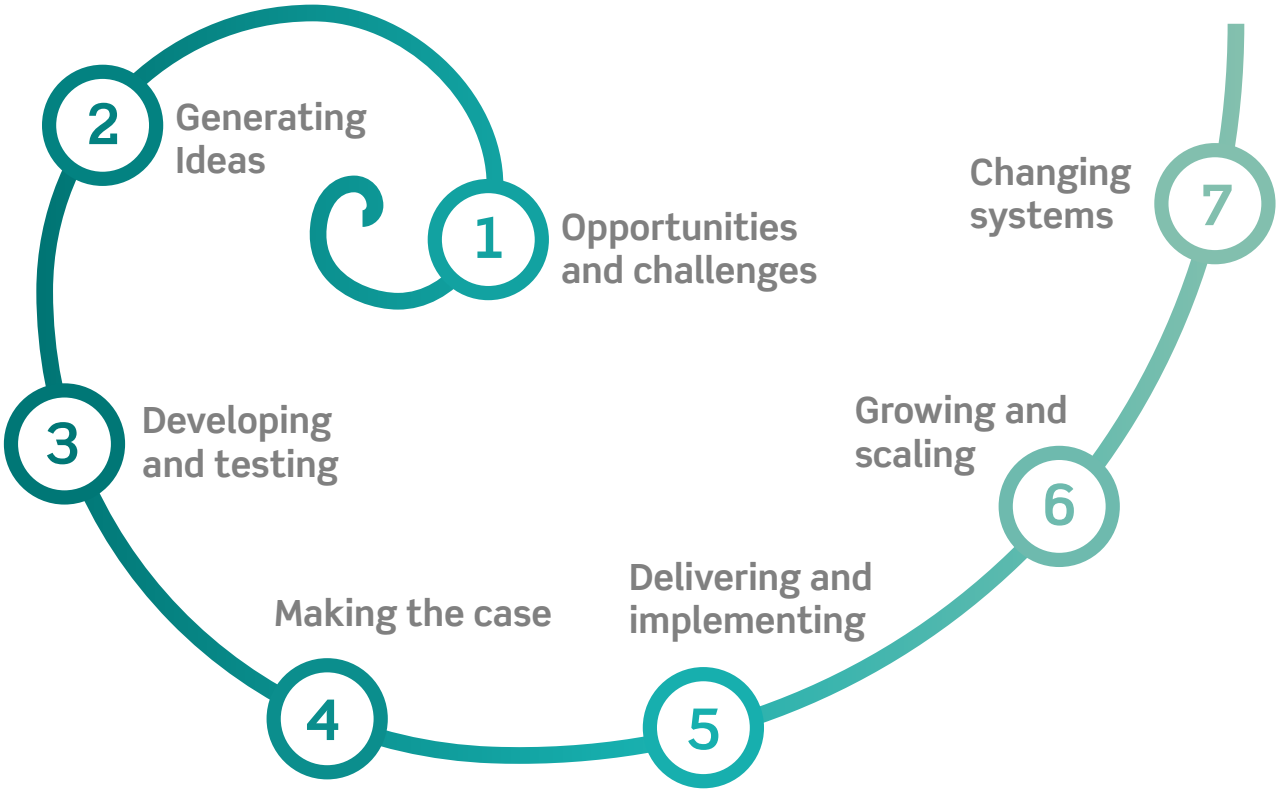


Figure 8 Source: Murray, R., Caulier–Grice, J. and Mulgan, G. (2010) 'The Open Book of Social Innovation.' London: NESTA and the Young Foundation.

The day started with a live presentation of case studies from **Arduino, Smart Citizens, Provenance, Confine, Goteo and e-democracy site Your Priorities**[127]. The speakers, all leading DSI practitioners highlighted how digital social innovation is often enabled by open data, free software, and open hardware platforms. In many cases, new services cannot be envisaged at the time that these open tools are developed, but they are often driven by users' uptake and community innovation activities. A great example is the Arduino which, as Zoe Romano (Arduino communication manager and head of wearable Unit) showed, has a diverse range of applications from running more efficient cement plants (to reduce energy consumption), to powering digital education tools.

For policymakers, these uses of open systems have implications for how R&I might be funded in the future. Many present at the workshop asked for public funding of innovation to be used in a more open way, and including a strong open access and open standard policy, so as to unlock technologies on which others can build useful services and networks. The traditional emphasis on roadmap-driven programmes and research needs to be complemented by bottom-up initiatives.

The afternoon of the workshop began to crowd-source policy ideas from participants. This focused not just on particular sectors, and levels of governance (from city to global) but also on the different policy tools that might be used such as digital human rights and data as knowledge commons.

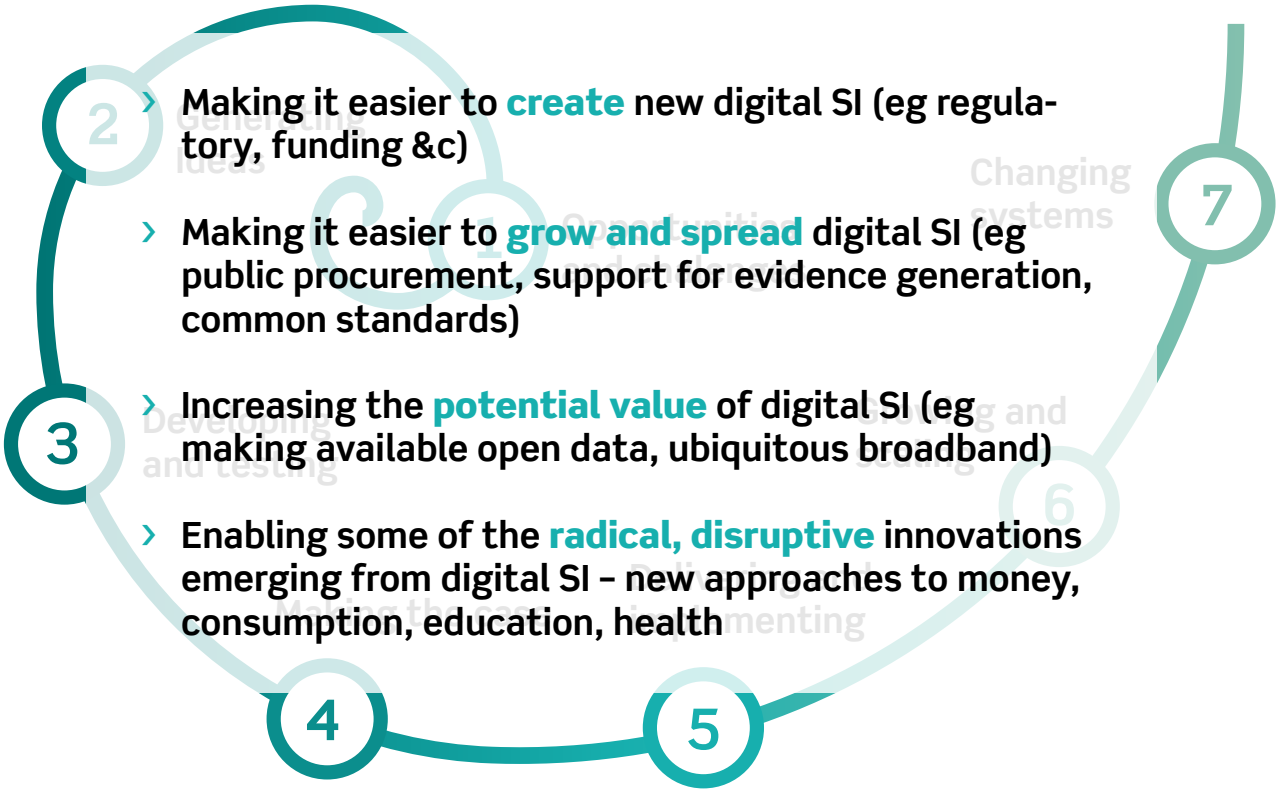


Figure 9 Policy Goals

5.1 Exploring crowdsourced policy ideas organised by categories

As main outcome of the workshop, 9 DSI policy areas were identified (see the livesketching) and over 30 DSI policy ideas emerged. Ideas were clustered together according to key common themes and the Table below shows the breadth of thinking. These areas of policy were further worked on during the day, with European Commission officials providing their responses to the ideas which emerged. The reality of developing good policy is that it can be rather boring, laborious and is often filled with compromises. But inspired by the passion of the people in the room, this workshop did a good job at bringing people together to discuss how Europe might just be the best place in the world to nurture digital social innovation.
In the spirit of Digital Social Innovation after the workshop the debate continued online using the Your Priorities platform[128] to debate the ideas and to prioritise the ones that could be implemented at EU level. Your Priorities is a web app that allows people to submit new ideas, debate and discuss ideas and vote up or down based on their priorities. The key element of the platform is a simple but powerful debate system to help improve the quality of the online debate. Each point can only be 500 characters and people can mark points as helpful or not helpful resulting in a list of the best points for and against. Both sides of the argument are equally represented in the user interface and this is highly effective in facilitating consensus and in the inclusion of minority arguments.

The diagrams and the table below show the policy ideas that were generated in the workshop

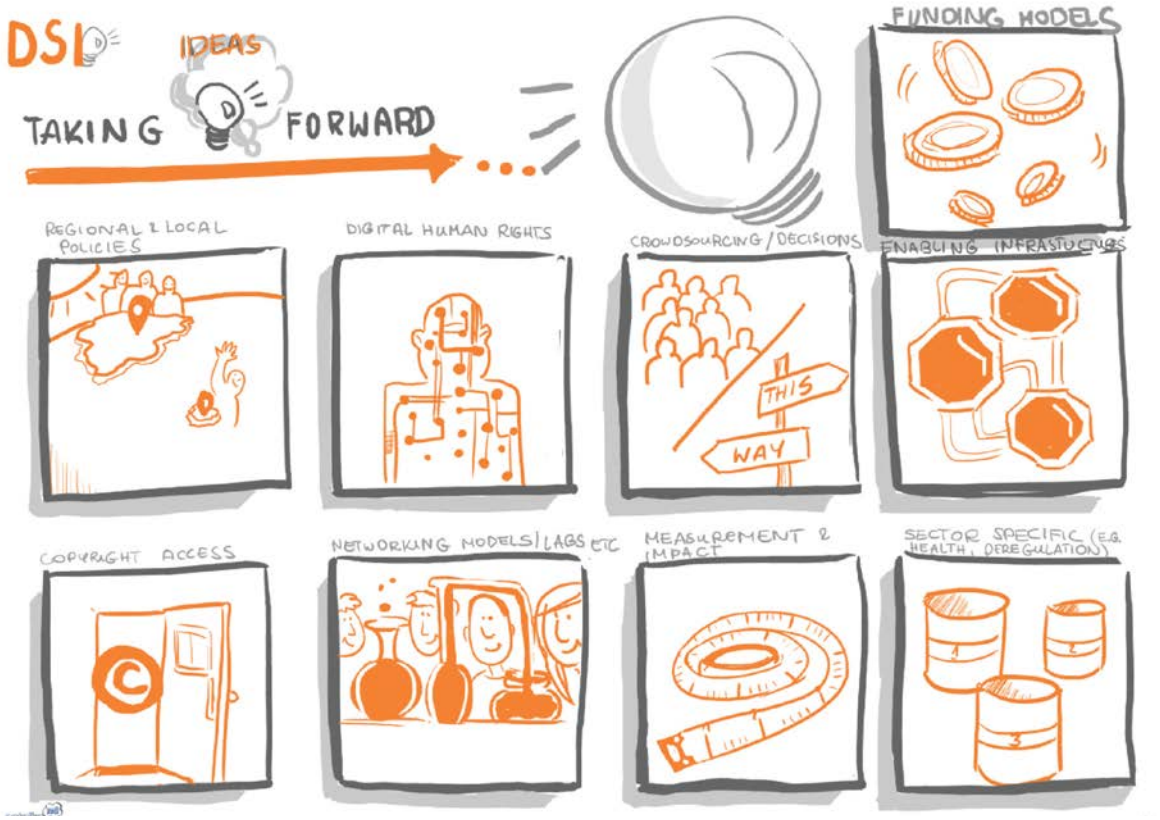


Figure 10 DSI policy ideas generation

	Crowdsourced Idea	Motivation for Idea
Copyrights and Open Access 	Open Standards for social, identity and payment data Many US companies have patents on identity, social and payment data. There is a need to require the European Public Sector and EC funded projects to not fall into this trap and provide open data sets on social, identity and payment.	Many US companies have patents on identity, social and payment data. There is a need to re-quire the European Public Sector and EC funded projects to not fall into this trap and provide open data sets on social, identity and payment.
	Public data sets available to encourage innovation	By ensuring there are open data sets available from the European public sector and EC funded projects will remove barriers from social innova-tors who often rely too much on Facebook, Twitter ect. for data. It will create more space for innova-tors to build easier and better tools.
Impact and Measurement 	Implement social value model into all policy measure-ments Put in place new guidelines that create a new social value model for evaluation and measuring policy meas-urement	Would help change the way policy making hap-pens and will help enable policy makers to look at the bigger picture. This could involve getting EU council to adopt beyond GDP measures.

Funding models and instruments 	Timefunding, crowdsourcing with time We are studing the way to allow pople to use their time as asset and allow us to give us mutual credit in order to help projects go life. Time its a coin we allready have and can be easly created with social task like many examples arround the world	To allow us to be able to use our time as currency Time can be used as currency and empowers people with the chance to give and receive credit to lean and be helped by others
	Align EU funding Align EU Regional Fund spending with EU Strategy for DSI /CAPS. Streamline use of funds within a Europeans strategy to help scaling DSI/CAPS initiatives .	Streamlining funding will help increase the number of DSI/CAPS initiatives and provide a holistic frame work to support them.
Digital Human Rights 	EU public Digital ID to enable citizens to control their digital ID Create an European wide distributed and standardised public digital ID for all citizens	Powers of companies such as Google and Facebook have a lot of control over an individual's online identity. By creating a standardised public Europe-wide digital ID would ensure individuals have greater autonomy and control over their online identity.
	Guidelines and rules to ensure privacy, fundamental freedoms and rights in the digital environment	Protect individual privacy, rights and fundamental freedoms There is increasingly more personal and social data available online which threatens individual privacy and freedom. By having set guidelines and rules on this data and helping individuals maintain control over their own data will prevent infringements on privacy.
Citizens engagement and feedback 	Democratic and distributed social network Social network based on open source code to promote the most interesting news decided by the people, sending links and voting. Based on the open source code of Meneame.net, but with a new user interface more similar to actual social networks like Facebook or Twitter. I would call it Yups.com: Yups for the positive votes and Oops for the negative ones. I've started right now the nonprofit project, but all help is welcome to spread the news important for the people, instead other interests.	
Enabling infrastructures 	Funding a Public-Private-People Partnership (PPPP) on distributed architectures in order to: create an open decentralised digital ecosystem including open data distributed repositories, distr buted cloud, distributed search, decentralised social networking, public identity management, and encrypted email service.	The internet ecosystem today is highly centralised The current Internet is dominated by a handful of mainly US companies that control all the layers of the tecosystem (app store, cloud, machine learning, devices), and are imposing their rules of the game. Europe needs to invest in future infrastructures that reflect the European values, support SMEs and civic innovators and deliver public good. Distributed, privacy-aware enabling infrastructures can also re-establish trust.
Ecosystems and Innovation labs 	Establish an EU Innovation Lab to support, facilitate and foster more innovation and DSI projects	Combat the lack of legitimacy and coordination of DSI initiatives within the EU by creating a space within the EU Commission to support and promote DSI.

Sector specific regulation /deregulation 	Net Neutrality and banning software patents Banning software patents and continue to campaign for the internet to remain a neutral space.	Keep bottom-up innovation feasible and affordable. Software packages that are patented can be expensive making them less accessible and not affordable to potential individual innovators. Also the internet needs to continue to be a neutral space where creativity can continue to flourish.
	Gender Equality in DSI Promote gender equality in DSI by tackling things such as criteria for funding, visibility ect.	Improve diversity in DSI. DSI disproportionately males dominated. Less diversity can hinder innovation as there is less variety of people doing DSI.

Table6: Crowdsourced policy ideas

5.2 The BETA "Bottom-up" policy workshop toolkit:

As outcome of the DSI policy workshop, we have designed a Bottom-up Policy Toolkit for practicioners and policy makers to run participatory policy experiments that can produce innovative policy ideas and solutions:

Step 1:

Get a wide range of people in the room.

The workshop should include practitioners, industry representation, academics and policymakers.

Step 2:

Start with live case studies from practitioners

- people who run services and who know what the problems/challenges/opportunities are. Make sure they represent a sample of the type of practice you are developing policy for and that they focus their presentations on what is important for people in the room. As an example, we asked each of our case studies to each prepare a five minute presentation covering the following:

Project background, including key facts (such as when they were founded, turnover, number of users, size of organisation, employees etc)

What they were trying to achieve with their service, including any evidence they have of impact

Opportunities and challenges

What really helped them get their project of the ground and helped them to scale up their work

What the biggest barriers were that they faced and how to address them (through policy? Funding?)

If they could make three changes to EU national or local policy and funding mechanisms to better support projects like theirs, what would they be?

You can read an example of one of the presentations here. It is important that you leave at least half of the time for participants to ask questions from the presenters.

Step 3:

Frame the development process.

Highlight that there are a range of different policy tools to draw on (Laws, regulation, money, standards, skills) and give some sector-specific examples of policies that created a favourable impact. Point out that they don't all have to be big ideas or need to be expensive to implement, and acknowledge the often serendipitous innovation that emerges. (e.g. DARPA led to the creation of the internet, the R&D funding at CERN led to the invention of the Web) Encourage people to think about:

Who could implement it (European Commission, national governments, municipal etc.)?

Who will benefit? What are the barriers? Who are the enemies of the idea?

Does it need money?

What work needs to be done to flesh it out?

You may also want to promote the importance of evidence-based policy-making as a continual process of understanding what works (and what doesn't). Finally, it's important to acknowledge that policy may not be able to solve some problems. For example, often huge amounts of value can be created by industry bodies working to develop better standards or terms of trade that don't need governments to get involved at all.

Step 4:

Identify the problems/opportunities.

We asked everyone in the room to individually complete this template to quickly generate ideas:

Step5:

Cluster the ideas together.

For a room full of 50+ people, this needs about an hour in length. We recommend that the workshop facilitator does this over a lunch break. With a diverse group of people in the room, you are naturally going to get a very diverse mix of ideas. Cluster them by the main problems they are trying to address. If you get more ideas than you have working groups, you can ask participants to 'dot vote' on ideas and choose the most popular themes for the working groups.

Step 6:

Get people into smaller groups to discuss the clustered ideas and further develop the best one or two.

This should take approximately 45-60 minutes. Appoint a facilitator to keep the conversation focused and a rapporteur to report back at the end. We reckon 5 is the minimum number of people needed. More than 12 and you'll struggle to let everyone have their say.

Step 7:

Plenary. Ask people to report back to the re-convened workshop.

Prime some attendees to give a response to the ideas presented. We asked actual policymakers to give their responses to ideas and we also asked the presenters to give their feedback. Finally, test out with the people who presented case studies in the morning to check the ideas are useful.

Step 8:

Summarise the day and issue a call to action.

Encourage people to take their ideas forward. We're using Your Priorities as a platform to promote the ideas to others. You might want people to

pledge some action. We asked attendees to write their pledge for how they'll develop their thinking on

digital social innovation and told them we'll email their pledge back to them after six months (this keeps people on their toes and allows us to re-engage with them after that time).

Step 9:

End on a high. Thank everyone of course. All through the process, remember the golden rule-oft.

running workshops – find engaging presenters with useful information for their audience, lots of participation, encourage networking, focus on action and good coffee

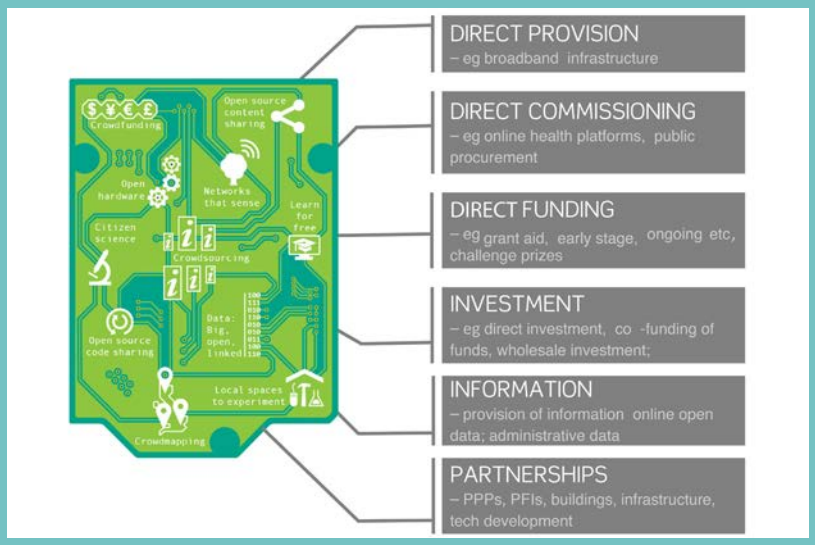


Figure 11Policy Tools

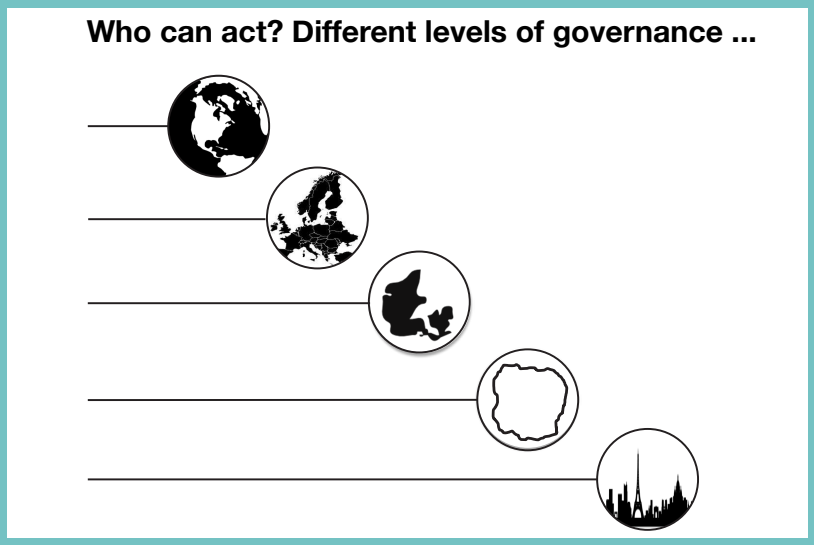


Figure 12 Governance levels

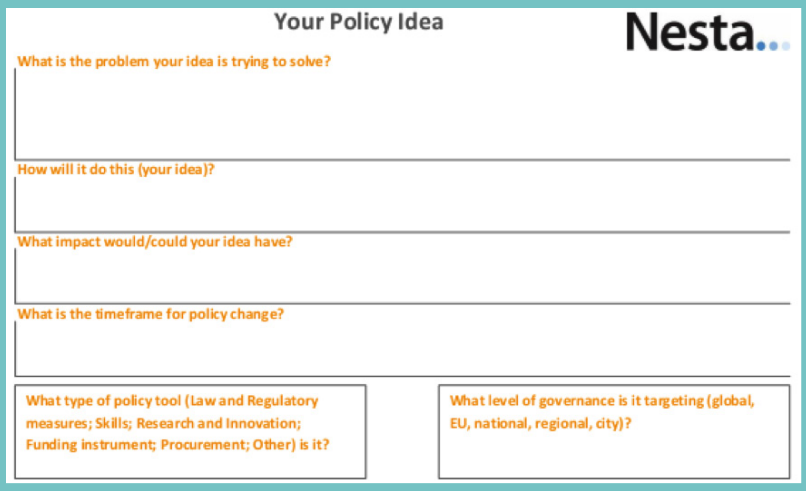


Figure 13 Policy Idea generation Cards

5.3 Emerging digital innovation policy issues

To summarise the preliminary themes that have emerged from the community of experts and practitioners of DSI, there are a number of perceived future Internet threats (such as concentration of power and surveillance), and six sets of key future policy issues that can start shaping a new DSI research and policy agenda.

A main Internet trend-threat in the current and future Internet ecosystem is recognised today: **an increasing concentration of power** in the hands of a few data aggregators (e.g. over the top players), none of which is located in Europe (Google controlling nearly 82% of the global search market and 98% of the mobile search market, Facebook dominating the Social Networking and Identity Ecosystem, whilst Apple, Amazon and Microsoft controlling the mobile market and cloud-based services platforms).

Furthermore, the Digital economy is now mainly based on business models that aggregate, analyse and sell personal data, turning personal data in what has been defined as the "oil of the Internet economy". Most users have accepted exploitative business models based on privacy infringement and often hidden surveillance mechanisms in exchange for free services. This bargain not only undermines privacy and weakens data protection but also commodifies knowledge, identity, and personal data. European SMEs, developers and social innovators are innovating with cheap open hardware, open source software, open knowledge, open data and analytics faster, and are producing valuable data about people, the environment, biometric and sensor data (as shown in the DSI map[129] but these data are not yet used to enhance the public good at a systemic level.

What needs to happen is to channel more resources and coordinated policy actions to support grassroots and social innovation. There is a common sentiment that a strong public intervention at EU level is needed to properly support these areas of developments which, far from being within the short-term interests of big EU industries, has insofar been left to isolated developers, activists and hackers. Recognising its **strong social value**, besides its strategic contribution to repositioning Europe worldwide, and promoting a coordinated approach to its development, would allow a whole new generation of industrial and social innovation to start in Europe. We outlined here some of the main policy issues and potential areas for intervention:

1. **Distributed architectures:** One big issue is how to provide infrastructural investments such as broadband deployments and pan European digital services that underwrite robust, equal, society-wide access to connectivity. This includes the need for open data distributed repositories, distributed cloud, distributed search, and distributed social networking. It can also include the development of new mobile platforms alternative to Apple or Android) as a kind of "**regulated monopoly**" able to ensure some basic services at European level, on top of which a whole new open ecosystem of services and applications could flourish, in a participatory innovation model, based on open source and open hardware developments.

2. **The Future of privacy, data protection, trust & ethics:** The need for privacy-aware technologies based on trust and ethics is recognised. Recent Snowden revelations and the developments in the security and intelligence services have shown a fundamental weakness in notions of end-to-end security that over-impact the requirements of our systems. A EU platform able to rethink notions of privacy, trust and security by design is needed and related technical solutions that are privacy enhancing 'by design'. It would also render all current intelligence operations against the EU ineffective from the very moment of its implementation. If the environment is unstable and insecure it will be broken. Users should be able to set the terms for controlling their personal data, including data portability. In the IoT there will thus be a social contract between people and objects with ethical implications. An alternative framework is also needed to provide an **open architecture for managing online identity, security, and personal data** in an integrated fashion and based on democratic and participatory processes. The **EU data protection reform package**[130] currently being discussed by Member States is moving in this direction, trying to build a single and comprehensive data protection framework to develop tools and initiatives to enhance citizens awareness, and ensure that businesses receive guidance on data anonymisation and pseudonymisation.

3. **Open & Big data for the Social Good:** The main questions in a data-driven society emerge around new governance modalities for Big Data, collective ownership of data, data portability, and how to valorize data as knowledge commons). Citizens should trust the institutions that control and negotiate their data and take decision on their behalf. Users' social graphs (personal attributes, friends and relationships) and "interest graphs" (what people like and do) are harnessed and sold to advertisers to extract and 'mine' targeted market information. The question is how to assure user control over personal information in an ocean of commercially valuable Big Data. Technical Solutions do not work by themselves, therefore legal and commercial solutions have to be based in technology and integrated with the appropriate policy framework. Defining sensible governance modalities for big data will requires a large collaboration between public and private actors.

4. **Public federated identity management for the entire EU:** Identity Management is becoming a very important issue in the digital economy, since social interaction and relations are increasingly mediated by the network and their instruments. The aggregated data extracted from the analysis of our identities (what companies define as "social graphs") and behavioural patterns of the user, is continuously mined and analysed with the main objective of maximising value extraction (e.g. for marketing, economic competition, and surveillance). A broader investigation and the understanding of the implication of such mechanisms are crucial for the understanding of future bottom-up digital economies. The agency that public or private providers have today on identity is mainly at device level. The device controls which platforms it talks to and the platform determines which services, products or spinoffs are supported. One innovative idea proposed during the policy workshop was to turn the current passport (a piece of paper or plastic with a chip) into an open source mesh-networked device (a chip with a screen). Security will be hardcoded into the device. The device allows talks to only EU platforms (IoT-A, Fi-ware…) and the platform will offer interoperability to preferred non-EU partners. This framework would allows for a 500 million market overnight that is able to build its own open infrastructures for the general interest.

5. **Open access, open standards, and Copyright reform:** Access to knowledge is a founding principle of any open and democratic society. Regulation and policy can play a key role in network neutrality, open standards, open access, and common frameworks preventing abuse of dominant market power. Regarding open access to scientific results the EC is promoting a comprehensive **Open Access policy**[131], so that results of publicly-funded research across EU Research Framework Programmes, namely FP7 and Horizon 2020 can therefore be disseminated more broadly, to the benefit of researchers, innovative industry and citizens. In the area of copyright, the European Commission just published its '**Report on the responses to the Public Consultation on the Review of the EU Copyright Rules**'. This report summarizes the responses (over 11,000) that the Commission had received in reaction to the copyright consultation held between December 2013 and March 2014. The results are very polarised, showing conflicting positions between citizens and institutional users on one side and right holders on the other. Copyright can only work when it is perceived as fair by all stakeholders, seeking the right balance between the interests of creators (to control their work and to be able to make a living of their creativity) and the interests of society (access to information and culture, freedom of expression) (Keller, 2014)[132]. Such patterns in public policy consultations show that stakeholders' involvement is crucial, and that the Commission should engage citizens and other public institutions as genuine stakeholders in discussions about key policy issues and the formulation of policy actions.

6. **Mobilising Collective Intelligence to grow new Digital Commons:** Digital social innovation projects are generating new forms of digital commons, and it is crucial to identify models of organisation of collective resources to achieve sustainability and to scale DSI. New business models based on sharing resources (such as energy, talent and tools), fair distribution of the fruits of collective intelligence, trust and reputation should be experimented and pioneered. Building and governing digital commons honours participation, inclusion, empowerment, equal access, and long-term sustainability. This research is showing possible ways to manage the commons and economic alternatives models based on new institutions of shared, common wealth, grasping the value of networked social production.

5.4 Preliminary Recommendations on innovation policies

After reviewing the literature on open innovation, defining what an innovation ecosystem is and analysing the different communities of such ecosystem, some areas of public intervention have been identified. Thus, in this last section, we will end with recommendations to improve innovation policies in Europe. These recommendations are quite general and have mainly to do with the policy-making framework. In the final study report, we will examine them in-depth.

Our first recommendation is that public policies in innovation have to be innovative. Because of past failures, innovation and innovation policies cannot be thought as they were conceived in the past. The traditional public policy analysis framework has to adapt to the knowledge era, paving the way for the emerging **open public policy innovation model** in which governments make use of external and internal sources of information to develop novel policy solutions. Open public policy innovation represents an iterative problem-solving process in which inflows of knowledge from external actors as well as information about their behaviour equip policy makers with a generative capacity for developing novel policy solutions. Such policy innovations are superior to policy solutions that are developed internally – inside the ministerial boxes.

Secondly, this same philosophy has to be applied to the innovation policy itself. In this respect, a shift from closed innovation inside the boundary of institutions to open and collaborative innovation is required.

Innovation should no longer be seen as a linear step-by-step process in which R&D activities automatically lead to innovation and commercialisation of new products, but as a complex, dynamic, and interdependent process of all organisations and stakeholders: a broad concept of innovation, both research-driven and innovative in business models, design, and services that adds value for users and strengthens overall European added value. Innovation should no longer be the result of top-down push technology strategies but of a **crowdsourced way of working**. In this context, policy (at all levels) can play a key role in creating coordinated strategies, common governance frameworks, and new instruments to achieve common innovation challenges in specific domains. This challenges the traditional role played by governments that, more and more, have to be seen as platforms, that is, as conveners and enablers rather than the first movers of innovation.

Thirdly, innovation policies need to be more **experimental.** This would allow discovering or testing novel instruments, products, or services and thereby propelling broader-based innovation policies. Although, as stated in section 2, the European Union has already implemented some programmes that give support to experimental social innovation, more investment in this area is needed. Policy-making should encourage social innovations to be tested and implemented in specific social settings.

Innovation policies also need to be more **targeted**. Our analyses of the innovation ecosystem communities have let us identify failures and needs of support within each community. Although some of them coincide (lack of funding, visibility, and technical support, or lack of connection, to give a few examples), there is a need to formulate specific objectives for specific communities, tapping into behavioural mechanisms and, therefore, offering their actors the right incentives to push participation in the community and, as a result, to boost innovation.

Innovation policies should **go beyond regulation and funding**. Regulation matters, particularly regarding certain issues as open access, open data, open standards, and public sector information re-use, topics already tackled by the European Commission (see, for example, the Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020 or the PSI Directive, the Directive on the re-use of public sector information). Actually, we believe, as can be concluded from sections 4 and 5, that digital social innovation is a lot about open knowledge and open data policies. Therefore, regulating open data standardization across Europe or setting up a European open data agency would be interesting ideas.

Funding is critical as well. The analyses of communities have shown that the lack of money hinders innovation within the communities. In this respect, section 5.1 has shown that many different programmes and supporting schemes have been used over time. However, funding programmes are top-down and do not involve actors and stakeholders actively and proactively. Therefore, innovation policies have to address other issues, that complement funding and regulations. Knowledge sharing and dissemination, capacity building, support studies and scientific research, and enabling infrastructures are a few examples.

Of particular importance is **support to enabling infrastructures** (such as open networks and distributed architectures) for they contribute to developing a climate that is conducive to boosting social innovation. Section 5.4 has presented each community's enablers, stressing their roles and characteristics. Although many of these intermediaries offer technical support services and networking activities, a lot remains to be done in order for them to reach a wider audience and to guarantee impact. Europe, for example, needs more civic accelerators but, also, regarding existing infrastructures, more fiscal incentives are needed as well as a legal space that could give more structure and governance and, therefore, make the most of intermediaries and enabling infrastructures.

Our analyses have also identified a gap between the so-called innovators (no matter which community they belong to) and the public sector that has to scale the innovations and fund them. We therefore recommend having public policies aimed at bridging this gap, at **integrating (local) governments and innovators.** Other than e-procurement and contracts, we recommend exploring other types of arrangements.

We finally want to add that innovation policies **t**. Edler et al (2013) conclude that, despite the existence of studies and evaluations, there is not much evidence on what really works and what does not. Knowing what produces results and what does not would immensely help policy makers to drop those policies that do not have an impact and to improve investment in those that really work. This is, therefore, also a recommendation related to policy making to support digital social innovation.

There is room at all levels to support digital social innovation. Each administrative level may play different roles. Innovators act locally but they may belong to wider and transversal networks. Local governments should, for example, offer local (economic) incentives for local innovators belonging to local communities. At the other end, European policy makers could strengthen the link among communities, support local and national governments, or coordinate transnational actions. But action is needed at all levels.

6. Analysing network data: Exploring DSI Network effect (WP2)

In order to analyse the relationship data from the mapping, we are adopting social network analysis to detect patterns of relations and argue that the causal success of DSI located in the social structure. By studying behaviours as embedded in social network structures, we will be able to explain macro and meso-level patterns that show the dynamics in which DSI organisations and their initiatives create scalable results and what DSI organisations are in need of help. One of the primary problems facing the mapping of an open-ended field such as DSI is how to direct the multiple diverse streams of data from interviews to social media into a central repository capable of giving a "big picture" of European DSI that can provide strategic recommendations for the EC. In combination with our hybrid iterative strategy of case study interviews, workshops, and events relevant to the communities, we believe we can identify and map these actors in a way that has hitherto not been possible.
Social networks are formally defined as set of nodes (or network members) that are tied by one or more types of relations (Wasserman and Faust, 1994). The data collected at http://data.digitalsocial.eu network represents DSI organisations and their social relationships mapped in the form of graph that is a collection of nodes and edges between them. In the case of the DSI social network collected in this study, the nodes in a graph are communities, and the edges represent joint projects. This social network analysis examines the structure and composition of DSI organisations ties in a given network and provide insights into its structural characteristics, such as the centrality of actors in the network; the number of individual connections; the number of communities; the least connected outliers; and the large-scale structural distribution of the ties that exist in the network and so on (Newman 2010).

Through our approach of **mixing open data analytics with human-centric interviews/case-studies,** we can better understand complex phenomena and socio-economic and environmental trends. Thisadvances the mapping of the field and our understanding of how to create new and powerful structural links among existing groups and initiatives. This goes far beyond just making a quantitative and visual picture of a network, but provides qualitative explanations of the European DSI network structure functions, through insight into the otherwise hidden dynamics of DSI that can only be revealed by case-studies and interviews. Furthermore, this visualization of the DSI network, embedded in our website, is interactive and aims at engaging the larger DSI community itself. This means we can use this ever-expanding visualization and network database as a tool for "crowd-sourcing" even more information about DSI in Europe, to prevent the network mapping from going out-of-date.

We will continue to strengthen these communities by using network-driven analysis to build crucial missing links in our open events, such as during the Open Knowledge Conference launch that directly engaged key communities. Finally, this analysis will then feed later work packages such as WP5 and WP6 in order to determine what recommendations on a policy and instrument level are needed for the EC to knit the map of DSI actors into a coherent single integrated EC DSI network, therby achieving the **"critical mass" necessary to harness the collective intelligence of DSI organisations to solve** large-scale European social problems.

6.1 Network Analysis Methods

One of the tasks of this second interim report is to both determine how the current data can help to answer a set of strategic questions around DSI. First, an adequate and rigorous conceptual framework is needed. Only with such a framework can data and hypotheses be interpreted in a sensible manner without projecting pre-conceived, and often wrong, assumptiosn onto the data-set. In particular in the longer term, this requires both an **unbalanced sample**, in which we assume the data adequately reflects the empirical phenomena at hand, and **significance testing**, as network-based data often assumes a non-Gaussian distribution such as a power-law.
Phrasing both the null hypothesis and alternative hypotheses in terms of network theory must be done with care. There must then be enough data to adequately test the hypotheses, using mathematical techniques that can statistically quantify the level of confidence in the proof of the data for any given hypothesis. For non-Gaussian distributions such as power-laws, traditional t-tests against Gaussian distributions and even traditional statistics around averages and means are scientifically invalid134. However, in this second interim report we cannot yet engage in this work, due to the small and mostly disconnected data-set we currently have gathered, where it seems there is a large bias towards the United Kingdom and DSI partners (as should be expected given that the partners have been in charge of outreach). We have, therefore, limited ourselves to a more broad-stroked analysis of the data. From this analysis will come a number of hypotheses that we will more rigorously quantify and test in the final study report.

In the **DSI Network Data-Set**, there are a total of 581 organisations with a total of 364 activities as of 4 August 2014. This more than doubles (the addition of 296 organisations) from 13 December 2013, where only 285 organizations were involved in the analysis. It seems most of the organisations adding themselves to the map are the result of the outreach effort by partners. We still have concerns that the data-set is heavily biased towards English speakers due the lack of translation of the website into languages outside English. We still believe that many more actors in countries such as Italy, France, or Spain where fluency in English is not to be expected would respond if the survey itself was translated into those three languages. Howver, the website was not designed using standard internationalisation techniques and adding them is outside of the budget allocated for this project. We would argue that future work after the end of the DSI project should allow the website and survey to be available in a number of different European languages, so that the data-set will be a more representative sample of digital social innovation in Europe. We earlier estimated that we need approximately 1,000 data-points, with a fair amount of connectivity. Currently we still have only half the data we need for a full analysis. However, we can "eyeball" the results of the data-set and determine general trends, as well as commence with a basic quantitative analysis.

6.2 What is the distribution of social innovation across Europe?

Is social innovation done by a few large actors (an exponential distribution)? Or a few large actors in concert with a large mass of smaller groups (a power-law distribution?) Or is social innovation more evenly distributed between various actors (Gaussian "normal" distribution)? In order to determine this, for all the organisations we map their **degree**, which is for a given node (organisation) the number of connections (links) it has with other nodes (organisations). Interestingly enough, as shown in Figure 1, the data is mostly disconnected. There are only 136 organizations with connections to other organisations (23%). It appears that the vast majority of DSI organisations in Europe are disconnected from each other. However, this is not surprising because in organic systems there are often non-normal distributions such as "power-law" distributions.

Indeed, if we graph the data-set **of only connected organisations**, we can see a clear "power-law" style distribution arise, with the vast majority of the organisations in networks having only one link with another organisation (dyads) or 3 links (triads) with other organisations (54%), but there appeared to be more organisations with five links (13%) than with only 4 links (7%) so the relationship is not strictly linear. There is then a dip in the number of links, although a surprising number of organisations with 10-20 links (13%) such as "Institute for Network Cultures" and iDrops vzw. At the very top of the list, there are two organizations with more than 20 links (Nesta and FutureEverything), and the most connected organisation (Waag Society) has 37 links. Overall, there is an average degree of 3.985. This shows that while a small number of organisations are heavily networked with a few like Nesta and Waag Society having networks spanning many countries, the vast majority are not and have only partnerships with one or two other organisations. We would hypothesize that the degrees of connection between digital social innovation are a power-law because there are a few heavily connected organisations with over three connections and a vast long tail of not very well connected organisations (89% of entire data has three or less links, including zero links). In the final version of the report, we will do significance testing on this hypothesis with a larger data-set. The distribution of links is given below, where count is the number of organisations and value is the number of organisations in Figure 14. We also then graph the network, where the size of a node is increased by how many connections it has in Figure 15.

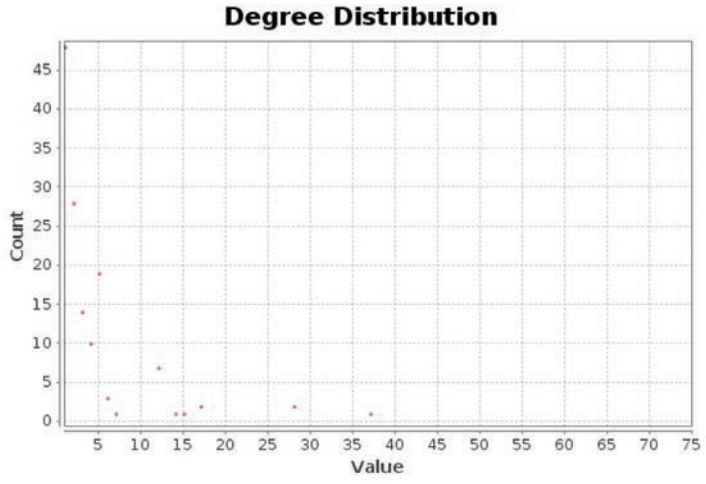


Figure 14 Distribution of DSI Connections in Europe

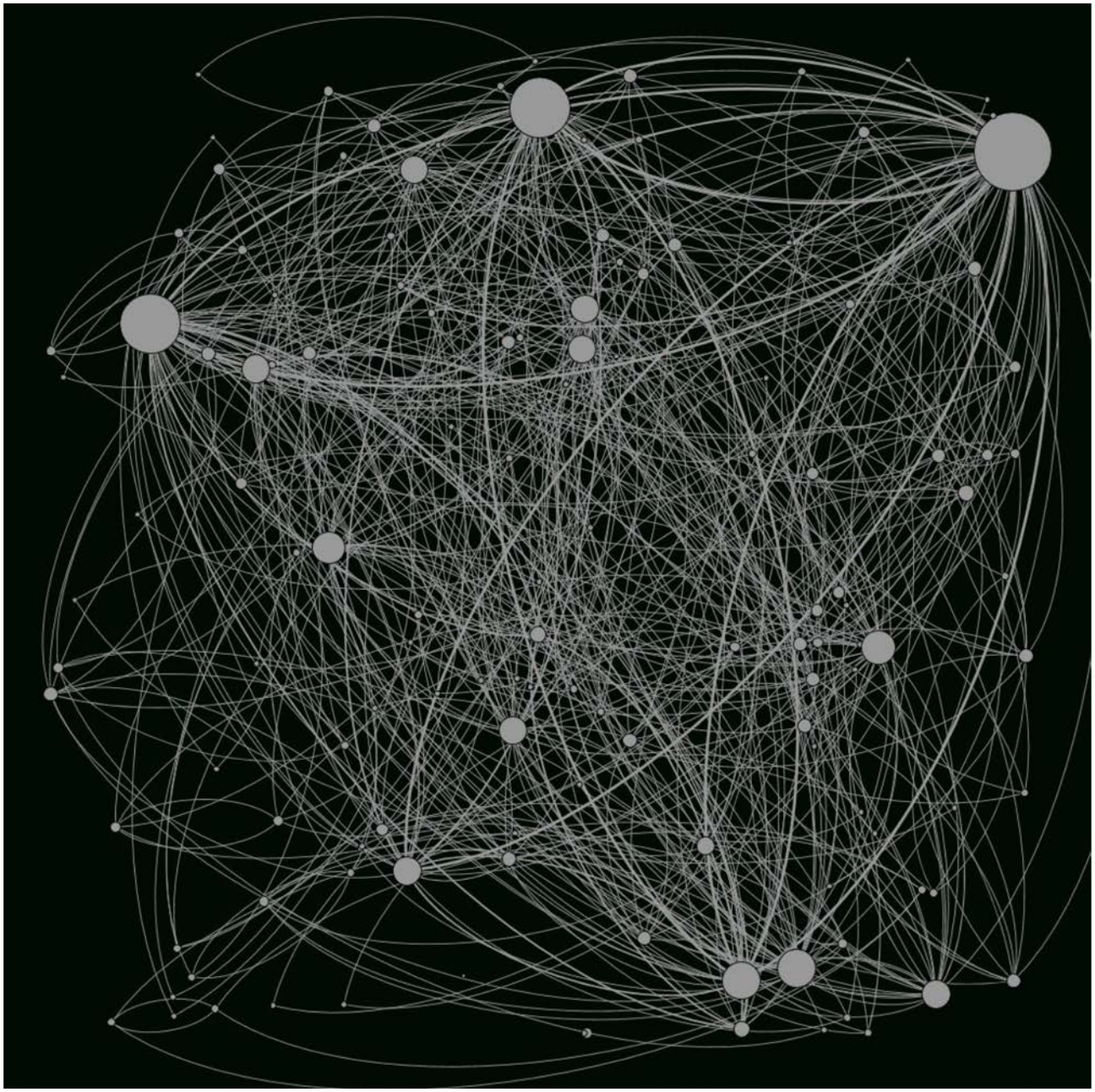


Figure 15 Visualisation of DSI Network

6.3 What communities of social innovation exist in Europe?

Community detection algorithms can be used to find dense substructures (often called "communities") within a larger and often sparse network. A community exists when a network is partitioned in such a manner that nodes within a community are more densely interconnected than those outside of the network. In particular, to quantify communities we looked at connected components, i.e. graphs where every member was connected. In terms of measurement, the modularity of the DSI network is .62, where modularity is the percentage of the connections that fall within the given community minus the expected such links if they were randomly distributed (Newman, 2006). This reveals that the there are robust communities. Interestingly enough, visually inspecting the communities found in the network of digital social innovation organisations, shown by the Force-Atlas135 diagram in Figure 3, reveals that there are 24 total communities, based on one very large inter-connected community and many very small communities (23) where these small communities do not have connections to the larger "super-community" developing in digital social innovation as well as to each other.

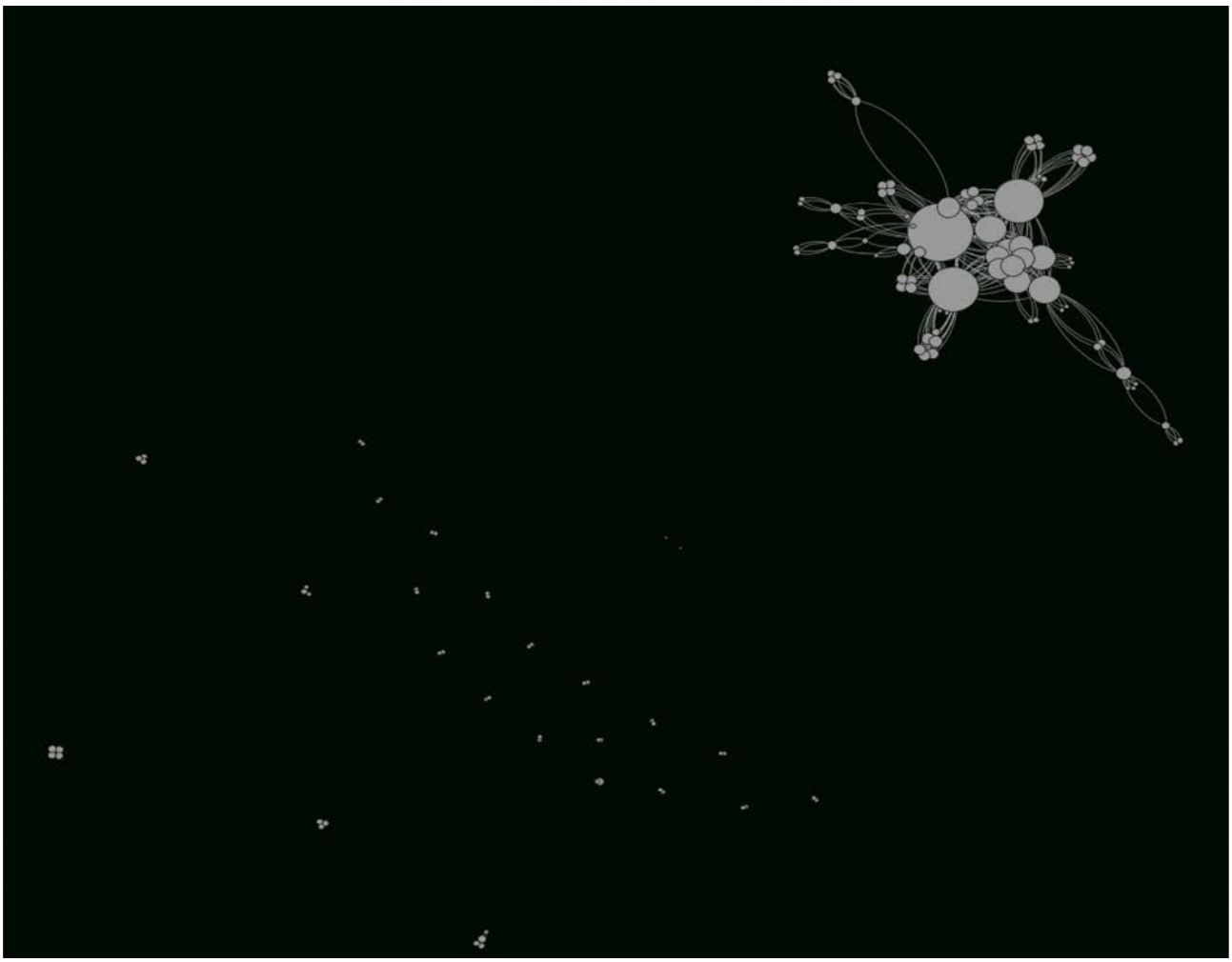


Figure 16 Diagram of Communities in the DSI network

This is revealing, insofar as we could have imagined that the digital social innovation network could have had three or four disconnected large communities, or that all smaller communities were simply composed on a single lone organisation being linked to another very heavily linked "super-connector" organisation (as would be the case in a graph of links to and from Wikipedia, for example). In detail, there is a clustering coefficient of .887, signalling a fairly high density of interconnections in existing communities (Latapy, 2008). The way to interpret a clustering coefficient is that it is the measurement of how likely it is that the organisations linked to each other are also linked. The super-community itself has some very long connections though, and so connects a number of otherwise disconnected communities through a large number of links, as the network has a network diameter of 7. Not surprisingly, again the "giant hub" or "super-network" of the digital social innovation network in Europe is itself heavily interconnected, and so it is not a single organisation monopolising all the influence, but many smaller ones who start networking with each other via contact with one of the larger super-connector organisations. For example, we can imagine that by contacting an organisation like Waag Society, an organisation that would be otherwise be isolated, such as a FabLab in Hungary, and then find many other FabLabs and start networking appropriately. This naturally leads us to the question of how to join the various communities.

6.4 Which organisations currently bridge the various communities?

Simply measuring centrality may fail to show which organisations act as crucial "bridges" between different kinds of networks. While a few highly connected organisations are important, organisations that connect otherwise disparate communities are crucial. This can be measured by using betweenness centrality, where the centrality of an organisation is measured by counting the number of times a node occurs as a shortest path between two other nodes. Interestingly enough, the **between centrality** shows that while the network diameter is 7, the average path length is 2.78. The betweenness centrality is spread in a very similar way to the degree distribution, which is not surprising, as shown in Figure 17.

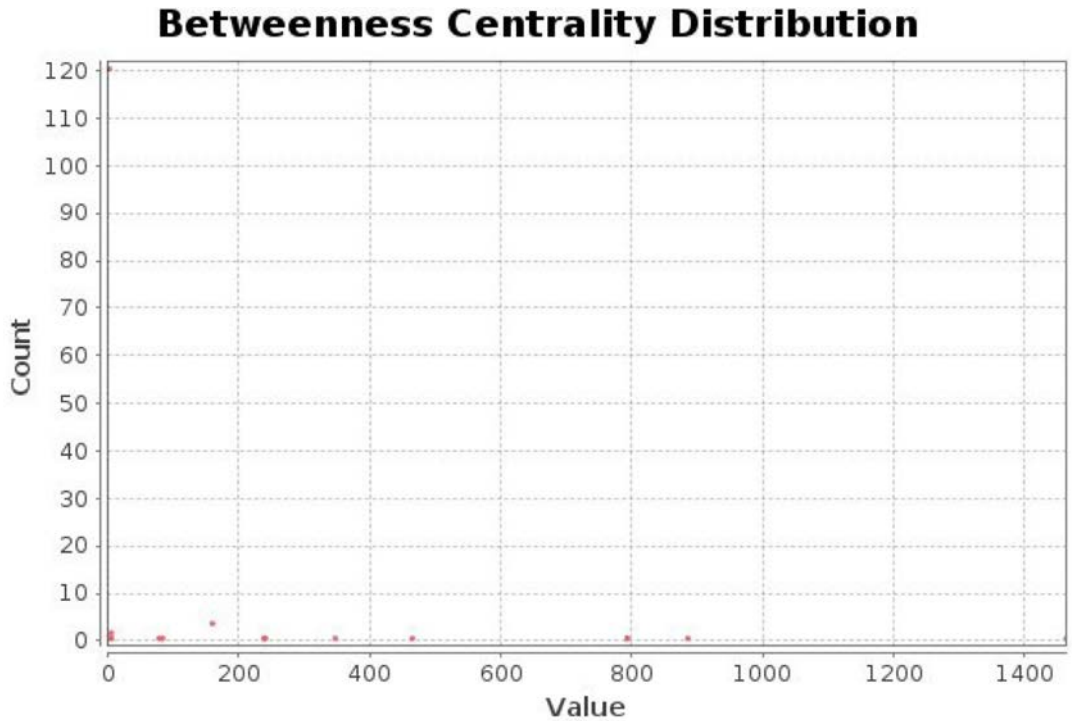


Figure 17 Betweenness Centrality

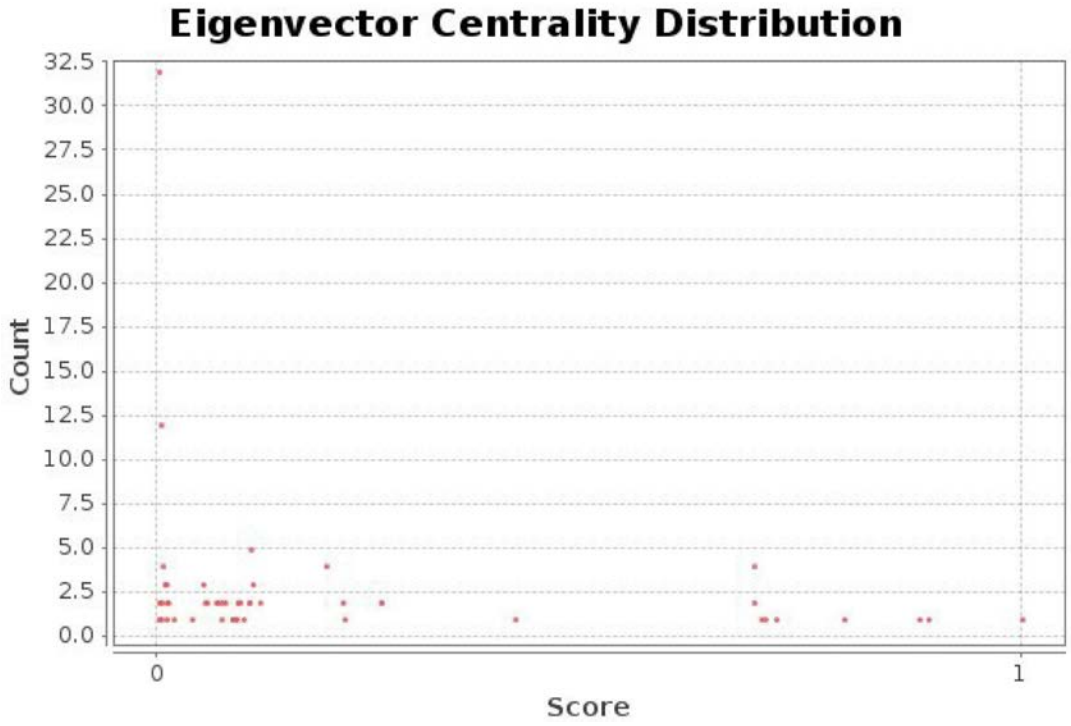


Figure 18 Eigenvector Centrality

What is more interesting is the **eigenvector centrality**, which shows how well-connected an organisation is to the parts of the network with the greatest connectivity. Thus, even if a organisation is not central with many possible links, it may only be a few links away from dense communities of well-connected organisations. This measure can be thought of as a measure of resilience. As shown by Figure 5, while betweenness centrality is spread very thin, due the networks being quite interconnected in the super-community in Europe, the eigenvector centrality is spread out much more evenly in Europe.

In summary, what is revealed is that many European social innovation actors are unconnected to each other, as there is only on average 0.93 links per organisational activity when organizations with no links are counted. Also, as mentioned earlier, in particular there are 444 organisations out of 581 (76%) that have no links to other organisations. The network is mostly dyads and triads of organisations. There is not simply a few large clusters that should be bridged, but *many completely isolated and very small networks that need to be connected to the larger single European Digital Social Innovation super-network.* If we take our data at face value, for the most part that does not seem to be happening organically.

This means thatthere is an opportunity for the European Commission to connect the very small networks and lone organisations to the larger super-network. This could happen via European projects or networking events. Given that the larger super-network is very international but nonetheless centred around the United Kingdom and the Netherlands, there should also be more of a push to get the rising smaller networks to meet each other. The creation of the super-community is also likely not merely a linguistic artefact, since it features heavy connections with France. It is also likely not just sampling bias in favour of the partners in the DSI study (although that clearly plays a role). For example, Open Knowledge Foundation and Forum Virium are both not part of the core DSI study team and yet have very dense roles in the super-community. It appears most of the smaller networks are local, such as those in Italy and Spain, and many countries have many disconnected small networks that would be benefit from increased networking, even in countries where more international links are being made, such as Germany. A precise analysis of how the small networks relate to the super-community and their relationship to particular countries and European efforts should be done in the next report.

6.5 What are the conditions for scaling DSI?

First, we have to determine what "scaling" DSI means? Likely it means that there is a dense, resilient network of digital social innovation throughout Europe. However, as has been demonstrated, European digital social innovation is still heavily disconnected. Given the previous analysis, it is still difficult to tell what the conditions for scaling DSI are, but much can be determined by looking at the characteristics in detail that formed the DSI European super-community. We can then determine what the likely attributes are, in terms of funding and other related characteristics, which led the DSI super-community to form in the first place.

We can also do a number of theoretical experiments by determining how a number of other influential well-placed hypothetical connections could be what???, by "bridging" the nodes of disconnected communities and measuring the impact on centrality measurements and re-partitioning the communities. One use of this technique would be seeing if added a new connection between organisations causes a "phase shift" in the level of self-organisation of the network of social innovation in Europe. This qualitative notion of a "phase shift" is normally captured by a network transforming from a non-interconnected network to a small-world network, where the network diameter would be vastly shrunk and the average eigenvector centrality would raise rapidly despite only a small number of links being added. However, we need to wait for a more thorough analysis when data has been added, given that otherwise the experiments will be very hypothetical and possibly erroneous – for example, it is likely that there are other networks that have not been captured yet in this sample, which would vastly change any experiment. However we can "eyeball" that such new connections would still make the point that the most productive "phase shift" would likely large amount of between the super-community and isolated networks that could be brokered by the European Commission. Thiswould likely increase the self-organisation of a single European digital social innovation community???, rather than enabling the continual strengthening of the already rich density of the existing DSI super-community or trying to build a competing super-community.

6.6 Next Steps for Network Analysis

What does this mean for our study? In general, although we have begun a rigorous quantitative network analysis, before doing precise hypothesis testing with significance tests as well as simulations to determine how to maximize DSI scaling, we muct (1) still collect more data and to take into account the fact that (2) our hypotheses, while refined in light of the early results shown here, should be properly quantified. While we have approximately doubled the data we gathered in the first phase, we will need to almost double that amount again to get the kinds of robust results we want, namely to around 1000 organisations. Lastly, ideally these organisations would be interconnected. Also, it is possible that some of the networks are not being entered into the survey due to difficulties with the user-interface. Regardless, the initial network analysis results are already interesting and showing that a single digital social innovation network in Europe is possible, but that lots of work must be done to connect the many disconnected local digital social innovation organisations to the larger European network.

7. Understanding and measuring the impact of Digital Social Innovatio

Just as it is the case with social innovation, digital social innovations need to demonstrate their impact to make the case for scaling and attracting funding opportunities. Even if it is impossible to foresee the precise impact and quantify the multiplier effect of the mapped DSI activities, there is a need to harmonise sound metrics to assess the impact of DSI activities, including the role of ICT networks, number of people/communities involved and "beyond GDP" criteria such as social satisfaction, wellbeing, ecological footprint and social inclusion. In its work on social innovation Nesta has developed its Standards of Evidence framework.136

The five levels of evidence are:

Level	Expectation	How the evidence can be generated
Level 1	You can give an account of impact. By this we mean providing a logical reason, or set of reasons, for why your products/service could have impact on one of our outcomes, and why that would be an improvement on the current situation.	You should be able to do this. yourself, and draw upon existing data and research from other sources.
Level 2	You are gathering data that shows some change amongst those using your product/service	At this stage, data can begin to show effect but it will not evidence direct causality. You could consider such methods as: pre and post survey evaluation; cohort/panel study, regular interval surveying
Level 3	You can demonstrate that your product/ service is causing the impact, by showing less impact amongst those who don't receive the product/service.Z	We will consider robust methods using a control group (or another well justified method) that begin to isolate the impact of the product/ service. Random selection of participants strengthens your evidence at this level; you need to have a sufficiently large sample at hand (scale is important in this case).
Level 4	You are able to explain why and how your product/service is having the impact you have observed and evidenced so far. An independent evaluation validates the impact you observe/generate. The product/ service delivers impact at a reasonable cost, suggesting that it could be replicated and purchased in multiple processes. locations.	At this stage, we are looking for a robust independent evaluation that investigates and validates the nature of the impact. This might include endorsement via commercial standards, industry kitemarks etc. You will need documented standardisation of delivery and you will need data on costs of production and acceptable price point for your customers.
Level 5	You can show that your product/ service could be operated up by someone else, somewhere else and scaled–up, whilst continuing to have positive and direct impact on the outcome and remaining a financially viable proposition.	We expect to see use of methods like multiple replication evaluations future scenario analysis; fidelity evaluation.

This framework is used by Nesta and other organisations involved in developing and/or funding social innovation to:

1. Assess the evidence behind programmes, products and services to see where they are currently placed on the Standards of Evidence, enabling funders (public and private) to understand how confident they can be in social entrepreneurs claims of impact and/or the potential for this.

2. Help social innovations or organisations working with social innovations to structure the evaluation strategy to continue building the evidence behind the intervention and to move up the levels of evidence.

3. To determine future funding decisions, and help funders (private and public) to measure the impact of all the products and services they fund, helping to build an understanding if and how the funded interventions are working, and whether they should receive continued investment.

4. As the basis for understanding and assessing the evidence of impact for a specific intervention or service. One example of this is Nesta's work with the UK Cabinet office on The Centre for Social Action Innovation Fund, which uses the Standards of Evidence to assess social innovations that are considered for support. Add sentence on digital element of the fund.For digital social innovations to be sustainable and to scale, they will need to demonstrate how they can evidence their work and progress from level one and onwards.

9. Next steps

The activities listed above have been successful in helping us map over 500 organisations, establish the term Digital Social Innovation within the community and to begin to understand the community and how it works. However, we are we need to continue our engagement work to increase our reach in to the DSI community. The remainder of this project will be focused on a number of key activities:

- **Deliver final study report**
  The last deliverable on the DSI Research Project is the Final Study Report, which will be submitted to the Commission in November 2014. The final study report will include lessons from our Research in WP1, WP2, WP3 and WP4 on defining DSI, mapping and analysing DSI organisations and networks in Europe and developing policies to support DSI. In particular the report will set out visions and recommendations for how EU, national, regional and local policy makers and funders of social innovation, can best support the growth of DSI in Europe.

- **Deliver final event in Brussels, December 16th**
  Organised in partnership with the CAPS projects, the final DSI event will present the findings from the research project to a high level audience of 400+ policy makers, practitioners and members of European Parliament. The focus of the event will be twofold, as it will seek to ensure the uptake of the recommendations from the final study report, and ensure the on-going support for facilitating the www.digitalsocial.eu community.

- **Map up to 800 – 1000 organisations on the map at www.digitalsocial.eu** Alongside developing policy recommendations our key priority remains engaging DSI organisations in the www.digitalsocial.eu community. Our aim is to engage 800 – 1000 organisations by the end of the project.

- **Deliver a number of DSI related Events in the autumn 2014.**
  We have a number of events planned for the Autumn 2014 including the Living Labs summer school and Crowdsourcing week. Both workshops will help us test policy recommendations and ensure further engagement from the DSI community.

- **Develop a sustainability plan for www.digitalsocial.eu to continue to grow the DSI community across Europe and beyond**
  It is still unclear who will own and facilitate the www.digitalsocial.eu community, including its social media presence (500+ twitter followers). In addition to the research we will work with the European Commission on developing a sustainability plan for the DSI website and community before the final event on December 16th 2014.

Endnotes

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3. http://ec.europa.eu/research/innovation-union/index_en.cfm
4. http://ec.europa.eu/programmes/horizon2020/
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9. Competitiveness is defined as the capability of an economy to maintain increasing standards of living for those who participate in it, by attracting and maintaining firms with stable or rising market shares in an activity. As such, the competitiveness of a region will depend on its ability to anticipate and successfully adapt to internal and external economic and social challenges, by providing new economic opportunities, including higher quality jobs.
10. http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/1524&format=HTML&aged=0&language=EN&guiLanguage=en
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41. http://www.canonical.com/
42. http://arduino.cc/
43. http://p2pfoundation.net/
44. http://opensource.org/
45. https://github.com)
46. A Project fork happens when developers take a copy of source code from one software package and start independent development on it, creating a distinct piece of software (Wikipedia)
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91. http://www.delib.net/)
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134. To take an intuitive example, in a world with one 3000 foot tall giant being compared against a normal population of a hundred people evenly distributed between 5 and 6 feet tall, the average would move up to 30 foot tall, despite only one person being a “giant” of 3000 feet and everyone else being between 5 and 6 feet tall.
135. http://opus.kobv.de/btu/volltexte/2007/404/pdf/ThesisNoack.pdf
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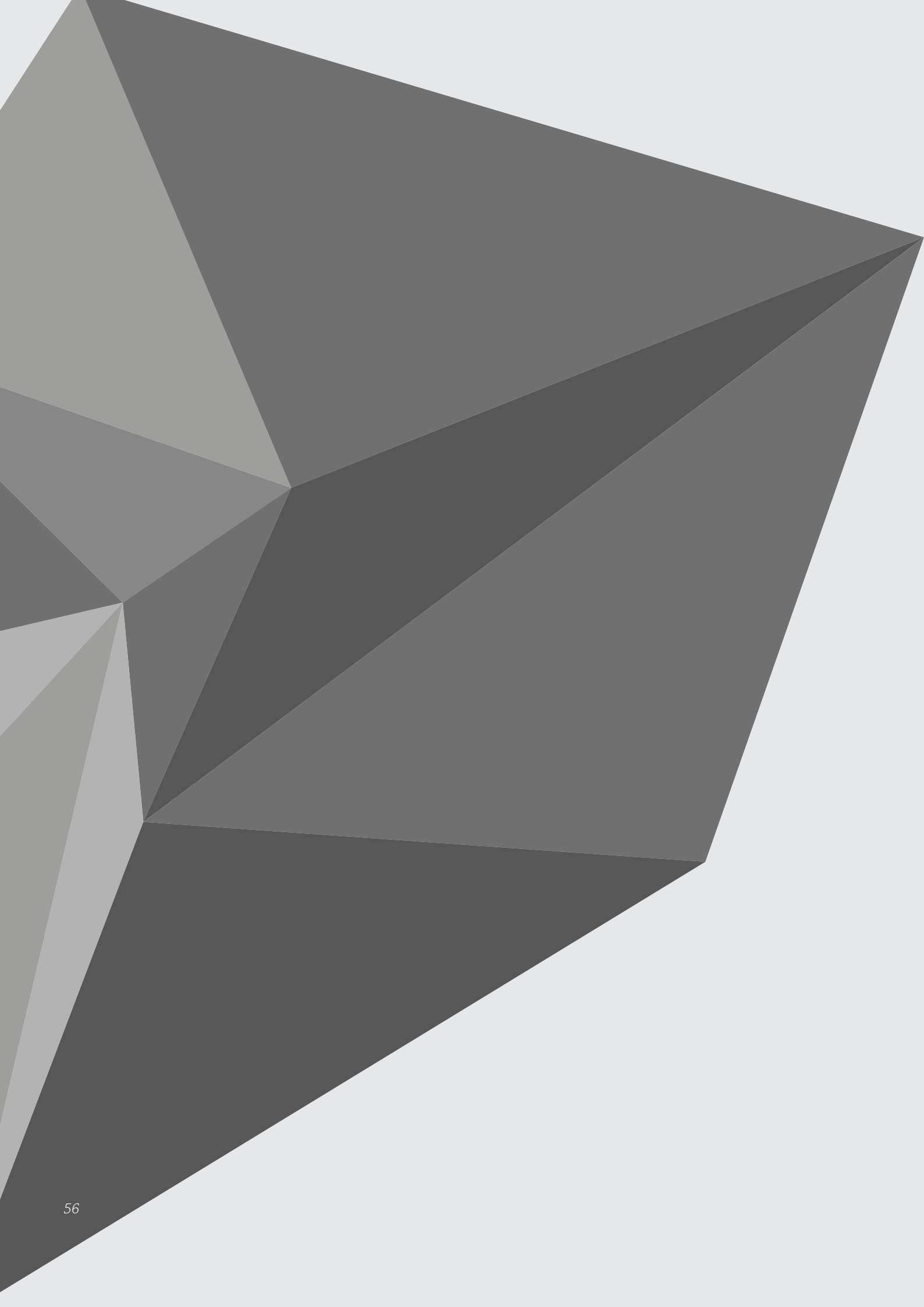
DIGITAL SOCIAL INNOVATION

Case Studies



Arduino

At a glance:

Type of Organisation:	Business
Aim:	Energy and environment, Smart public services, Pioneering science
Technology Trends:	Open Networks, Open Knowledge, Open Hardware
DSI activities:	A network, Operating a DSI service
Key facts:	Over 300,000 official Arduinos has been commercially produced
Website:	http://arduino.cc/

Organisation Name

Arduino

Short description

The core to an Arduino is a simple, ultra-low-cost circuit board, based on an open-source design, armed with a microprocessor which can be programmed with simple, open-source software tools by the user. The idea is that anyone should be able to turn an Arduino into a simple electronic device such as a light switch and sensor.

Type of organisation

Arduino is a business based in Italy.

History and mission

Released in 2005, Massimo Banzi, an Italian engineer and designer, started the Arduino project to enable students at the Interaction Design Institute Ivrea (IDII) build all kinds of electronic contraptions using an open-source hardware board. The software consists of a standard programming language compiler and a boot loader that executes on the micro controller. The project first started with 3,000 euros for the production of 200 units, but when IDDI bought only 50 units, the Arduino team decided to put the remaining units up for sale; and developed a business after realising the board's broader applications for multidisciplinary projects. Arduino has since grown to become popular–selling around 200,000 units in 2011–largely because of its creators' decision to make the board's design "open source" and its quick adoption by hobbyists, artists, scientists, and 'makers.'

What does it do, and how does this activity enhance social innovation?

Arduino is a key player in the international maker movement of D.I.Y. hardware hobbyists and tinkerers. A quick survey of the multitude of diverse projects demonstrates how it has enabled a spin-off of collaboration and creativity. Furthermore, Arduino's ready acceptance that sometimes its own community will have better solutions to some of the technological challenges they encounter (see for example the case of Complubot elaborated on below, where Arduino co-founder Massimo Banzi enlisted the help of two Spanish kids who had made a prize-winning Arduino powered Complubot robot, when he was approached to make an educational Arduino-based robot for kids). This demonstrates an ability to devolve power outside traditional channels in order to enable innovation to occur.

What is the social impact it is seeking, including any evidence of impact to date?

The arrival of Arduino is said to mark the move from open-source software to open-source hardware. Arduino has been described as "LEGO for electronics" in its easy-to-use approach. Furthermore, Arduino has significantly lowered the economic barriers to D.I.Y. electronics thanks to the product's low cost and open source business model. The Arduino designers freely share the specifications for anyone to use, and third-party manufacturers all over the world offer versions of their own, which are often further developed for specific purposes.

Importantly, the social impact of creations developed by Arduino users themselves has been notably wide-reaching – an interesting example with a clear social impact is PHDuino . This is an example of how student scientists are using Arduino-based hardware to replicate scientific equipment using more readily available components in developing countries.

Furthermore, the company highlights that official Arduino boards are "made in Italy", thus not using cheap labour and low quality materials: to emphasise this they had the Italian map stamped on the front of the first board, and also the names they used recall their Italian origin (e.g. Arduino Duemilanove, Arduino Diecimila, and Arduino Uno which is the latest version).

What is the role of the organisation within the DSI ecosystem?

Much like GitHub and Raspberry Pi, Arduino might in some ways be said to form part of the very DSI architecture. Various educational and innovative projects and products have been built on the back of Arduino's hard and software. This is very likely the result of Arduino's clear organisational focus on collaboration and sharing amongst its community.

What technological methods is it using?

Arduino has been designed so that it can sense the surrounding environment by receiving input from a variety of sensors and, vice versa, can affect its surroundings by controlling lights, motors, and other actuators. The micro controller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software running on a computer (e.g. Flash, Processing, MaxMSP).

The boards can be built by hand or purchased preassembled and the software can be downloaded for free. The hardware reference designs (CAD files) are available under an open-source license, and users are free to adapt them to their needs. While the hardware used to power Arduino is open-source, Arduino software is also open-source. The source code for the Java environment is released under the GPL and the C/C++ micro controller libraries are licensed under the LGPL.

What technological methods and tools is it using, and what did these enable that was not previously possible?

During a TED Talk on Arduino, Banzi said Arduino has been a significant catalyst in the 'Makers' Movement.' Arduino has in many senses heralded a paradigm shift from open-source software alone to open-source hardware. Correspondingly, Arduino's low economic threshold has removed a lot of potential barriers to users previously excluded from getting involved in D.I.Y. hardware and robotics – the availability of Arduino hardware design blueprints for download has meant users who ordinarily might not have been able to afford or order the boards have been able to build the boards themselves by hand.

Enhancing collaboration and engagement: DSI network effect

The other way in which Arduino demonstrates technological collaboration is the way that Banzi has relied upon pre-existing advances made by the Arduino community when trying to find particular technological solutions: For example, take the case of a Spanish team called Complubot composed of two kids: Nerea and Iván. Together with their coach, Eduardo, they competed for – and won – the Soccer B category at the World Series of the RoboCup Junior (for high school students). When Arduino co-founder Massimo Banzi was approached to make an educational Arduino-based robot for kids he contacted the Complubot team to enlist their help because of their knowledge and experience in this area.

The Arduino@Heart program is a Brand License Agreement designed for makers and companies wanting to make their products easily recognisable as based on the Arduino technology with a fee for them reaching the maximum of five per cent of the wholesale price. Arduino supports @ Heart partners through promotion of their brand, products and content on its site and social networks with links to documentation and tutorials. This helps ensure that partners' brands are marketed to the right target groups and are clearly associated with Arduino. Incidentally, one of these Arduino@Heart is the Smart Citizen Kit – a hardware kit to gather environmental data, which itself is the subject of one of the case studies in this report.

How is the organisation funded?

The organisation makes a relatively small amount from the sale of each board (only a few euros of the total price), which gets rolled into the next production cycle. The Arduino team has created a company based on giving everything away. On its website, it posts all of its trade secrets for anyone to take – all the schematics, design files, and software for the Arduino board. Arduino design plans can thus be downloaded and manufactured by anyone; as there are no patents. These plans can be sent off to a factory, where the circuit boards are mass-produced and sold by anyone who wishes to do so - without paying the Arduino team anything in royalties.

All of this is allowed to happen because the Arduino board is a piece of open source hardware, free for anyone to use, modify, or sell. Banzi and his team have spent precious billable hours making the thing, yet unlike conventional proprietary business models, they sell it themselves for a small profit – while allowing anyone else to do the same.

Arduino offers an interesting example of how an organisation might be sustainable and open in nature. In fact, the organisation's more significant income comes from clients who want to build devices based on the board and who hire the founders as consultants.

What were the main barriers to innovate?

Many questioned if it would be possible to forge a sustainable business model considering the entire basis for Arduino relies upon open source technologies (in fact, the only piece of Intellectual Property (IP) the team protects is the name Arduino, the main asset of the company which is trademarked in order to ensure that the brand name is not negatively influenced by low quality copies. Anyone who is willing to sell boards using that name has to pay a small fee to Arduino). Despite this, Arduino has established itself as a thriving worldwide business – in spite of giving away all the data required to build Arduinos completely free.

Some commentators have gone further to suggest that Arduino has also short-circuited most conventional industrial infrastructure by 'placing the ability to create wealth directly in the hands of private individuals.' In many respects, Arduino has charted an alternative modus operandi for technology companies of the future: the notion that companies and private individuals can give away their primary products, while making a living on the sideline activities that such donations attract.

What really helps achieve these goals?

Arduino's success can undoubtedly be explained by the sheer scope and breadth of its applicability – a quick scan of some of the projects built using Arduino demonstrates how it has been used by scientists, hobbyists, artists, and students for various projects – and to great effect. Yet other than Arduino's broad appeal, its success can be attributed to a number of factors:

Creative Commons Licensing – Arduino release all of the original design files (Eagle CAD) for the Arduino hardware. These files are licensed under a Creative Commons Attribution Share-Alike license, which allows for both personal and commercial derivative works, as long as they credit Arduino and release their designs under the same license.

Low production costs – while it's possible for Arduino enthusiasts to have their own board manufactured, production costs and profit margins on the boards have been kept low enough for people not to be deterred from investing in a board.

'Open Business Model' – This means there has been a community willing to co-design and collaborate with the founders, who can tap into this pool of expertise and specialisation as needed to offer bespoke consultation services and products to their clients.

Open Source Software – Not only the Arduino hardware is open; the Arduino software is also open-source. The source code for the Java environment is released under the GPL and the C/C++ micro controller libraries are under the LGPL.

Avaaz

At a glance:

Type of Organisation:	Not for profit
Aim:	Participation and Democracy
Technology Trends:	Open Networks, Open Knowledge, Open Hardware
DSI activities:	Operating a DSI service
Key facts:	Approximately 28 Million Users Worldwide. Has taken 155,896,453 actions since January '07, in 194 countries
Website:	http://www.avaaz.org

Organisation Name:

Avaaz

Short Description

Avaaz is an independent, not-for-profit global e-petitioning and campaigning network that works to ensure that the 'views and values of the world's people inform global decision-making.' Avaaz relies entirely on small donations and receives no money from governments or corporations (see more details of spending breakdown below). This global organisation is run by a small, highly-skilled online team of 11-50 employees, with most staff working collaboratively in a "virtual office" environment from four continents so as to ensure 'even the smallest contributions go a long way.'

History and core mission

Avaaz –which literally means "voice" in several European, Middle Eastern and Asian languages–launched in 2007 with a simple democratic mission: 'close the gap between the world we have and the world most people everywhere want.'

Avaaz seeks to empower millions of people from all walks of life to take action on pressing global, regional and national issues, 'from corruption and poverty to conflict and climate change.'

What does it do, and how does this activity enhance social innovation?

At its simplest Avaaz is an online e-petition service, where anyone can launch a petition on a cause close to their heart, just as any Avaaz member is free to sign any of the petitions should they agree with it. Current campaigns include a petition for the ban on trading of lions, another on is on awareness of human rights in Tibet.

As a community Avaaz is unique in its ability to mobilize citizen pressure on governments all around the world to act on crises and opportunities anywhere, within as little as 24 hours. With the launch of its new Avaaz Community Petitions, Avaaz appears to have further expanded the capacity of individuals to reach out to others in order to become mobilised on pressing global, regional and national issues. According to the Avaaz website, their "model of Internet organising allows thousands of individual efforts, however small, to be rapidly combined into a powerful collective force."

The scope and breadth of the organisation's reach is palpable when one considers the organisation campaigns in 15 languages, is served by a small core team of 52 full-time staff worldwide, has thousands of volunteers in all 192 UN member states, including Iran and China, and over 28 million members worldwide. Avaaz members take action: signing petitions, funding media campaigns and direct actions, emailing, calling and lobbying governments, and organising "offline" protests and events – as part of their bid to have the voice of the world's people enter and shape consequent dialogue around decisions that affect us all.

What is the social impact it is seeking, including any evidence of impact to date?

Although the effect of e-petitions is still unclear, their ubiquity online makes them a critical area of study for social scientists interested in the impact of e-democracy. As mentioned above, Avaaz.org has over 28 million members worldwide, with their largest e-petition receiving over 14 million signatures (Hill, 2010). Researchers also believe that particular groups on the Internet may benefit from the strategic opportunities offered by e-petitions, allowing collective action against big businesses, governments, and international organisations (Postmes & Bruntsing, 2002).

While Avaaz has evidently been successful in enlisting the help of large numbers of supporters, critics of this form of crowdsourcing, like Internet theorist Evgeny Morozov, have claimed Avaaz promotes a form of "slacktivism," claiming that they encourage previously tenacious activists to become lazy and complacent. While this may be the case with earlier Avaaz petitions, their Stop Rupert Murdoch campaign suggests a concerted effort to move beyond cyberspace into more direct action paradigm. Similarly, their site encourages the use of both online and offline channels to generate the greatest impact of members' campaigns.

Speaking directly on their influence in the proceedings brought against Rupert Murdoch, Avaaz's founder, Ricken Patel has said their "activism played a critical role in delaying the BSkyB deal until the recent scandal was able to kill it". Last November, in collaboration with 38 Degrees, a similar online campaign group, Avaaz sent 60,000 complaints to Ofcom during its initial review of the BSkyB merger. Through the winter, Avaaz continued, shifting its aim on to David Cameron and culture minister Jeremy Hunt. Shortly before the New Year, 50,000 of its 700,000 British members sent the pair messages that called for a full investigation into the deal. In early March, after Jeremy Hunt decided that the merger would not compromise Sky's editorial independence, Avaaz mobilised another 40,000 complaints (which all had to be read by DCMS officials) and organised several stunts, including pickets outside the Royal Courts of Justice and Hunt's constituency surgery. Avaaz argues that this –

coupled with its 160,000-strong petition in early July – led to the merger decision being delayed until September, which was then referred to the Competitions Commission, and was finally forgone by Murdoch altogether.

In broader terms, a joint report produced by Information Society Unit at the Institute for Prospective Technological Studies (IPTS) and co-financed by IPTS, and the European Commission's Directorates General Education and Culture, Information Society and Media, and Enterprise and Industry during 2007 and 2008, suggests that indirectly, Social Computing applications also empower Civil Society Organisations (NGOs, voluntary groups, associations, etc.), which play a significant role in fighting social exclusion. Concretely, it enables easier participation, wider knowledge aggregation and broader dissemination, and as a consequence, improves resource collection and operational efficiency.

According to this same report, another potential area of impact of Social Computing sites such as Avaaz, is the potential for adoption by a large number of organisations belonging to the so-called third-sector (charities, NGOs, voluntary groups, associations etc.) which play a very important role in fighting many of the root-causes of social exclusion and in assisting socially-excluded people. Organisations such as Avaaz have offered an alternative conception about how these organisations might increasingly adopt Social Computing applications to manage, promote and run their activities, and change their ways of organising, recruiting, raising funds, and broadly enhancing their transparency and responsiveness. In fact, Social Computing is even seen to challenge the established mode of operation of the third sector, by favouring light structures of engagement based on technical solutions which make it easier to link volunteers and activists with a cause and with the resources to support it, without the need for a stable organisation.

Certainly more metrics are needed to measure the impact of e-petitioning and Social Computing. This is critical in the context of informed policy implications. According to the IPTS, the most urgent need is certainly for new metrics to address the emergence of new social media, and in general, for systematic measurements and internationally comparable data. These would enable better assessment of the long-term importance of Social Computing trends in terms of their socio-economic impact, and the quantitative and qualitative differences between the EU and the rest of the world. With specific regard to Avaaz, comparative data would enable researchers to identify which regions have had greater successes through e-petitions, and might allow links between causation and correlation to become clearer.

What is the role of the organisation within the DSI ecosystem?

Builds an online community premised upon civic participation and engagement; seeks to influence global decision-making through various online campaigns and petitions.

According to the Avaaz website, the organisation employs a technical team to make sure the website is constantly secure. The site is also verified by Geotrust, a world leader on Internet security verification. The Avaaz donation pages have addresses beginning with https:// rather than http:// thus signalling they are secure pages.

The site is well integrated with other social media platforms, allowing users to easily share online petitions or campaigns. According to Matt Holland– Avaaz's Online Director, like other high-capacity web services, Avaaz's hosting platform is complex and includes a physical server farm, a content distribution network, and some resources served through Amazon's cloud services.

Avaaz's ability to quickly mobilise citizens to pressure relevant targets to act on crises and opportunities anywhere, within as little as 24 hours, is something that could not have been possible without the Internet. It can do this well beyond the bounds of a particular country, to draw global attention and potentially gain crucial critical mass on what might have been in the past a localised or isolated issue.

Furthermore, in an effort to be more accountable to its members (and to follow its 'bottom-up' democratic mission), Avaaz has pioneered a process of consultation with its members (to be carried out annually) via technological channels. As part of this half a million emails were sent out imploring its members – those who have signed previous petitions, or participated in other actions – to answer an extensive online poll on what should be done in 2013 regarding the direction and future of the organisation. The resulting ballot is perhaps one of the 'biggest exercises in direct democracy ever undertaken': across millions of members, 14 languages, and over a hundred countries.

Questions range from what the general priorities should be (at the time of writing, "human rights, torture, genocide, human trafficking" is top, while "food and health" is lowest priority), to specific campaign suggestions, to how seriously Avaaz staffers should take the poll: at present, 86% of members seem happy for the staff to use it just as a guide, while only 6% think it should form a binding mandate.

It has been through the use of technology in this way that the potential input of Avaaz's member community (which now stands at over 28,000,000 people worldwide), could be factored into the organisation's future goals.

Enhancing collaboration and engagement: DSI network effect

With the launch of Avaaz Community Petitions in 2012 the capability of the organisation's social mission seems set to expand. Avaaz Community Petitions is "a new web platform that gives people around the world the power to start and win campaigns at the local, national, and international levels". It is "a crowd-sourced part of Avaaz, the largest-ever global web movement bringing people-powered politics to decision-making everywhere".

It was initiated by social movement activists and encourages people to participate through an online platform and organising & campaigning. Avaaz.org Community Petitions is local, national and global in orientation and concerned with democracy, politics & representation, economy, education, environment & sustainability, anti-discrimination, equality & social justice, health, human rights, international development, public services and neighbourhood & community.

How is the organisation funded?

Avaaz is 100% member-funded and thus only accountable to its members – not to major donors, foundations, or any special interests.

While Avaaz is a global organisation with staff and members across the world, they are currently incorporated as a non-profit 501(c)4 organisation in the state of Delaware, USA. Under New York State law.

The US Internal Revenue Service requires Avaaz to declare and account for their expenditures in each of the following 3 categories: Management and General, Program (i.e. Campaigns), and Fundraising. Avaaz describe how the financial transparency has had the effect of adding value to the organisation. This has been a useful tool for those wishing to quickly assess the financial focus of the organisation (and was doubtlessly a useful tool when Avaaz put the future direction of the organisation up for democratic vote amongst its members). For instance, in 2010 Avaaz had a total revenue of $6,664,634, whereas its total expenditure was $5,574,908 - which was broken down as $4,613,013 - which was spent on Avaaz programmes, i.e. campaigns (83%), $777,620 on management and general (14%), and $184,275 on fundraising (3%). Transparent financial reporting in this manner certainly aligns itself well with Avaaz's mission to be accountable to its members.

What are the main barriers to innovate?

Security Upgrades: One challenge Avaaz was forced to overcome was a "massive" persistent cyber attack, which it believes a government or large corporation was behind. Hours after the initial attack, the organisation made a public appeal on its website, revealing that a 44-hour distributed denial of service (DDoS) strike hit the organisation's IT infrastructure. That update also revealed the scale of the hit was equivalent to 20 times Avaaz's highest traffic in its history, taking the site down for a total of 14 minutes. The FBI has also been informed about the attack. While Datagram (the site's hosting company), Croscon (who perform ongoing security audits of the site's servers) and Arbor Networks (who provided defensive hardware which helped fend off the attack) all supported the organisation throughout the attack, Avaaz were advised to further upgrade their IT security in the event of similar future attacks. Avaaz consequently launched a campaign (the first of its kind in over 5 years) asking for donations to allow for this security upgrade.

Avaaz's site shows that almost 42,000 people have donated to this campaign. According to Ricken Patel (Founder of Avaaz), the specifics of how the generated funds will be used are still being planned, but will very likely be used to employ a full-time or part-time security office; upgrade to the service level for defensive tools; traffic analysers to more effectively track the source of attacks and upgrading capacity of firewalls. In addition, the fundraiser will also have a wider range of objectives, such as helping to ensure the physical security of the organisation's staff.

According to Patel, the funds generated should support this priority for some time to come: "That's part of how online fundraising and campaigning works – you leverage bursts of engagement from our membership with particular priorities and campaigns to generate longer term sustainable impacts."

What really helps reach goals/ how to overcome these barriers?

Part of the success of Avaaz's model relates to the ease with which potential petitioners can create community petitions. This can be achieved in three simple steps. First, users enter basic information about the anticipated campaign (such as the campaign's goals, targets, as well as the problem the campaign seeks to address). Following this, the user is provided with a preview of the campaign and then given the option to make it live for anyone to sign. Now that the campaign has been made public, users are encouraged to disseminate and share their campaign. All this means that within minutes, community members can start getting the word out on issues that matter to them.

Useful tips are offered to members to assist them in generating the greatest impact with their target, as well as the potential of using on and off-line channels to greatest effect.

Citizens Foundation Your Priorities

At a glance:

Type of Organisation:	Social enterprises, charities and foundations
Aim:	Participation and democracy
Technology Trends:	Open knowledge
DSI activities:	Operating a DSI service
Key facts:	In Reykjavik, Iceland, 40% of citizens use the Your Priorities platform
Website:	https://www.yrpri.org/

Organisation Name

Citizens Foundation (including the Your Priorities platform)

Short description

Your Priorities is a web-based platform developed by the Icelandic Citizens Foundation. The platform enables groups of people to develop and prioritize ideas and together discover which of these ideas are deemed the most important to implement. Since 2008, the Citizens Foundation has used Your Priorities to promote online, democratic debate in Iceland and worldwide, and the open source platform is available free of charge to any group, city or country around the world interested in using the platform to source ideas from citizens. The most prominent use of the platform to date, is its application in Reykjavik, Iceland, where the city uses the platform to source ideas from citizens to be debated in the city council on a monthly basis.

Type of Organisation

The Your Priorities software is open source and the product of the Icelandic nonprofit Citizens Foundation based in Reykjavik.

History and Mission

The mission of the Citizens Foundation is to bring people together to debate and prioritize innovative ideas to improve their communities.

The Citizens Foundation centres upon the belief that great ideas can come from anywhere –not only from politicians. They look at the Citizens Foundation as a startup enterprise, and in many senses the design and functionality of their websites, products and services might be thought of as an attempt to re-design democracy itself. As Gunnar Grímsson, one of its founders explains 'The key metric of success for our websites is participation. Without participation there is no democracy'.

Created in 2008 in the wake of Iceland's economic collapse, Citizen Foundation founders Gunnar Grímsson and Róbert Bjarnason describe how they decided to develop the platform because they felt the economic collapse was as much a democratic crisis as a financial one. To address this perceived loss of trust in politicians, these civic hackers stepped in to encourage citizen participation in governance. Their key offering was the open-active-democracy-platform Your Priorities, which could help citizens debate and prioritize issues in Iceland and beyond.

In the 2009 Reykjavik mayoral elections, the platform gave equal space to all parties. The Best Party used it most widely, and went on to win the election. During the election, 10% of Reykjavik voters voiced ideas on the site, 43% of voters viewed the site, and over 1,000 priorities were created. As a result of its popularity during the campaign, it became integrated permanently into the city's administration, in the form of the Better Reykjavík website, which is built on the Your Priorities platform.

.What does it do, and how does this activity enhance social innovation?

The Your Priorities website enables citizens to voice, debate and prioritize policy ideas, budget decisions and micro-issues affecting their neighbourhood. The best ideas with the most support are elevated to the top and actioned on. The type of 'action' depends on the organisation using the platform. For example on the Better Reykjavik website, each month the top ideas in all categories are gathered by city officials, debated in the city council and where possible sent for processing by the city, keeping citizens informed all along the way. In Estonia, the People's Assembly are also using the Your Priorities platform. The Estonian President has promised to put forward the citizens priorities as law proposals in the Estonian parliament.

What is the social impact it is seeking, including any evidence of impact to date?

Open Active Democracy: Citizens Foundation believe that democracy is under threat, especially as a result of the lack of participation by young people. They hold that the Internet is the best way to reach out and motivate this younger generation to participate in democracy, and that this is the direction of democracy in the future. To this aim, the Citizens Foundation have designed and developed a number of products and services that are intended to put pressure on authorities to do their job properly, as well as harnessing the minds of the masses. The integration of the platform in to Reykjavik city is the strongest evidence of impact of the platform to date. Indeed the main reason the Citizens Foundation was awarded a European e-Democracy Award for their Better Reykjavik website was because of its perceptible impact – in 2011, at the time of the award, the site involved 40% of Reykjavik's citizens and obtained direct implementation of many proposals in political programmes.

What is the role of the organisation within the DSI ecosystem?

Through making the Your Priorities platform available as open source to other organisations, the Citizens Foundation is actively facilitating the easy spread and uptake of their new service.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: The platform relies on the ability of crowds to convene online and deliberate at scale, without being limited by geographical distance or organisational affiliation and hierarchy.

Open Source and Open Collaboration: The platform is open source and free for anyone to download and use, which has led to the spread of the model via the Internet beyond Iceland. Open Active Democracy is the software that powers Your Priorities. As well as being made available on GitHub so that like-minded civic hackers can contribute to and improve this coding, users are also encouraged to translate the site's contents if they are able to do so.

Integration: The fact that Citizens Foundation's website, Better Reykjavik is well integrated into the official political structure – means that citizens can observe how their opinion has the capacity to shape real political debate. This demonstrates how e-democracy has the potential to improve democratic accountability (and therefore legitimacy).

Enhancing collaboration and engagement: DSI network effect

As an organisation, Citizens Foundation remains resolute in its commitment to facilitating re-use of its products and platforms. The organisation is now working on and looking for funding for a democracy project in the Balkans. Currently there are 11 projects from 7 countries signed up with different focus on how to use e-democracy to improve their communities. 'One of the key things is the transfer of e-democracy knowledge from Iceland and Estonia to the Balkans as well as knowledge transfer between the Balkan countries. There are 3 projects from Serbia, 3 from Kosovo and one each from Albania, Bosnia, Croatia, Montenegro and Macedonia.'

How is the organisation funded?

Donations: While users can use the website totally free of charge, the website features an integrated tool to make donations to the Your Priorities project. As a nonprofit organisation, donated funds ensure continual development and maintenance of the Your Priority software.

Social Enterprise services: Cities, countries and groups can also pay to use some of the Your Priority services. The price of these services is contingent upon how many users they have.

What are the main barriers to innovate?

Official political incorporation: importantly, official political buy-in is necessary for platforms like Your Priorities and websites like Better Reykjavik to operate properly.

Marketing and PR: "If you build it they will come" is a famous quote from the early days of the Internet – this was never quite true and certainly is not today. Marketing and promoting a website is a lot of hard work and costs money. As 'democracy nerds' the Citizens Foundation team are worried that most of our social lives are being run by one company, Facebook. But as entrepreneurs they point to a tendency to always try to turn problems into opportunities. Doing so has enabled them to exploit Facebook, finding that it is one of the best ways to attract people to electronic democracy both via sharing and Facebook advertisements.

User Interface: There needs to be as little friction as possible for taking part. Therefore, the team have, for example, made it possible for people to login and participate using their Facebook login. The user interface has been simplified in every generation of the software to enable more people to participate more easily.

Incentivising engagement: To make taking part fun and rewarding, Citizen Foundation websites enable people to earn 'Social Points' for writing up points for or against ideas that many people think are helpful – these can be used to buy promotions for ideas that appear as banners at the top of the page. Another potential initiative in this category that the team are considering is that users could be offered cash prizes for participating: 'You might, for example, have an idea drive to find the best ideas to save money in a given category and give a cash prize to the citizens that come up with the most practical and socially acceptable ways to save money.'

What really helps reach goals/ how to overcome these barriers?

Iterative Learning and Prototyping: Importantly, neither the Your Priorities nor the Better Reykjavik websites were Citizen Foundation team's first attempt at creating an 'electronic democratic' web platform. Rather, these websites are a 'better iteration' of their pilot project, Shadow Parliament– a project which aimed to document and scrutinise the actions of the government. Founders Gunnar Grímsson and Róbert Bjarnason report that Shadow Parliament never gained the critical mass of users required for it to work effectively, but it served them well as a pilot project for their later projects.

Official Buy-in and Partnership: One of the obvious factors which the Better Reykjavik project has benefitted from is the surprising degree of official buy-in from the city council. This is largely a consequence of the Better Party's (Icelandic: Besti flokkurinn) early adoption of the Citizen Foundation Web tools which they used as a guide for their policy focus. The decision to integrate, and in many respects institutionalise, the scheme into the city's administrative system first voluntarily, but later through an official partnership from the 19th October, 2011 has been critical to the project's success. Incidentally this decision has been mirrored to some degree by the national government with the Citizen Foundation's subsequent project, Better Iceland.

As a result of this official partnership and open collaboration, the Better Reykjavik platform has provided citizens with the opportunity to see how their input can directly influence policy. Once a month, the City Council is now committed to meet to discuss the five most popular ideas across the board; as well as the most popular ideas in each of thirteen categories on the website. Citizens involved in supporting a particular

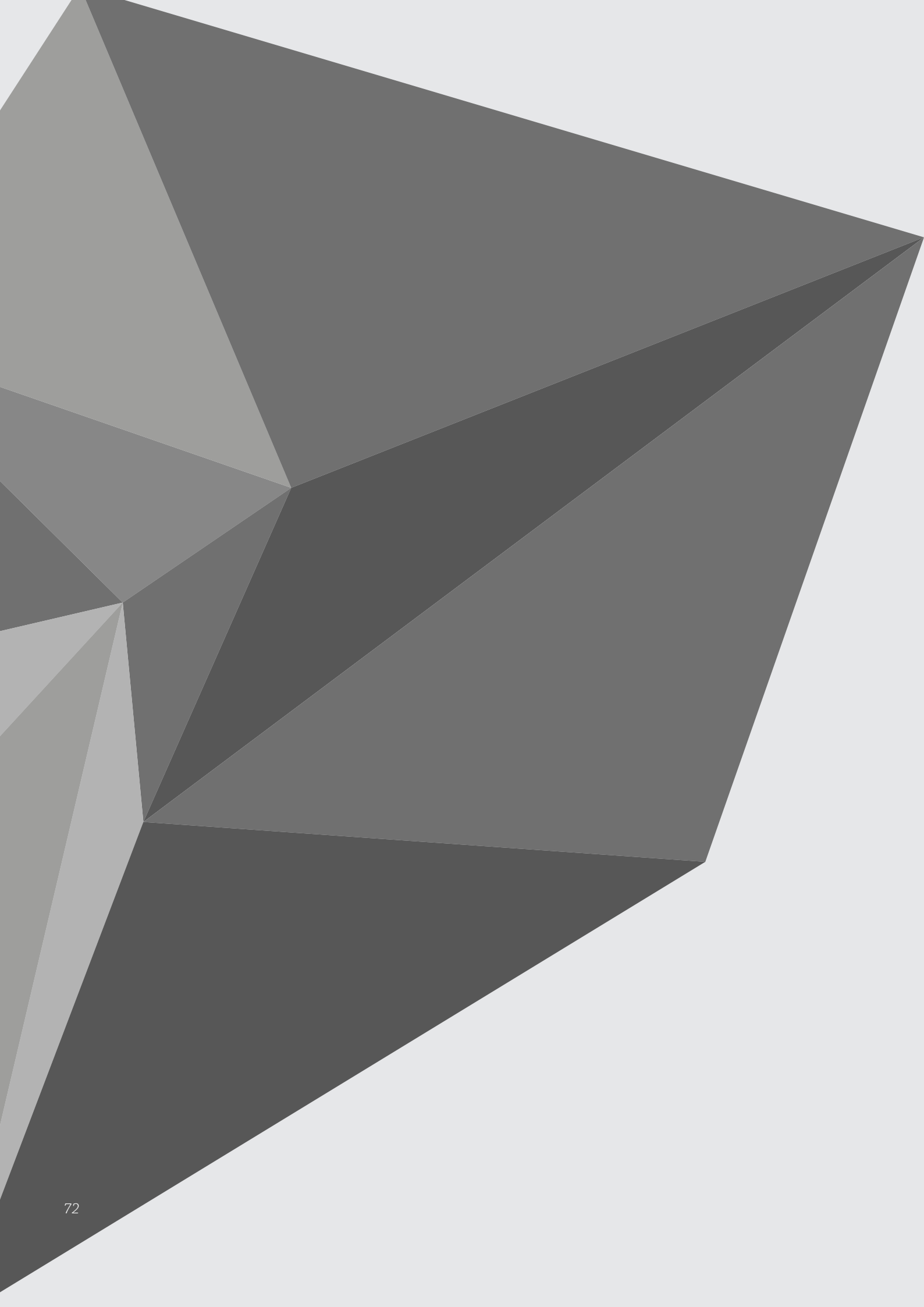
proposal are given regular updates from the city council regarding its viability and processing. This has the result of encouraging greater dialogue between the city council and citizens.

The Pirate Party has adopted a similar model in the context of Better Iceland, using the most popular ideas on the website as a guide for questioning the government, but also as a tool for future law proposals.

This 'official buy-in' has doubtlessly lent an added degree of legitimacy to the Citizens Foundation democratic mission, which is sure to have been a useful aide in their attempt to scale out the Your Priorities platform to a wider international community of users.

How to achieve better European collaboration?

The Citizens Foundation was awarded for their efforts with Better Reykjavik in 2011, winning the European e-Democracy Award thanks to its "potential Europeanness". According to Christophe Leclercq, founder of Foundation EurActiv PoliTech, who delivered the award: "Three things characterise the Reykjavik entry. Its impact, its speed and its potential Europeanness. [...]Firstly, their websites' impact, because they involved 40% of Reykjavik's citizens and obtained direct implementation of many proposals in political programmes. Secondly, their speed, as they achieved this in one week, in the run-up to the Reykjavik local elections. And thirdly, their Europeanness. Iceland is a candidate for EU membership. As Europe prepares for European Citizen Initiatives, this can be a source of inspiration for others in Europe."



CitySDK

At a glance:

Type of Organisations:	Academia and research organisations, non profit and social enterprise organisations
Aim:	Participation and democracy, smart public services
Technology Trends:	Open Network, Open Data, Open Hardware, Open Knowledge
DSI activities:	A Network
Key facts:	CitySDK consist of 23 partners, 9 countries, 3 open source APIs
Website:	http://www.citysdk.eu/

Organisation Name

City Service Development Kit (CitySDK)

Short description

City SDK is a European consortium of partners helping cities to open data, while giving developers the tools they need to develop applications that scale. It focuses on three types of urban domains: participation, tourism and mobility. For each of those domains, an open software API is developed in one of the participating cities or regions, which is then put to use also in several others. The API's help developers make applications that will function in other cities, thereby extending the potential reach for applications manifold. At the same time it provides cities with an easy, open source, standards based way to publish real-time open data.

Type of organisation

CitySDK is a European Consortium consisting of 23 partners in nine countries, led by Forum Virium, Finland. The consortium is made up of eight cities and city regions, six private companies, three development and expert organisations, one network organisation and five research institutes.

History & Mission

CitySDK runs from January 2012-June 2014, and was set up with the purpose of helping cities to open their data and giving developers the tools they need, and through this support provide a step change in how to deliver services in urban environments. With governments around the world looking at open data as a kick start for their economies, CitySDK aims to provide better and easier ways for the cities throughout Europe to release their data in a format that is easy for the developers to re-use.

Taking the best practices around the world the project will foresee the development of a toolkit – CitySDK v1.0 – that can be used by any city looking to create a sustainable infrastructure of "city apps".

What does it do, and how does this activity enhance social innovation?

CitySDK is creating a toolkit for the development of digital services within cities. The toolkit comprises of open and interoperable digital service interfaces as well as processes, guidelines and usability standards. Through this CitySDK seeks to enable a more efficient utilisation of the expertise and know-how of developer communities to be applied in city service development. Apps and tools for CitySDK are developed in cooperation with the Code for Europe fellows (see http://www.codeforeurope.net).

The Project focuses on three Pilot domains: Smart Participation, Smart Mobility and Smart Tourism. Within each of the three domains, a large-scale Lead Pilot is carried out in one city. The experiences of the Lead Pilot will be applied in the Replication Pilots in other partner cities.

The CitySDK project wants to engage with the Developer community in each of the participating cities and across Europe. This will take place through hackathons, apps challenges, and developer meet ups in the partner cities, and becomes embedded in existing events such as PICNIC, FutureEverything and OKFest. In addition, CitySDK will be made publicly available, along with links to the open data from the various partner cities, and developers will be encouraged to work with this to create new ideas and applications for the partner cities and others.

The actual work is divided into five activities:

- Developing a Technological Framework (lead: University of Tilburg).
  Consolidating and packaging existing practices and assets into a technological framework and reference architecture that enables the effective transfer of smart city service components between cities.
- Smart Participation Pilot (lead: City of Helsinki).
  Creating an open interface that acts as an issue-reporting channel between the citizens and civil servants. It is based on the Open311 technology, which is a standardized protocol for location-based collaborative issue tracking.
- Smart Mobility Pilot (lead: Waag Society).
  Bridge the mismatch between the many European mobility datasets on the one hand and the app development community on the other.
- Smart Tourism (lead: Municipality of Lisbon).
  Creating a European-wide market for tourism applications based on Open Data made available by public or private entities.
- Dissemination activities (lead: Manchester City Council).
  Identifying key stakeholder groups and ensure that the project reaches the widest possible targeted audience.

Part of the work is technical in nature: selecting standards, developing frameworks and architectures, as well as writing the actual code for the API's and applications. Another part is stimulating engagement and update: organising hack-a-thons, presenting at conferences, to students and in city halls, bringing together city officials and the (coming) development community. Lastly there is work in deciding where the results will go after the project, to ensure uptake and growth of the solution.

What is the social impact it is seeking, including any evidence of impact to date?

CitySDK wants to create a profound change in the way that cities and developer communities are able to work together to create new services and products using "open data". It fosters and facilitates international knowledge sharing around the best practices, APIs and tools being developed within the project.

Although the CitySDK API's have only reached a stable form in the second half of 2013, several applications have been developed. One of them is FixMyStreet in Helsinki, making use of CitySDK's Open311 interface to insert service requests by citizens into the city's backend system. Another is the Open Data Globe, showing the dynamics of European cities based on the available open data. There are several applications related to mobility, such as the Greater Manchester Realtime Scheduling application, the Park Shark City Platform and the City Navigator, a fully Open Source, mobile HTML5 public transport journey planner and navigation application for on-the-go use.

What it the role of the organisation within the DSI ecosystem?

CitySDK develops tools and standards that provide benefits for both city officials and development communities. CitySDK has a strong press and attracts users from both sides. It bridges the very real gap to enable them to work together, solving the cities problems by employing the vast amount of development talent that is typically not affiliated with large IT companies. Furthermore, it enhances capacity building and strengthens the Smart Citizen – citizens that know and use technology and use it to further their own goals, and that of society.

What technological methods and tools is it using, and what did these enable that was not previously possible?

CitySDK makes use of: the Internet, as a way to collaborate, disseminate knowledge and data.

Open Source Software, which enables the uptake and extension of the software by the development community forgoing stifling discussions on IP and closed development silos

Open Data, as it builds software to publish Linked Open Data in standardised formats that enables app developers to make royalty-free applications that scale

Open API's, that provide a non-proprietary way for data-owners to publish (real-time) datasets use those in applications

Agile Software Development, by way of SCRUM tools and methodologies

Next to these, standards are used like GTFS (General Transit Feed Specification) and Open 311, and languages like JSON and RDF API's written in Ruby and Sinatra. Data stored in PostgreSQL/PostGIS database.

Collaboration using digital technologies is done mainly using e-mail, video conferences and Google docs for communication and Github to share code and specifications.

CitySDK itself would not have been possible even five years ago. It is technically and organisationally state-of-the art project combining the

above mentioned technologies in previously unimaginable ways.

Standards and implementations have become so user friendly that the potential user base is large. The Open Data policies implemented by the EU and individual countries facilitate the building of CitySDK as well as its rapid spreading and uptake.

Enhancing collaboration and engagement: DSI network effect

Through the apps and services it is developing CitySDK aim is to build smart services where user generated data make up the core activity of the service.

How is the organisation funded?

CitySDK is a 3.4 million Euro project, 50% funded by the European Commission within the ICT Policy Support Programme of the Competitiveness and Innovation Framework Programme. The other 50% is brought together by local funding and national funding; each partner having a different mix. Currently, business models for the period after the project are being developed.

What are the main barriers to innovate

Governments and civil servants are hesitant, or incapable of opening high quality data that is in high demand, e.g.. real-time traffic data.

Governments and civil servants demand results too quickly. It takes perseverance as well as investment in time, money and relationships before good outcomes happen.

Business cases for implementing the resulting API's are currently missing; this however will probably be overcome since some partners are actively pursuing the start-up of companies, and some others have managed to get a lot of government support.

Lack of developers that manage to think 'big', e.g. develop application that scale outside of their countries.

Good results in terms of applications that solve problems need the input of domain experts. Generic coding skills lead to beautiful visualisations, not more.

What helps to reach goals and overcome barriers?

Evangelists and believers within city governments are key to spreading the news, instilling goodwill and overcoming barriers regarding opening data, implementing API's and working with the local development community.

Visual applications of technology (like http://dev.citysdk.waag.org/buildings/) help to inspire others and lead to follow up questions and applications.

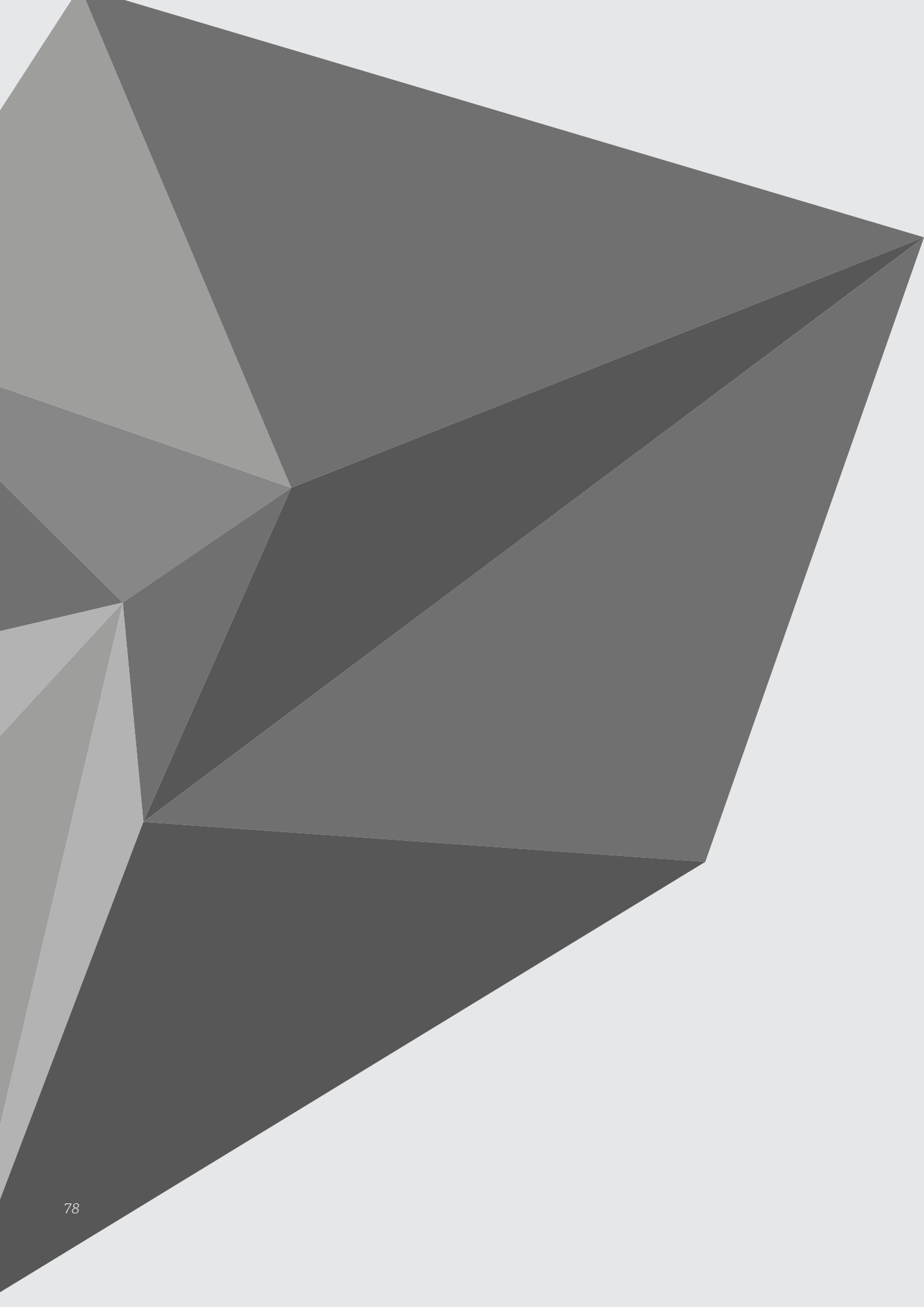
A lot of effort is spent is connecting data owners, technicians and domain experts. This pays off in the end.

How does it achieve better European collaboration?

CitySDK sets the groundwork for an ecology of applications that can travel across Europe – or more specific, across governmental bodies that implement the ensuing API's. It fosters standardisation from the bottom-up based on actual use cases. It turns out this actually works well for the development community and data owners alike. This opens a whole new market for developers and businesses in terms of spatial

scale, as well as local governments and regions that can use the best-of-breed applications developed elsewhere to solve their local problems (e.g.. by use of EuropeCommons, http://www.europecommons.org/). Because the results are openly available, anybody can take the (final) applications and extend them, or adapt them to their needs. CitySDK creates a set of codified, reusable knowledge in the form of applications, which by nature strengthen collaboration across all that are willing to add to it, or profit from it.

Finally, the 23 partners within the consortium work together for an extensive amount of time and get to know each other very well. This will add to EU collaboration for years to come.



Commons 4 Europe

At a glance:

Type of Organisations:	Cities, non profit agencies and academic institutions
Aim:	Participation and democracy; Culture and arts; Other
Technology Trends:	Open Data; Open Networks; Open Source
DSI activities:	Operating a DSI service, Network
Key facts:	As part of the project the consortia developed Europe commons, a catalogue of applications with demonstrable impact
Website:	http://commonsforeurope.net/

Organisation Name

Commons4Europe/Commons4EU (consisting of Code4EU, BuB and Europe Commons)

Short description

"A new wave of fostering innovation in cities and creating cutting edge digital services"
Commons for Europe (Commons4EU) is a pan-European consortium that mirrors a similar initiative in the USA called Code for America. Code for America involved 'a new type of public service based on the work of volunteer programmers that has sought to building bridges between the public and new technologies.' Inspired by this, Commons4EU aims to enable users 'to provide real time validation for innovative methodologies and new applications arising from cutting edge technology in wireless networks, sensors integrated in Wi-Fi networks and other technologies based on fibre optics to the home (FTTH).' The overarching Commons4EU project focuses on networked collaborative projects for use online and with mobile devices, based on the experience of Code for America, which aims to be beneficial to all the participating countries. Their application is expected to reduce administrative costs, increase transparency and participation, and to bring about effective citizen engagement. Practical examples of applications created as part of this initiative include use of city-owned buildings and spaces, to creating digital tools for museums and heritage and building new applications for use of public transport in the cities.

Type of organisation

Commons4europe is a consortium of cities, agencies and academic institutions from across Europe.

The network of organisations Commons 4 Europe is a pilot project part-funded by the European Commission, and modelled on the Code for America project. The project's consortium consists of fourteen organisations coordinated by ESADE, with the participation of Barcelona City Council and members of the NeTs group (Networking Technologies and Strategies). These organisations are coordinated by Miquel Oliver, of the Department of Information and Communication Technologies (DTIC) at UPF, which is a leader in the creation of pan-European broadband pilot projects. Aside from these organisations, nine European cities are at the heart of the project: Barcelona, Amsterdam, Barcelona, Helsinki, Manchester, Rome and the British group of municipalities involved in the Nesta project – who together form an associated network through their joint commitment to the project for its 3 year duration (from end of 2011 until the anticipated end of this phase of the project in October, 2014).

History and Mission

The Commons 4 EU project was started in 2011 with an initial core team of 7 cities: Amsterdam, Barcelona, Berlin, Helsinki, Manchester, Rome and UK-Nesta (UK cities involved in the project through Nesta) and fourteen organisations coordinated by ESADE. The project is planned to last for 36 months, at a total cost of 4.8 EUR million. It came about as an attempt to emulate some of the success of the USA's Code for America project.

Commons 4 EU's principal raison d'etre has come about as a response to questions of great importance to governance structures today: how can cities provide the diversity of services required in an advanced society in a scenario with limited resources and budgetary constraints, and what benefits can new technologies offer this paradigm? To deliver on these objectives, the Common4Europe network is broken up into two main projects:

Code for Europe: this is a network of different parties (city authorities, fellows, etc.) who work together to replicate and adapt the Code for America model for Europe. They develop collaborative web projects following the methodology of Code for America 'based on principles rather than on sectors and by opening existing code in the participating cities and leveraging the European EPSI (European Public Sector Information) platform.' Code for Europe follows a certain model to achieve certain project objectives:

Projects should be based around web/mobile applications.

Applications should enable cities to connect with their constituencies in ways that reduce administrative cost and engage citizens more effectively.

Projects should support the shift towards transparency and collaboration.

There should be a consistent focus on re-use, meaning that an application built for one city could be used by any other city.

Bottom-up-Broadband Common (BUBs): The BUB project seeks to engage and explore with users in 'real-life environments', using primarily

three new technologies: 'Super Wifi, Sensor integration into wifi networks and fibre deployment as commons (both new techniques such as aerial as well as fibre bandwidth management)'.

What does it do, and how does this activity enhance social innovation?

The Commons 4 EU partner cities and organisations seek to innovate their services through technological means. The specific technologies used are very flexible, varying from city to city according to local needs, or the technological preferences of the 'fellows' (developers, entrepreneurs and designers who are being positioned within the participating city halls to help make a breakthrough in how these governments ('service their citizens'). These 'fellows', who are based within the city halls of a number of the participating cities, are each tasked with mapping out digital solutions to key challenges the cities have set them. The benefit of situating a fellow in such close proximity to the partner city authorities, is evidenced by the host of custom-tailored web applications that have emerged to address specific, 'local' needs. These range from maximizing use of city-owned buildings and spaces, to creating digital tools for museums and heritage and building new applications for use of public transport in the cities.

Another spin-off project of the network has been Europe Commons, a website with a broader scope than either the BuB or Code for Europe projects. Europe Commons is intended to catalogue applications which have some sort of demonstrable impact and capacity for scale, that taps into the project's overarching focus and 'shareability' and re-use.

What is the social impact it is seeking, including any evidence of impact to date?

City services and authorities have had growing demands placed on them by citizens at a time when they are concurrently facing significant budgetary cuts. As a sector, these same authorities are often characterised as being 'slow to innovate', with little collaboration occurring across different cities or within different city departments. This network has thus been formed at a time when re-thinking how these governance models operate is becoming more necessary than ever. Commons4EU seeks to explore possible solutions to some of the challenges city authorities are presently facing, looking to digital technologies as a means of doing so.

Commons4EU identifies the need for more open innovation; greater collaboration; and much more agile project development. The overarching principle is how can it bring together people defined as 'change agents' (be they developers or fellows) into the context of city halls. In tandem with this, the project aims to have city authorities think of new ways technology might be used to solve city challenges. Formed with the intention of exploring ideas like Smart Cities – Commons4EU has sought to bring together a network of pan-European city authorities who together can explore how technology might be used to supplement how certain services are delivered in the context of the city. Thus, in a number of respects, Commons4EU is fostering an iterative, collaborative learning network between city authorities, agencies and the other institutes involved.

Although the project is not expected to draw to a close until late-2014, its apparent value seems to have already been acknowledged. 12 months on Helsinki city have hired their fellow on a full-time basis. This demon-

strates the value of having someone who can translate ideas into a 'digital reality', and is also an illustrative example of the kind of cultural change that has come about through the city's involvement with the Commons 4EU network. In the case of the city of Amsterdam, there has similarly been more interest in forming more long-term partnerships. More generally, there has been greater momentum building, for example with the project looking likely to scale out to Wales.

Alongside this the social impact of the Commons4EU project is evident from some of the useful applications that have been created as a result of it. "Tag. Check. Score." is one such application. It simultaneously taps into current technological trends such as open data, open source, as well as digital volunteerism (crowdsourcing), in a way that has a clear social impact. The application was created to address a challenge presented to many museums around Europe, where countless cultural heritage pictures have already been digitized, but remain 'untapped' – in sum, 'the metadata is missing and the cultural heritage is thus not searchable.' Due to a lack of personnel, it is difficult for museums to gather the relevant information. The Ethnological Museum in Berlin now engages citizens via the app "Tag. Check. Score." in order to solve the problem by crowd-sourcing metadata for the digital image inventory. The "Tag. Check. Score." application was developed by Alan Meyer, Fellow of Code for Europe, together with Fraunhofer FOKUS and the Ethnological Museum Berlin. Like Zooniverse's Cell Slider, "Tag. Check. Score." is underpinned by the principle of digital volunteerism. Citizens assist in enriching the photographs of the museum via the app by tagging pictures with meta-data, checking and correcting existing tags and thereby scoring points: Tag. Check. Score. Because digitization has presented a whole host of challenges for many museums, libraries and archives, the aim was to also develop a reusable IT open source solution. In the Berlin State Museums alone six million objects await to be recorded. Therefore, the Source code of "Tag. Check. Score." available on GitHub, while the code is licensed under AGPL.

What is the role of the organisation within the DSI ecosystem?

Commons 4EU aims to build up the capacity of cities to foster more social innovation, whether this is related to grassroots initiatives or more large-scale projects such as they shift towards becoming 'smart cities'. To lay the foundation for future digital social innovation, Commons 4EU recognises also the need to equip citizens with the requisite civic toolkit to utilise digital technology for democratic ends.

What technological methods and tools is it using, and what did these enable that was not previously possible?

As mentioned above, the technological specifications across the Commons 4 EU tend to vary widely from project to project. From the 'Super Wifi, Sensor integration into wifi networks and fibre deployment as commons' (which includes new techniques such as aerial as well as fibre bandwidth management), to the web applications developed by fellows for Code for Europe – these smaller projects tend to be reflective of the local needs of the partner city or of the fellow's own technological preferences. This flexible approach to technology is reflected in the wide range of technologies employed by the different fellows – who will work with their own preferred web platform (using open source languages like

Python and Ruby on Rails) to build their open web applications.

On a larger scale, this might be indicative of how Commons 4 EU looks beyond more traditional 'big tech solutions' to offer a simpler, much looser set of solutions; "with smarter design, to re-think and explore new ways of delivering some of the 'lighter touch public services' such as libraries and parks, etc."

Despite the fact that Commons4EU aims forge digital solutions that will supplement rather than supplant pre-existing governance structures. Technology has nonetheless enabled the active sharing of new ideas in a way not possible in the past. While more needs to be done to continue to encourage this active sharing and re-use of good ideas, websites like Europe Commons and collaborative tools like GitHub offer a glimpse to digital technology's potential for collaboration and quick re-use.

Enhancing collaboration and engagement: DSI network effect

Commons4EU is in many senses a network formed with the aim of connecting up civic innovators –with the world of the city authority. In this way Commons 4 Europe acts as a 'connector.' Yet as well as operating as a connector generally, Commons4EU also works with other social innovators on more specific challenges as part of an informal global network and conversation about how technology might be used to rethink the way we approach city governance. Collaborative work of this kind has been carried out with other organisations like Code4America, Code4LatinAmerica and Code4Africa. Furthermore, the network has worked closely with Future Gov, and mySociety.

Yet Commons4EU does not simply act directly as a collaborator. Rather the network aims also to foster and encourage a spin-off network of active collaborators. Code4Europe is illustrative of this. It encourages more re-use of successful applications across Europe and to promote a culture of borrowing from one another and sharing of open source code. To this aim, the fellows work together on a joint GitHub account – and every project being worked on for Code4Europe is coded and documented here for all to see thereby offering additional support the overarching collaborative aim of the project.

Nesta, one of the project partners, have also created a platform called Europe Commons. Applications and products which have indicated some sort of demonstrable impact and capacity for scale are catalogued here. This is intended as a collaborative tool for potential social innovators – offering a useful guide of what is already out there in terms of solutions that are relatively easy and cheap to replicate; or possibly a basis upon which digital social innovators can build their own applications. In the case of Europe Commons – the site's open source coding is hosted on Drupal.org, where like Code for Europe interested civic developers can contribute to the site's code in a similar way to GitHub.

How is the network of organisations funded?

Of the 4.8 EUR million allocated to the project for its 3 year duration, roughly 50 per cent of the funding has come from the European Union (specifically the Competitiveness and Innovation Framework Programme of the European Union), while the remaining 50 per cent comes from contributions from each of the partner cities and agencies.

What are the main barriers to innovate?

Trying to have cities buy-in culturally and financially: The most substantive changes occur in those teams and city authorities that recognise that this is an opportunity to do more than simply upgrade technological products and service offerings, and to instead reflect more deeply upon the ways they too can innovate. The best instances are those that forge a partnership with the tech talent and the front-line team.

How to move on the agenda so there is more use and re-use of successful innovations: While moving to a predominantly open-source mode of code production has a great deal of value, there is still a degree of operational resistance from some developers – re-use requires an upfront investment from developers who must take the time and energy necessary to break down and understand someone else's code. While collaborative coding tools such as GitHub have challenged somewhat the often asocial aspect of software coding, the culture of developers who simply favour building applications from scratch sometimes persists.

What really helps reach goals/how to overcome these barriers?

No information on this.

COMMUNIA

At a glance:

Type of Organisation:	Government and public sector organisations
Aim:	Science, Other
Technology Trends:	Open Networks, Open Knowledge
DSI activities:	An advisory or expert body
Key facts:	Established in 10 EU Member States
Website:	http://www.communia-project.eu

Organisation Name

COMMUNIA

Short description

COMMUNIA – The European Thematic Network on the Digital Public Domain, is an international association based in Brussels.

The overarching aim of Communia is to become a European point of reference for theoretical analysis and strategic policy discussion of existing and emerging issues concerning the public domain in the digital environment'.

Type of organisation

COMMUNIA is an international a network of researchers and practitioners from universities, NGOs and SMEs established in 10 EU Member States. All members, including organisations and individuals need to pay a yearly membership fee. The network has been incorporated under Belgian law since 2012.

COMMUNIA has been a World Intellectual Property Organisation (WIPO) observer since October 2012.

History and mission

The mission of the COMMUNIA Association is to foster, strengthen, and enrich the Public Domain, defined as the wealth of information that is free from the barriers usually associated with copyright protection, either because it is free from any copyright protection or because the right holders have decided to remove these barriers. It is the raw material from which new knowledge is derived and new cultural works are created. This definition is extracted from the Public Domain Manifesto, an output of the Thematic Network:

'COMMUNIA effort is aimed at helping to frame the general discourse on and around the public domain in the digital environment by highlighting the challenges arising from the increasingly complex interface between scientific progress, technological innovation, cultural development, socio-economic change on the one hand and the rise and mass deployment/usage of digital technologies in the European information society'

The COMMUNIA association is built on the eponymous COMMUNIA Project Thematic Network, funded by the European Commission from 2007 to 2011, which issued the Public Domain Manifesto and gathered over 50 members from academia and civil society researching and promoting the digital public domain in Europe and worldwide.

What does it do, and how does this activity enhance social innovation?

The COMMUNIA Association aims to maintain and reinforce a network of European and international organisations that provide reference for policy discussion, such as the World Intellectual Property Organisation (WIPO), and to take strategic action on all issues related to the public domain in the digital environment and related topics.

Activities include publications, meetings, conferences, projects, consultations, studies, research and collaboration with other associations and entities in Brussels, in Europe and worldwide.

In particular, the fields of endeavour of the COMMUNIA Association include:

- Preservation of the Public Domain in its strict sense, after copyright expiration: COMMUNIA EU Positive Agenda for the Digital Public Domain and COMMUNIA WIPO Positive Agenda for the Public Domain;
- Celebration of the Public Domain Day every year;
- Alternative forms of licensing for creative material, such as Creative Commons or other free/open licenses: COMMUNIA policy paper on proposed Directive on collective management of copyright;
- Open government data and public sector information: COMMUNIA policy paper on the proposal to amend the European Directive on re-use of Public Sector Information;
- Open access to scientific publications and open scientific data: COMMUNIA Position on EC Horizon 2020 Open Access policy;
- Access to and re-use of cultural heritage;
- Management of orphan works, i.e. works whose author is unknown: COMMUNIA policy paper on the proposed orphan works directive.

What is the social impact it is seeking, including any evidence of impact to date?

The COMMUNIA Association and its Members raise awareness in, educate about, advocate for, and offer expertise on and research about the Public Domain, in the digital age within society and with policy-makers.

The COMMUNIA association seek to address the lack of representation of the interest of the public domain at the national, European and international levels. This has prompted the association to continue their research and advocacy activities after the end of European funding by creating a non-profit entity. They want to give a voice to the public domain

and raise awareness of its potential and value for society. The number of contributions they make to debates reflects this: blog posts, participation in consultations, drafting of policy papers, amendments and statements. COMMUNIA believes if they manage to change the law to recognize and preserve the public domain, they will have been successful.

What it the role of the organisation within the DSI ecosystem? The COMMUNIA association gathers organisations and partners who are interested in and willing to work together to foster, strengthen and enrich the Public Domain. The association works on deliverables such as policy papers, projects, and WIPO statements. Event-wise the association organises meetings, conferences, projects, and consultations.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The Internet prompted the creation of the association.

Without the opportunities presented by the Internet, the association would not exist. After decades of measures that have drastically reduced the public domain, typically by extending the terms of protection. The association claims it is time to strongly reaffirm how much societies and economies rely on a vibrant and ever expanding public domain. The role of the public domain, whilst crucial in the past, is even more important today, as the Internet and digital technologies enable people to access, use and re-distribute culture with an ease and a power unforeseeable even just a generation ago.

How is the organisation funded?

The COMMUNIA Association was started based on the COMMUNIA project funded by the European Commission. The business model is based on the association's independence, and the budget depends on the membership fees of the members. The association is also a part of the European Thematic Network and receive funding through this.

What are the main barriers to innovate and how are they in the domain?

The association has encountered mainly four barriers:

- Governance and the definition of decision-making procedures
- Incorporation and drafting of articles of incorporations under Belgian law
- Understanding of EC voting and amendment procedures
- Funding and sustainability as a voluntary-based organisation

What helps to reach goals and overcome barriers?

According to Dr. Melanie Dulong de Rosnay, who is the president of the Administration Council at COMMUNIA, it is the contribution from the association members, which helps overcome these barriers so that they can reach their goals, in terms of expertise from members, contributions of time, as well as membership fees.

Also, the activities within the association are organised on a voluntary basis, the member who identifies a question proposes it to the group and leads it. This enables the members to most efficiently organise research or activities, and feeds motivation and engagement.

How does it achieve better European collaboration?

The association coordinates activities in partnership with other organisations in Europe, in terms of:

- Publications, meetings, conferences and other public events.
- Studies, research; projects and consultations.
- Representation of the Association and of issues related to the digital Public Domain towards institutions, notably political and international organisations.

Confine

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Research on and with community networks
Technology Trends:	Open Networks
DSI activities:	A community networking test bed
Key facts:	Since 2011 when the project launched, it has now over 30.000 users.
Website:	http://confine-project.eu

Organisation Name

Confine

Short description

The Confine Testbed experimental facility supports experimentally-driven research on Community- owned Open Local IP Networks. This integrated project offers a testbed for experimental research that integrates (in a federation) and extends three existing community networks.

Type of organisation

The programme is delivered by a number of European public and academic institutions, including, Universitat Politècnica de Catalunya, INESC TEC Technology & Science, Fundació Privada per a la Xarxa Oberta, Lliure i Neutral guifi.net. FunkFeuer, Athens Wireless Metropolitan Network, The OPLAN Foundation, Comunicació per a la Cooperació – Pangea, Fraunhofer institute and Interdisciplinary Institute for Broadband Technology.

History & Mission

CONFINE is a project funded by the Framework Programme 7 (FP7) and is running from October 2011 to 2015. The background to the project is that recent technological developments have pushed forward the Internet and its possibilities, leading to a seemingly omnipresent Internet. However, providing sustainable, cost-effective and high quality Internet connection, with coverage for all citizens is still a challenge. Often this stems from economic causes, as Internet provision in a metropolitan area is usually more economically attractive than providing access in rural areas. “Community networking”, also known as “bottom-up networking”, is an emerging model for the Future Internet, where communities of citizens build, operate and own open IP-based networks. Hundreds of

community networks operate across the globe, in rural and urban, rich and poor areas. These networks are usually run by non-profit organisations and can cooperate with local stakeholders to develop community services, including local networking, voice connections and Internet access.

CONFINE offers an open distributed infrastructure for researchers to experiment with community networks. Community Networks are large scale, self-organised and decentralised networks, built and operated by citizens for citizens.

The goal is to advance research and empower society by understanding and removing obstacles for these networks and services.

What does it do, and how does this activity enhance social innovation?

In practice CONFINE is attempting to develop a unified access to an open testbed with tools that allow researchers to deploy, run, monitor and experiment with services, protocols and applications on real-world community IP networks. This integrated platform – Community-Lab – will provide an open, distributed infrastructure to these emerging networks supporting any stakeholder interested in developing and testing experimental technologies for open and interoperable network infrastructures, strengthening open community networks. The goal of Community-Lab is to advance research and empower society by understanding and removing obstacles for these networks and services.

CONFINE's Community-Lab integrates and extends three existing community networks: Guifi.net (Catalonia, Spain), FunkFeuer (Wien, Austria) and AWMN (Athens, Greece); each is in the range of 500 – 20,000 nodes, a greater number of links and end-users. This test bed provides researchers with access to these emerging community networks, supporting any stakeholder interested in developing and testing experimental systems and technologies for these open and interoperable network infrastructures.

Community-Lab is a resource for the research community to address the limits and obstacles regarding Internet specifications that are exposed by these edge networks. It supports an integrated and multi-disciplinary effort to address and assess the usefulness and sustainability of community networking as a model for the Future Internet.

Five research projects: Confine is a project that seeks to expand research and collaboration on community networking, starting from the FIRE (Future Internet Research and Experimentation) community nourished by the EC. An open call for participation in the research was published in September 2012, which received 36 applications. Five research proposals were selected and give 50,000 euros in funding to cover the preparation and performance of experiments. Each of these 5 applications represents an external research group with previous promising research results. The researchers will take advantage of the Community-Lab test bed to advance their research with new experiments running for one year. In September 2013, with a more mature and larger test bed, a second open call for participation will be announced to allow the selection and support with project funding of a larger set of new experiments from external participants.

Future collaborations: However, only restricting the project to the test-bed would allow for limited outside participation. CONFINE hopes to be able to share testbed access with a number of partners outside the open call, which is not feasible, at least in the short term. More devices would be needed, which comes with strong financial implications.

Therefore, the project also wants to generate open data sets for research that will allow for outside participation and research collaboration, with a strong focus on community networks and to a lesser extent the test bed. Actually, the open data efforts will be focused more on the Future Internet context of CONFINE, rather than the test bed itself.

What is the social impact it is seeking, including any evidence of impact to date?

The primary goals of a community network may include providing a sustainable, trusted platform for an urban neighbourhood, suburban village, town or region to enhance a vital community communication that strengthen participation and a functioning democracy. The project brings in additional users (researchers) with a common entry point and additional resources (nodes, servers, links) in sparsely populated areas.

The CONFINE project targets the exploration and advancement of the community networking model, moving towards providing the right quality of experience and sustainability of community networks, by looking at the social, technical, economic and legal implications.

What it the role of the organisation within the DSI ecosystem?

The CONFINE project addresses the need to explore bottom-up future sustainable Internet infrastructures. Since this aim requires contributions from all social groups, the CONFINE project focuses on performing research and experimenting ideas, with its academic and research groups. The project makes uses of social networks to organize its activities, to make the knowledge addressing, sharing and spreading easier. In addition to the Community-Lab testbed, CONFINE maintains two additional academic testbeds for experimental purposes, connected to the Community-Lab testbed over FEDERICA. In Belgium the academic testbed is maintained by iMinds, in Germany it is maintained by Fraunhofer FKIE.

What technological methods is it using? How is it using digital technologies to collaborate?

From a technical point of view, community networks are large-scale, distributed and decentralised systems composed of many nodes, links, content and services. Community networks expand over neighborhoods since their inhabitants are able to establish new nodes or groups of nodes linked to other nearby nodes. Nodes connect using affordable and accessible wireless IEEE 802.11 a/b/n technology, using equipment from various manufacturers, with diverse dynamic routing protocols running on different zones of each network. Operation is done in the un-licensed ISM frequency bands at 2.4GHz and 5GHz. Most networks use wireless technology although fibre links. When forming a large scale mesh network in a dense urban area, channel allocation becomes very challenging to achieve correctly. Moreover, when deploying IEEE 802.11 technology over long distances, some networks have links spanning more than 20 kilometers, the MAC protocols have to be optimized or radically changed

to keep functioning. The characteristics of heterogeneity, required network neutrality, openness and size of these networks are a great challenge to routing protocols and its implementation on low-cost devices.

To reduce costs and democratize their construction, community networks are often built with simple and low cost off-the-shelf hardware. The nodes are usually running an open source distribution, such as Linux (Openwrt) or FreeBSD. A Community-Lab node consists of two or three devices: the community device, the research device and an optional recovery device to force the research device to re-boot in case of malfunction. These devices are connected by a wired local network, with the community device acting as a gateway. Community-Lab node may either be isolated from others or within what we call a Community- Lab cloud.

A broad range of application services is used in these community networks, such as VOIP, content distribution, on-demand and live media streaming, instant messaging, remote backups and updates, file storage and file sharing.

The project has also set up http://opendata.confine-project.eu/ using the Comprehensive Knowledge Archive Network (CKAN) [23] software. This central catalog points to open data available from the different CONFINE partners. With CKAN, the datasets can be easily tagged and commented on (Braem et al. 2013).

What did technology enable that was not previously possible?

From a technical point of view, community networks are large-scale, distributed and decentralised systems composed of many nodes, links, content and services. They are extremely dynamic and diverse, as they are built in a decentralized manner, mixing wireless and wired links with diverse routing schemes with a diverse range of services and applications. Governance, knowledge and ownership of the network are open and include citizens as active participant in the network. Therefore these networks are not just decentralized but also self-owned and self-managed by community members, self-growing in links, capacity and services provided.

How is the organisation funded?

CONFINE is a European funded research project funded in FP7 as a large scale Integrated Project. Run time: 2011-2015, contribution 4.942.000 euros. However, sustainable models are also in place since participants can self-fund their networks with community financing.

What are the main barriers to innovate?

At the physical layer, community networks often use wireless networks because of their lower costs when trying to build large-scale networks. However, the absence of cabling requires extensive wireless planning. Furthermore, to reduce costs and democratize their construction, community networks are often built with simple low cost off-the-shelf hardware. The characteristics of heterogeneity, required network neutrality, openness and size of these networks are a great challenge to routing protocols and their implementation on low-cost devices.

A broad range of application services is used in these community networks, such as on-demand and live media streaming, instant messaging, remote backups and updates, file storage and file sharing. These services face enormous challenges due to the limited capacity of servers and links

and the structure of the network. Operating in this large and constantly changing environment requires the deployment of distributed service infrastructures that exploit locality, react to environmental changes and rely on cross-layer optimizations.

Regulation can also be a barrier, since Confine propose a community network that is very different from well known commercial or private networks that often receive the most attention. From a privacy point of view, community networks pose an unusual challenge. Users should be able to cooperate in the network, while maintaining the privacy of their data and the data they relay. This leads to different threat models and a new notion of trust between users.

What helps to reach goals and overcome barriers?

Community networks are an emerging field to provide citizens with connectivity in a sustainable and distributed manner in which the owners of the networks are the users themselves. Research on this field is necessary to support Community Networks growth and scope, and improve their operation and quality.

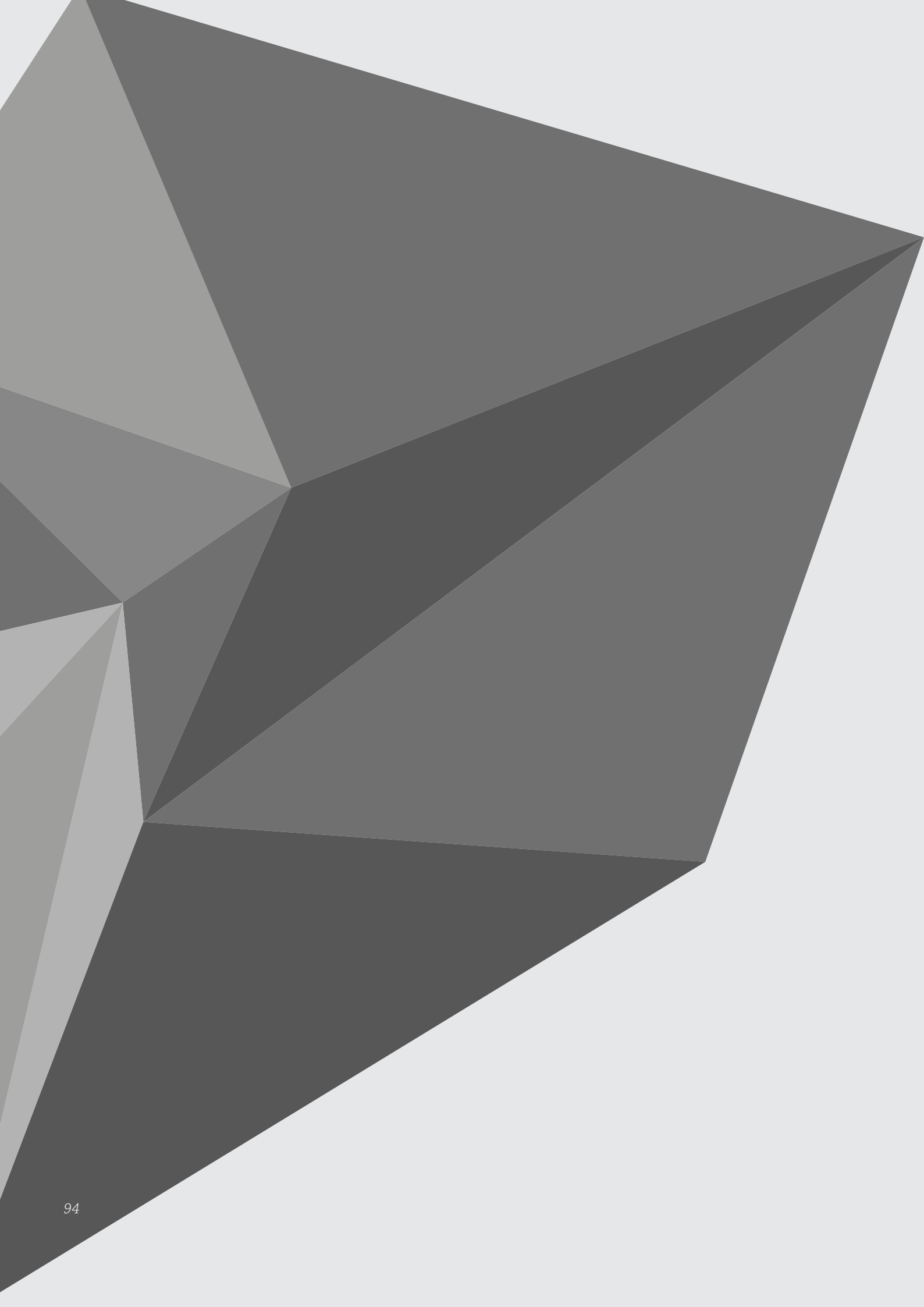
How does it achieve better European collaboration?

The project aims to have a project team that is active across Europe. Since its launch it has gathered a group of students, researchers, professionals, and large-scale communities from Spain, Austria, Greece, UK, Germany and Belgium.

The testbed is ready for experiments, growing in functionality, tools and number of research devices spread across the participating community networks. An open call for participation was published in September 2012, resulting in the reception of 36 applications. In September 2013, with a larger testbed, a second open call for participation was announced.

Therefore, a European community is being built up, where people have the same belief and work on the same goal, while sharing different experimental approach via meetups, events, etc.

Networks also exist beyond Europe, e.g. in the USA, WasabiNet is running in St. Louis, Missouri while The Personal Telco Project is deployed in Portland, Oregon. In Latin America, numerous networks exist and cooperate, e.g. Bogota Mesh and Monte Video Libre. In Melbourne, Australia, Melbourne Wireless is a quickly growing community network (Braem et al. 2013).



Desis Network

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Health and wellbeing, Energy and environment
Technology Trends:	Open Networks, Open Data, Open Knowledge
DSI activities:	An event, A network, Running/hosting maker spaces and hackerspaces, Operating a web service
Key facts:	Members active in Europe, America, Asia, Australia, and Africa
Website:	http://www.desis-network.org

Organisation Name

Desis Network

Short description

DESIS (Design for Social Innovation towards Sustainability) is a network of design labs, design schools and design-oriented universities, actively involved in promoting and supporting sustainable change. It is made up by a network of non-academic actors and institutes who have come together with the overarching goal of coordinating international research projects on social innovation design.

Type of organisation

DESIS Network is largely based on self-organisation at the local level and on network-wide distributed responsibilities and administrative roles. In this spirit, it is coordinated and directed by a Council (the DESIS Council, with one representative for every DESIS Lab). On the administrative side, each DESIS initiativeis managed, and administrated, by a partnership of DESIS Labs. Therefore, the administrative responsibility of DESIS Network is limited to international coordination and website management.

History and Mission

The DESIS Network originates from three main international activities in the 2006-2008 period: 'the European research EMUDE (2005); the UNEP Program CCSL (2008) and the international conference Changing the Change, within the framework of Torino World Design Capital' (2008). In the 2009-2011 period, DESIS spread to several regions of the world, establishing partnerships with other entities and moving towards the current organisational network and way of working: a consortium of Design Labs based in design schools and in other design-oriented universities that work alongside local, regional and global partners to promote and support social change towards sustainability.

DESIS Network aims to clarify the design for social innovation potential both inside and outside the design community. That is:

To make it clearer, inside the design community (designers, design researchers, design media and design schools), that social innovation is, and will continue to be at least for the near future, a fundamental field of application for all the design disciplines.

To give social innovators tangible evidence of the potential of design thinking and design knowledge in supporting the processes in which they are involved.

What does it do, and how does this activity enhance social innovation?

DESIS research projects: DESIS collaborates with several partners and design schools, and is actively researching and exploring digital possibilities in social innovation. One interesting example of a research project by the network is "Sustainable collaborative services on the digital platform: definition and application". A paper which explores a number of examples of how digital collaborative services have been used to deliver presently unmet social needs (amongst these is Hitchhikers, 'a service created by hitchhikers to connect people with empty seats in their cars and people in need of a ride.')

In this way DESIS's output of research serves to bridge the gap between grassroots activity and this network of designers and social innovators (whilst simultaneously expanding the potential outreach and awareness of these instances of digital social innovation).

DESIS Labs and Network: DESIS Labs are groups of professors, researchers and students who orient their design and research activities towards social innovation, while also attempting to grow and expand potentially useful alliances with other potential partners. They can operate at the local scale with local partners and, in collaboration with other DESIS Labs, they also engage in regional and global large-scale projects and programmes. They are based in Design Schools and design-oriented universities and can be extensions of already existing entities or new, specifically established ones.

What is the social impact it wants to achieve?

DESIS Network's overarching social goal is to better understand the value of social innovation (including digital social innovation), and its potential for scale. DESIS Network aims at using design thinking and design knowledge to co-create, with local, regional and global partners, socially-relevant scenarios, solutions and communication programmes. It does all of this in a number of key ways:

Scaling-up social innovation DESIS Network's main aim is to use design thinking and design knowledge to trigger, enable and scale-up social innovation. That is:

To enhance its potential by creating a more favourable environment (social, cultural, political, economic).

To raise its visibility by searching for promising initiatives and communicating their existence and significance to a larger audience.

To stimulate new initiatives, by proposing visions and solutions as seeds to be developed in open and collaborative interactions with local communities and other involved actors.

Promoting an Open Design Programme: DESIS Network's most ambitious aim is to promote a broad and flexible design programme intended to generate a platform of open knowledge. A design programme where several local, regional and global projects may converge, reinforce each other and generate innovative scenarios and solutions adequate to the great challenges of contemporary society.

In short the DESIS Network's higher ambition is to generate an Open Design Programme able to give different projects visibility, to facilitate their alignments, collaborations and synergies and on these basis, to develop visions and proposals.

What is the role of the organisation within the DSI ecosystem?

As a global research network DESIS is in a unique position to disseminate and develop findings research on digital social innovation.

Enhancing collaboration and engagement: DSI network effect

DESIS Network collaborates with other networks whose focus (such as social innovation, quality of everyday life, design for sustainability, and design school coordination) is complementary to their own. In this spirit, to date, formal agreements have been established with: Social Innovation Exchange (SIX), Sustainable Everyday Project (SEP), Learning Network on Sustainability (LeNS), Partnership for Education and Research about Responsible Living (PERL) and International Association of Universities and Colleges of Design, Art and Media (CUMULUS). DESIS also establishes special partnerships with private companies, non-profit organisations, foundations and government agencies that share similar views and are willing to co-develop open projects on topics and areas of common interest.

How is the organisation funded?

No information available

What are the main barriers to innovate and how are they in the domain?

No information available

What helps to reach goals and overcome barriers?

No information available

How does it achieve better European collaboration?

The very structure of the DESIS network is one geared towards collaboration on a European level. As already mentioned above, DESIS members come from all over Europe and whilst research projects tend to be locally funded, the results of this work and research are shared all across the DESIS network. For example, the research report "Piloting digital storytelling and action research as an approach to stimulate pro-environmental advocacy and behaviour change", was funded and commissioned by DEFRA (the Department for Environment, Food and Rural Affairs based in the UK) and conducted by the University of Bath to explore the effectiveness of digital storytelling. It conveyed this through the use of short video clips, as a means to stimulate pro-environmental advocacy amongst the 50 plus age group, and shared their detailed report on the DESIS UK website. This is just one instance that demonstrates how DESIS has forged useful alliances between academic institutes and government authorities.

Everyaware

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Health and wellbeing, science, energy and environment, participation and democracy
Technology Trends:	Open networks, Open data, Open knowledge, Open hardware
DSI activities:	Research project, network, operating web service, providing education & training
Key facts:	3-year project EU funded with € 2.1M
Website:	http://www.everyaware.eu

Short description

The Everyaware project aims to empower citizens to engage actively in improving their own environment and making it more sustainable. The project does this by providing capabilities for environmental monitoring, data aggregation, and information presentation to users by means of mobile and web-based devices such as smartphones, computers and sensors. The work on Everyaware is presently ongoing (the project runs from 2011 – 2014), therefore this short case study is a snap shot of the project's ambitions and activities and does not purport to present any final findings from the overall project.

History & Mission

The Everyaware project was set up in 2011 as a collaborative research project between academic organisations from across Europe, coordinated by Fondazione Istituto per l'Interscambio Scientifico in Italy. The project receives 2,1 million euros in funding under the European Commissions 7th framework (FP7).

Type of organisation

Everyaware is an academic research network with partners from across Europe, including Fondazione ISI, Italy; Sapienza Università di Roma, Italy; VITO (Flemish Institute for Technological Research), Belgium; University College London, UK; Leibniz University, Hannover, Germany.

The main driver behind Everyaware is the belief that 'the current organisation of our economies and societies is seriously damaging biological ecosystems and human living conditions in the very short term, with potentially catastrophic effects in the long term. The enforcement of novel policies may be triggered by a grassroot approach, with a key contribu-

tion from information and communication technologies (ICT)'. Building on this, the four high-level aims of Everyaware are:

- Involving citizens in the process of monitoring the environment, combining objective and subjective measures
- Enhance citizens' awareness
- Ultimately change individuals' behaviour
- Putting pressure on policy makers.

Everyaware sees the creation of methods and technological innovations that can make people fully aware of their actual environmental conditions and the future consequences of their actions. For Everyaware, such methods and innovative technologies are key factors for driving the change in behaviour towards more bottom-up initiatives that will lead to more sustainable lifestyles and societies.

What does it do, and how does this activity enhance social innovation?

Through the project Everyaware intends to integrate theoretical and practical techniques from the disciplines of environmental sensing, computer science, statistical physics and social science to collect and analyse physical measurements from sensors and associated subjective opinions of participants. In practice the project aims to do this through two main activites, the Everyaware platform and a set of case studies which will explore the detailed aspects of ICT-enabled citizen engagement in environmental monitoring.

The Everyaware platform: The overarching aim of the Everyaware platform is to develop an integrated hard and software platform which enables citizens to effortlessly capture information related to their behaviour and choices, which EveryAware refers to as 'subjective data'. It pairs this with 'objective environmental data' from sources such as static sensors. The aim of this is to undertake a comparison between sensor data and subjective opinions which will expose the mechanisms by which the individual perception of a known phenomenon is translated into its social perception and eventually into choices and actions.

A central server efficiently collects, analyses and visualises data sent from arbitrary sources. The Everyaware platform will handle both sensor and subjective data acquisition. It will host a modular system based on two hardware components: a smartphone controlling the data acquisition and a modular sensor box with several pluggable sensors. This approach guarantees high scalability of the overall system and allows for an optimal distribution of sensors (e.g., wearable sensors for air or noise pollution). At the same time, web-interfaces allow users to easily upload their sensor readings, and equally easily tag these with subjective information.

Experimental Tribe is the first prototype of such platforms to be realised. It is a web platform for gaming and social computation. It helps researchers to devise web games/experiments, and offers a platform for others to join in, meaning the public can both enjoy and contribute to the scientific research.

The web platform is built to engage social computation, letting the different organisers of projects collaborate and coordinate on the shared platform. Users can run experiments, partake in experiments, share their experiences, and carry out research. Experiments range from urban dynamics, mapping human behavior patterns, opinion dynamics, to perceptions of political networks. Or through gaming, users can contribute to scientific research. Since the games on the platform have been created for research purposes, the researcher can then work with all sort of statistics related to players and the gameplay.

The data storage system and the gaming platform are the two main components of the Everyaware web-based infrastructure, which complement each other by addressing specific goals in the context of collecting, storing and analysing relevant environmental data.

Case studies: Case studies concerning different numbers of participants will test the scalability of the platform, aimed at involving as many citizens as possible to leverage on the low cost and high usability of the sensing devices. Everyaware includes several case studies, and projects that have strong focuses on environmental issues. Example case studies that Everyaware has carried out include WideNoise and Air Pollution Sensing project.

WideNoise is an iPhone and Android app that helps people to understand the soundscape around and to help live a healthier life. WideNoise also has an online real-time interactive map, which shows the collected data and indicates the noise pollution levels all over the world. At the same time, WideNoise also visualises the data to explain to users in a more accessible manner how they might gain a deeper understanding of the problem.

SensorBox, AirProbe, a dedicated Web server and Web application, together form a system that measures concentrations of pollutants in the air and localises them through a GPS. This enables users to see the measurements in real time by using a Bluetooth and AirProbe app on their smartphone, and also makes it possible for users to access the aggregate data gathered by the community, as personalised information concerning personal levels of exposure to pollutants. Based on this system, there is also an international competition APIC (AirProbe International Challenge) organised between four cities: London (UK), Antwerp (Belgium), Kassel (Germany), and Turin (Italy). Users in the 4 cities compete to build the most complete map (in terms of time and space) of air pollution for their city.

What is the social impact it is seeking, including any evidence of impact to date?

Everyaware seek two types of social impact with the project:

- Through research it seeks to develop a knowledge base around why and how citizens can become engaged in assessing the state of the environment through ICT and using this information to affect change.
- To develop practical tools and platforms that provides the necessary infrastructure for the change it seeks, and by demonstrating how this can be done in practice.

What it the role of the organisation within the DSI ecosystem?

Everyaware projects tend to have similar approaches and goals to enhance its research and development. Everyaware also experiments in building platforms such as Experimental Tribe, where a high social engagement is emphasised. This supports the research and development of finding solutions towards environmental issues, and raises awareness from people based at the grass root level.

What technological methods and tools is it using, and what did these enable that was not previously possible?

In their research and practical work, Everyaware focus on sensing, mobile and location-based technologies, as well as data visualisation.

Sensing technologies: Along with sensors, human beings can act as a probe to monitor many phenomena, especially in the environmental area.

Mobile and location-based technologies: Cell phones and PCs incorporate sensors of increasing accuracy: GPS sensors, cameras, microphones, accelerometers and thermometers are already a default equipment in most of the mentioned devices. Networks have also accompanied this process, by expanding the availability of an Internet connection throughout daily life.

Online communication platforms: It is developed within the Web2.0 paradigm to provide users with the opportunity of collectively categorising, evaluating and filtering the content they browse.

Everyaware believes its technological focuses will enable citizens to be involved in a techno-social integrated process, this means, low-cost sensing technologies, which allow the citizens to directly assess the state of the environment; social networking tools, which allow effective data and opinion collection, and real-time information spreading processes. In addition, theoretical and modelling tools developed by physicists, computer scientists and sociologists have already reached the maturity to analyse, interpret and visualize complex data sets. The integration of participatory sensing with the monitoring of subjective opinions is novel and crucial, as it exposes the mechanisms by which the local perception of an environmental issue, corroborated by quantitative data, evolves into socially shared opinions, eventually driving behavioural changes. Enabling this level of transparency critically allows an effective communication of desirable environmental strategies to the general public and to institutional agencies.

Generating data and sharing opinion in a user-friendly manner: The combination of sensor-based data generation and online sharing provides the possibility of gathering opinions in a user-friendly manner. Sensor-based gathering of temperature and noise-level information, for example, allows collection of data on totally new levels of scale. Use of mobile phones for this purpose seems a particularly powerful way of getting ordinary people involved, as it could integrate subjective data (such as moods or opinions) as well as scientific readings. It is possible to make more sense of the collected data when they are displayed over a base map of the local streets either via GPS readings or by captures through a map interface.

Raising awareness and effecting decision and policy making: This focuses on the question of whether 'socially accepted' data gathered in this way could induce widespread opinion dynamics leading to changes in behaviour. The idea is that the availability of locally relevant digital data, together with their analysis, processing and visualisation should trigger a bottom-up improvement for social strategies. The appropriate and personalised representation of the collected data to users has the potential of triggering a bottom-up improvement of citizens' behaviours. On the other hand, the augmented awareness could also act as a source of pressure on the relevant stakeholders and policy makers.

Reducing the gap of the views between public and individuals on environmental issues: The comparison between sensor data and subjective opinions aims to expose the mechanisms by which the individual perception of a known phenomenon is translated into its social perception and eventually into more informed choices and actions. A deeper understanding of this mechanism, grounded in real-life scenarios, paves the way to engineering better incentives for change and poses the basis for an effective strategy of environmental communication reducing the gap between the general public and institutional bodies, with a stake in environmental policies.

Grass root community supporting scientific research: Everyaware aims to generate awareness within various grass root movements. These socio-semantic systems have also attracted much attention from the scientific community, to investigate quantitatively how cooperative phenomena arise and could be harnessed to improve the performance of such collective tasks.

How is the organisation funded?

The Everyaware project receives 2,1 million euros in funding under the European Commissions 7th framework (FP7). It is a EU project funded under the Seventh Framework Programme, Information Society Technologies, IST - FET Open Scheme, contract n. 265432.

What are the main barriers to innovate and how are they in the domain?

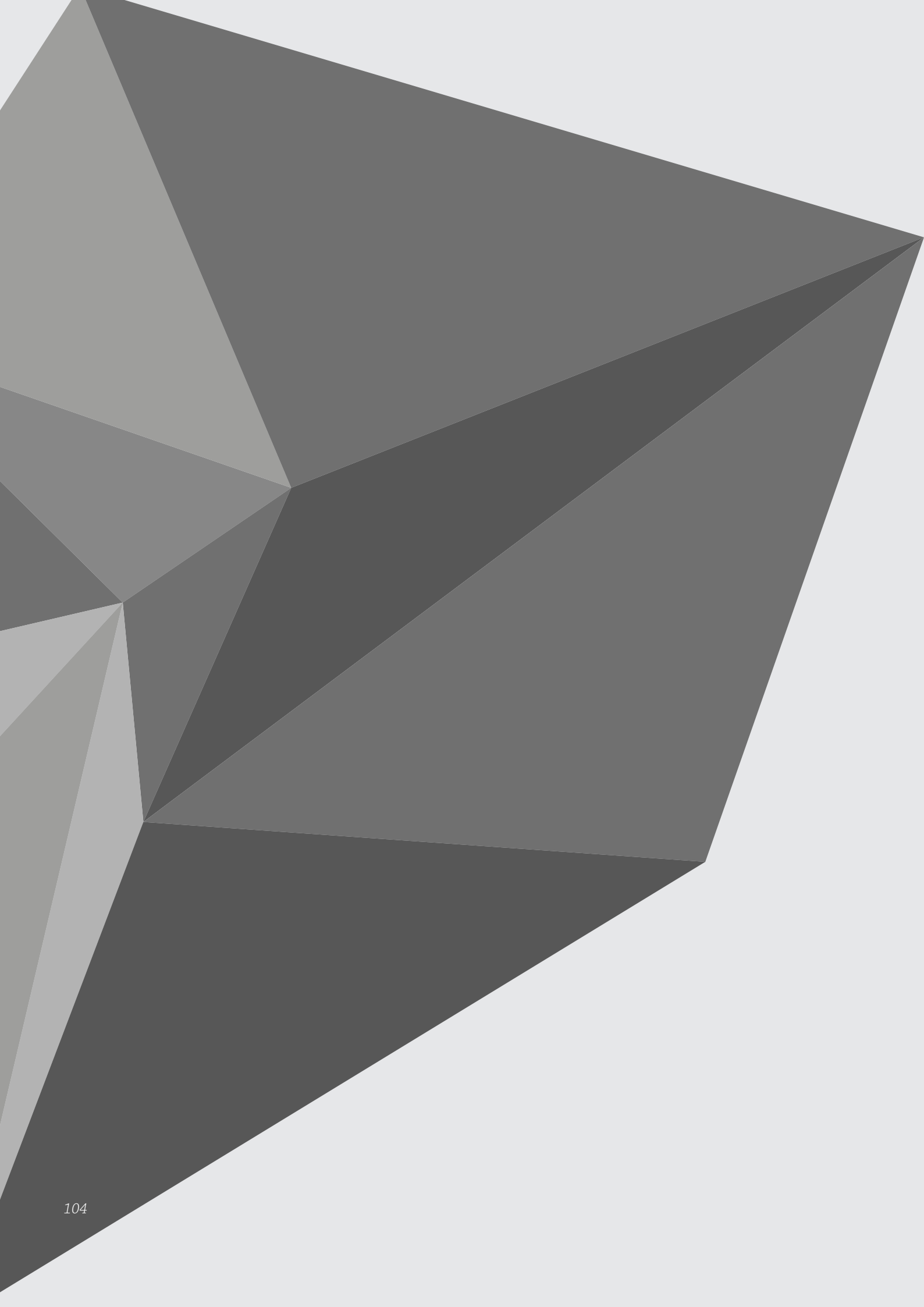
N/A

What helps to reach goals and overcome barriers?

N/A

How does it achieve better European collaboration?

The platform is a cross-European research network. It will be a resource for capturing new types of data across EU.



Fablab Amsterdam

At a glance:

Type of Organisation:	Social enterprise, foundation
Aim:	Education and Skills, Science, Culture and Arts, Energy and Environment
Technology Trends:	Open Networks, Open Hardware, Open Knowledge
DSI activities:	A network, hosting makerspace/hackerspace, providing education & training
Key facts:	Over 250 individual fabrication projects done in Fablab Amsterdam
Website:	http://fablab.waag.org/

Organisation Name

Waag Society

Short description

Fablab Amsterdam is a Fab Lab (short for fabrication laboratory), fully equipped with digital equipment, where people with ideas for projects and products can experiment with transforming those ideas into prototypes and products. Fablab Amsterdam is also part of a global network of standardised open hardware setups.

Type of organisation

Fablab Amsterdam is part of the international Fablab community (there are now Fablabs in most parts of the world, from inner-city Boston through to rural India, South Africa and the North of Norway. The network shares standards on what equipment is required for a Fablab to be fully functional as well as the capabilities needed, fabrication and production knowledge, as well as project experiences. Fablab also forms a network of intellectual property for exchanging ideas within the community, with its expertise in digital designs and fabricated solutions.

History and mission

One of the cornerstones of Fablabs is that users must learn to do it themselves, and they must share use of the lab with other uses. An added mission of Fablab Amsterdam is to provide education possibilities in digital fabrication. Training in the Fablab is based on doing projects and learning from peers. A Fablab gives access to individuals to use lab facilities to make almost anything (that does not hurt anyone).

Fablab Amsterdam first started in 2008 as an outreach project at Waag Society, by Professor Neil Gershenfeld, Director of the Center for Bits & Atoms, MIT. Waag Society is a non-profit organisation that focuses in the field of social innovation through creative technology, and the creation of Fablab Amsterdam was for Waag Society in synch with their ambition to pioneer new ways developing, prototyping and testing concepts and sharing knowledge.

Alex Schaub, who was working at Waag Society that time and is now the Fablab manager, went through the intensive training from Fab Academy and built up the very first network of Fablab Amsterdam, which is still very active. With the community effort, Fablab Amsterdam has grown to be a fully equipped fabrication workshop that gives everyone, from small children to entrepreneurs and businesses, the capability to turn their ideas and concepts into reality.

Fablab Amsterdam is situated within Waag Society's space 'De Waag' in the centre of Amsterdam.

What does it do, and how does this activity enhance social innovation?

Activities in Fablabs range from technological empowerment to peer-to-peer project based technical training, local problem solving and small-scale high-tech business incubation as well as grassroots research. Users learn by designing and creating objects of personal interest or importance. Empowered by the experience of making something themselves, they both learn and mentor each other, gaining knowledge about the machines, the materials, the design process, and the engineering that goes into invention and innovation.

Fablab Amsterdam opens two days a week free of charge to the public, to anyone who is interested in working in the Fablab and using its machines to develop new products or projects. The only requirement for using Fablab Amsterdam in open days is to document the work and project on the Fablab website and share the designs with the rest of the community under a Creative Commons license.

For this reason there is a huge variety in the types of prototypes and final products developed at the Fablab, from small scale projects with little social purpose such as a 3D plug for a bicycle handlebar to larger more complex social purpose projects such as the Low Cost Prosthesis which is described in more detail below.

Outside the open days, Fablab Amsterdam charges a small fee for using the facilities. It is also possible to hire Fablab crew to help better use the equipment and achieve ideas. Other activities that are carried out at the Fablab Amsterdam include workshops and Fab school for children. Waag Society also regularly schedules events that use the facilities of the Fablab.

In addition this Fab Academy, a distributed course in digital fabrication run by MIT, can be taken in Fablab Amsterdam.

What is the social impact it is seeking, including any evidence of impact to date?

As part of its work on enabling invention by providing access for individuals to tools for digital fabrication, Fablab Amsterdam has seen several areas that where this approach can have a social impact.

Creating networks of makers: A lot of people who have a passion for DIY (Do-It-Yourself) come to Fablab Amsterdam to work on their own projects with the lab's machine. The Open Days have made this easier and encouraged more people to join in. People then help each other, and share knowledge and experience. Building on this, the team behind Fablab Amsterdam describe how people that use the lab in addition to working on their own ideas, form a DIY community.

Healthcare: A priority for Fablab Amsterdam in 2013 has been developing and running the healthcare programme, Fablab Cares. This project was started based on a belief that people with physical limitations and disabilities have managed to find all kinds of ways to get through living with their condition, and the Fablab low-cost approach to making can help people make healthcare tools of their own and become less dependent on expensive devices.

To develop Fablab Cares the team in Amsterdam sought global collaborations especially in rural areas of the developing world, which the team see as fertile ground for beginning this work. One example of this is the Fablab Low Cost Prosthesis program, a technology to produce a lower knee prosthesis for less than $50, which was started together with HON-Fablab, a Fablab Network member from Indonesia. The project is being developed in line with open innovation principles, enabling end users, designers, researchers and manufacturers to jointly develop the prosthesis together in the Lab.

What it the role of the organisation within the DSI ecosystem?

Fablab Amsterdam uses digital fabrication to create an open hardware environment, and builds an open network based on that, in which open knowledge is being shared. It engages different parties in digital social innovation, by addressing what has been achieved with its facilities.

What technological methods and tools is it using, and what did these enable that was not previously possible?

A mix of arts, crafts and digital fabrication: Fablab Amsterdam believes in and applies both digital fabrication and traditional craftsmanship in its design and production work. The digital fabrication include machines such as, Laser cutter, Milling Machine, Vinyl Cutter, Embroidery Machine, 3D Printer, Thermal Cycler, Microscope, Centrifuge, Spectrometer, Incubator, Autoclave, Rotary Evaporator, etc. Different machines are placed in an open space, to make the work with different machines easier.

Teleconferencing system and digital communication: To Fablab Amsterdam, it is very important to build and be part of the global Fablab network. An advanced video conferencing system is installed in the lab, enabling every Fablab to be connected to each other. This makes it easy for Fablabs to share knowledge and information, especially things such as the production process, which can be shared across different labs in real-time. The network also makes it possible for people to attend the Fab Academy from all over the world.

Open Hardware and Open philosophy: Much of the work in the Fablab relies and is based on open source design and open hardware such as Arduino. One example of this is Alignment laser, which aims to engineer a low cost prosthetic alignment laser (P.A.L.) system that meets the specifications of higher cost industry laser systems. Building on this all designs that are made in the Fablab are made freely made available online for anyone to replicate under a creative commons license.

The digital fabrication enabled the Fablab community to execute the idea of creating a global DIY community. Before the Fablab people with a DIY interest wouldn't have been able to access the technology and machines in the lab such as 3D printers and laser cutters. In addition to this, the low cost technologies that are experimented with in Fablab have created the possibility of reducing the production cost of new products, just as the open licenses enable the quick spread of these between Fablabs and other DIY communities.

Enhancing collaboration and engagement: DSI network effect

The distribution of knowledge between the different DIY communities around the world helps to grow the overall value of the Fablab network. The free or low cost access to open source hard and software means that Fablab communities both benefit from and contribute to the value of these, which benefits a global DIY community using the same open tools.

How is the organisation funded?

Fablab was funded as a project of Waag Society, with the aim of making it easier for Waag Society to prototype its design concepts, as well as to carry on international knowledge sharing.

What are the main barriers to innovate?

Financing the Fablab. Fablab Amsterdam is not making money at this moment, its business model is mainly only to maintain the lab and its community. The small incomes from the fee charged to use the space are used to supply the open days. But this form of running the lab will be kept for at least a while. To make this possible, Fablab Amsterdam has been helped by a lot of interns and volunteers. The financial situation is a challenge for the whole Fablab community. It is difficult to attract a diverse range of stakeholders for whom the Fablab is a hub and exchange. Fablabs are often dependent on public funding. Most Fablabs are not prepared for requesting commercial funding and instead only focus on reducing costs. A danger is to start cannibalizing the free access in an attempt to generate revenue, which, by destroying the prime directive of the Fablab concept, actually increases the threshold for new makers to come play and experiment and thus serves to reduce the revenue potential, instead of increasing it. Almost none take lateral approaches to generating revenue and becoming a stable and energy-giving node in the local ecosystem.

Skills to take on complex projects with the DIY community: In its recent venture into healthcare Fablab Amsterdam identified a lack of skills as a barrier to growing the Fablab approach. Creating projects such as the Low Cost Prosthesis requires specialist skills, such as biomechanics, that often goes beyond what the team and volunteers in the Fablab have. A challenge going forward is to identify how to connect specialist skills to the DIY community, in order to take on more complex projects.

Setting up the organisation and building the skills: Alex Schaub describe how Fablab Amsterdam was concept-less when it was founded, and he and the other founders Schaub was given the total freedom and responsibility to set up and grow the lab. This naturally required a lot of hard work, as did finishing the Fab Academy training to give him the skills and capabilities to run the Lab.

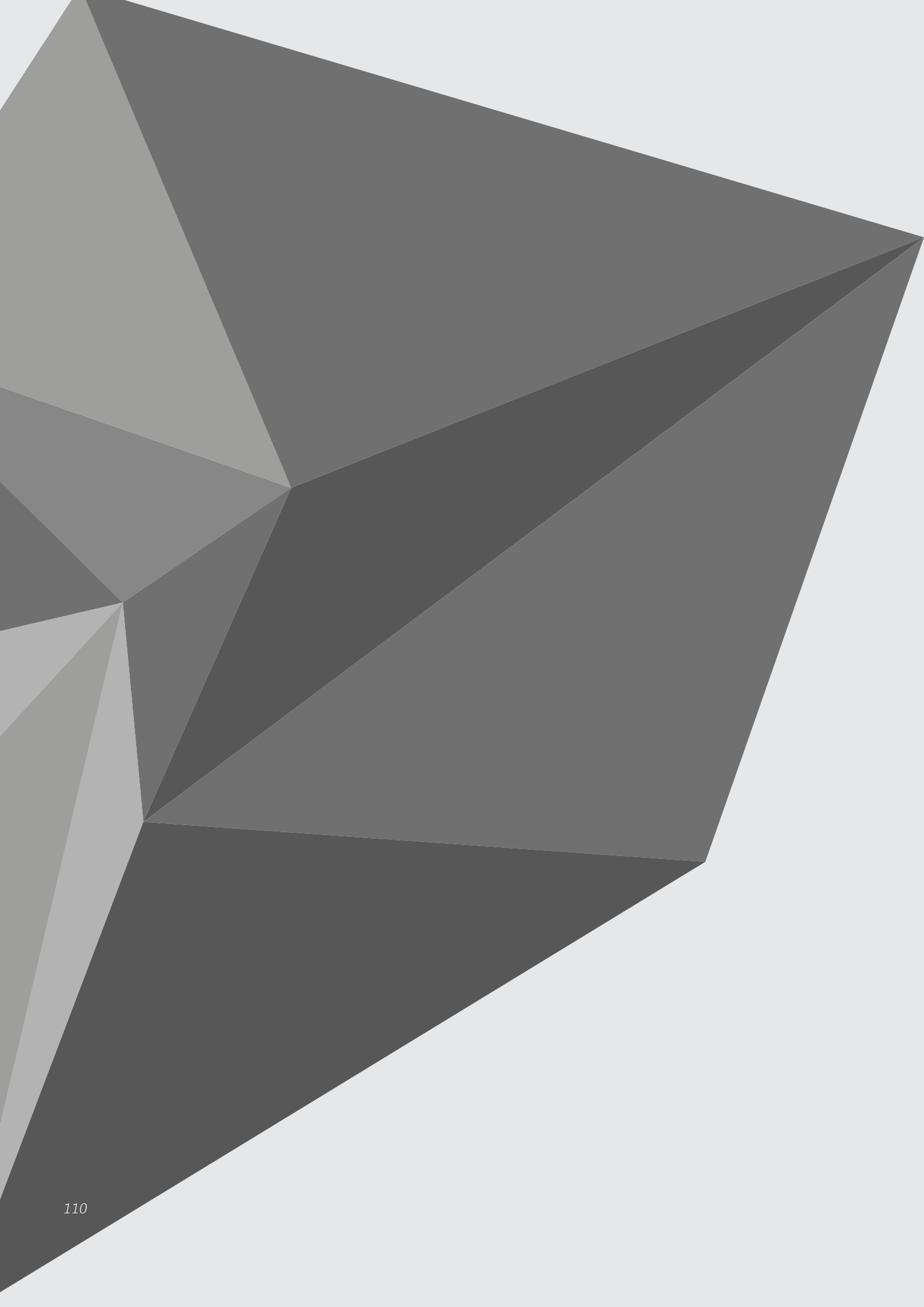
What helps to reach goals and overcome barriers?

Being locally relevant and globally connected

Locally relevant: Fablab Amsterdam finds a key success factor of the Fablab is its ability to be locally relevant, by providing space for innovation and creation, and hosting lots of events to an Amsterdam based community of DIY makers, whilst at the same time being globally connected, collaborating on projects with other Fablabs.

Run by volunteers: The majority of work in the Fablab is run by an active community of volunteers. This, the Fablab team sees as one of the most important drivers for success, as the value of the lab is determined by the activity and uptake of its facilities.

Getting support and help from other stakeholders: Getting external support from more established organisations has also proven to be extremely helpful for Fablab projects. For their work on Fablab Cares, Wieden+Kennedy (W+K), one of the largest independently owned advertising agencies in the world, helped make a video for Fablab Amsterdam for free, which helped the lab promote its belief in DIY healthcare innovation. Alex describes how this support came about as W+K were attracted to the social purpose work of the Fablab.



Fairphone

At a glance:

Type of Organisation:	Social Enterprise
Aim:	Create a 'transparency economy' by opening up the supply chain for electronics
Technology Trends:	Open Hardware, Open Knowledge
DSI activities:	product and research
Key facts:	25,000 phones sold in less than 6 months. 50,000 followers on Facebook.
Website:	http://www.fairphone.com/

Organisation Name

Fairphone

Short description

Fairphone is a start-up company producing the world's first ethically sourced smart phone, initiated at Waag Society in the Netherlands.

History and mission

Fairphone was founded as a social enterprise in 2010. The organisation can't be described as an ordinary smartphone manufacturer. It started as a joint project between Waag Society, Action Aid and Schrijf-Schrijf in the Netherlands as a campaign against the dire conditions endured by people working in sections of the global and often very complex electronics goods supply chain. This included attempting to shine a light on people working in the tin, cobalt and tantalum mines (materials used in mobile phones) of the Democratic Republic of Congo (DRC), many of which are controlled by armed groups, to the assembly lines in China where harsh conditions and long hours are often the norm.

"As a social enterprise we work like other businesses, but we are different, Our goal is social change rather than profit." – Fairphone founder and CEO, Bas van Abel.

The campaign and research ran for three years. In 2013, the social enterprise was founded with the aim of designing, creating and producing its own smart phone. Through its own phone production, Fairphone sought to take the next step in uncovering the story behind the sourcing, production, distribution and recycling of electronics, and demonstrate how a more transparent supply chain could be developed.

What does it do, and how does this activity enhance social innovation?

Fairphone wants to create a smart phone that puts ethical considerations over and above improving merely technological ones. Thereby creating an alternative in the smart phone market and raising the bar for the industry. The project is not about the phone itself, instead Fairphone aims to open up the supply chain behind making the smart phone, and create full transparency around how the product is made. The phone is a storytelling icon and the starting point of a conversation about transparency in production processes and supply chains. By connecting the dots for consumers about the social and environmental impacts of the electronic products they purchase, they become part of a larger movement for redefining the economy.

To achieve its goals Fairphone is created as an open platform using mainly social media; anyone can step in and help crowdsource relevant information and follow each step in the development of the Fairphone, from individuals, businesses and organisations to funds and bloggers.

Production of a fairer smartphone: Fairphone aims to prove that it is possible to build a reasonably priced, well-specified smart phone with a low environmental impact, sourced from the same countries mobile phone companies would normally source material and assembly from, but by supporting independent miners and manufacturers who guarantee basic standards to their employees. On November 13 2013 Fairphone announced that it had sold the first batch of 25,000 smartphones, using only social media for marketing. The Fairphone team sees this as a unique achievement, as this means 25,000 people were willing to buy a phone that has not been produced yet from a company that has never produced a phone before, based on belief in the values and mission behind the company. The organisation aims to deliver the phones by the end of December 2013.

The tin and tantalum in the first edition Fairphone are sourced from conflict-free mines outside of the control of warring parties in countries such as the Democratic Republic of Congo, where natural resources have frequently been used to fund a long-running and highly destructive civil conflict. The company is working with stakeholders and partners on the ground to achieve similar assurances about other materials used in the phone and to negotiate terms with manufacturers to ensure a living wage for workers assembling the devices.

Research: As described above a cornerstone of the Fairphone model is to understand and demand transparency from every link in the supply chain. To do this, the organisation undertakes local research and partners with NGOs on the ground in the countries from where it sources it materials. In the DRC for example Fairphone looks to ensure that the raw materials that go into the phone do not fund the warring parties in the country.

The research is coordinated by a lead researcher within the Fairphone company. Through the online platform (50,000 followers on Facebook) every step in the research and development is communicated. Fairphone has received many research requests and cooperation offers since the start of the enterprise. There are five action areas defined and through active advisory groups all the relevant input from the community is being incorporated.

What is the social impact it is seeking, including any evidence of impact to date?

The founding principles behind Fairphone is that the entire global supply chain is too complex and overwhelming to be addressed as whole, which is why Fairphone started with a single product. Fairphone see the smart phone as a practical starting point for telling the story of how the economy functions, as it is an everyday object that nearly everyone owns, uses or can identify with, which makes it both a tangible device and a great symbol of the connected and social world the supply chains that the organisation is trying to shine a light on operate in.

"It's not our aim to become the biggest phone company in the world, it's our aim to influence the biggest phone companies in the world," Tessa Wernick , Fairphone communications director.

However, it is important to note that Fairphone do not see the phone as a solution in and of itself, instead they see it as a vehicle for change, through the revelation of its story, understanding how phones are made and producing an alternative.

Through mobilizing 25.000 potential consumers, Fairphone feels it has demonstrated how collective action can be made to count and how a community has the power to fuel change.

What it the role of the organisation within the DSI ecosystem?

Fairphone grew from a community platform to the first open mobile phone manufacturer. It is a great case of the open design movement creating grounds for new relations between product, manufacturers and consumers. The appealing story together with the careful community-building by the partners brought a lot of media coverage and made the initiative grow.

What technological methods and tools is it using, and what did these enable that was not previously possible?

In their own words 'Fairphone is not just a bunch of do-gooders; it is making a super cool, high-performance smart phone packed with all the modern features'. The truly outstanding feature is the community though; basically a large group of followers on Facebook and twitter. Since this started as a very collaborative project Fairphone has depended on the community for feedback and input. In the course of its lifetime a committed and talented community grew actively supporting the initiative and product.

As a very small organisation - there are only eight full-time staff - Fairphone is maximising its impact through an open-source, social and collaborative approach, with audits run through partnerships with charities and NGOs, research through crowd sourcing, sales and marketing solely through social media. Every step in the development process, every decision the company makes, is being shared online for people to react and comment on. All the feedback is taken seriously and valuable tips and information are taken into account. This open approach extends to plans for the phone itself and the software, although there is some way to go on this.

How is the organisation funded?

As a research project of Waag Society, Fairphone received funding from Doen Foundation and the Dutch expertise and advisory centre for citizenship and international cooperation . Fairphone won the ASN world prize in 2011. Since Fairphone decided to establish as a social enterprise and design, create and produce its smart phone, it has received funding from Bethnal Green Ventures to participate in a startup Bootcamp and set up its business proposition in London and later about 400,000 euro of private funding to cover operations until its pre-order campaign.

The phone itself is being sold in a pre-sale model, and in batches of 25,000 at a time. 5000 people order and pay for the phone before the company decides to go into production. This way a healthy relationship with the manufacturer can be built, allowing feedback and iterations.

What are the main barriers to innovate?

The supply chain for the production of electronics is very complex. It is, therefore, very difficult to create a fair product in this industry that is used to dealing in extremely large numbers. The strategy is to take small concrete steps and to keep telling the big story. New economies do not grow overnight. It takes a lot of effort and a long term vision.

What helps to reach goals and overcome barriers?

Fairphone can also be seen as a platform to bring best practices together. Not only brokering partnerships between stakeholders, but also using existing initiatives like CFTI (Conflict-free Tin Initiative) and Solutions for hope, that source tin and tantalum from conflict-free areas. This change can only be achieved by doing things together. Fairphone works with factories where a specially established fund will ensure decent wages are distributed amongst workers. It's all about opening up the supply chain, creating transparency.

GitHub

At a glance:

Type of Organisation:	Private business
Aim:	Work and employment, other
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	The platform has 4 million users worldwide
Website:	https://github.com/

Organisation Name

GitHub

Short description

GitHub, a San Francisco-based company, was started in 2008 as a way for open source software writers in various locations to rapidly create new and better versions of their work collaboratively. It has since grown to be the largest social coding repository in the world. GitHub has an apparently flat organisational structure; out of its 227 employees there are virtually no managers, and staff are given a great degree of autonomy in choosing the types of projects they wish to work on; a system of self-allocated work spurred on by the belief that creativity and innovation are contingent upon employees investing themselves in the projects they commit themselves to.

History and Mission

GitHub sets out with a seemingly simple objective: to build better software together. Source code management was historically a particularly asocial (and sometimes antisocial) practice. By shifting this once solitary activity to one centred instead around digital collaboration or indeed 'social coding', GitHub has managed to craft a successful business model based around code review and code management for open source and private projects, by tapping into this community of collective coders.

GitHub started in October 2007 in an effort by Preston-Werner and co-founder Chris Wanstrath to solve some of the challenges presented by Git, a version control system developed by Linus Torvalds, the creator of Linux. Over time, GitHub's mission evolved from offering a paradigm

shift in the way programmers had coded largely in isolation to something more. Since then the platform has gone through a rapid development and is now largest social coding repository in the world with more than 9.8 million repositories.

What does it do, and how does this activity enhance social innovation?

At its simplest Github can be described as open source tool for people to come together online and collaborate around a project, in the majority of cases the projects people use Github to collaborate around are code for websites and software solutions. As a project is developed Github stores and manages revisions to projects. To make it easy for developers to collaborate Git has developed a number of features such as a Web-based graphical interface, wikis and basic task management tools for every project. However, the key feature of Github is the ability to 'fork' projects. This allows the copying of a repository from one user account to another (possible because the code is open source). This enables a developer to copy a code that he or she does not have writing or editing access to and modify it. The developer can then share any modifications the original owner through a "pull request". He or she can then choose to accept any changes made and merge these with the original version.

This makes it both a tool for quickly developing new project collaboratively, and building on this facilitates new digital collaborations to emerge online through 'forking' and 'pulling'. Equally, the fact that all code is open means that people often won't have to start from scratch when developing a new product, but can instead build on existing projects already shared on Github.

What is the social impact it is seeking, including any evidence of impact to date?

Digital collaboration is at the very heart of what GitHub does. Indeed, as the graph below illustrates, Homebrew – a platform used by developers to make code run more smoothly with the Mac OS – was the most heavily trafficked project on GitHub in 2012. This infographic illustrates the flow of code and dialogue that resulted in over 2,000 changes to enhance and improve the Homebrew source code. While Homebrew is just one sample project hosted on GitHub, there are over 5 million other projects on the site involving 3 million coders.

However it seems GitHub wants to stretch digital collaboration and transparency to its limits, far beyond the realm of coding alone: "We want lawyers, people in the government, everyone to use GitHub," its co-founder and CEO Tom Preston-Werner has said. Speaking at TechCrunch Disrupt SF, he said the aim was to "extend the use cases for GitHub…I want people to use this for every reason."

What was the social impact?

A study based on a series of in-depth interviews with central and peripheral GitHub users (carried out by the School of Computer Science and the Center for the Future of Work, Heinz College and Carnegie Mellon University); found that people make a surprisingly rich set of social inferences from the networked activity information in GitHub, such as inferring someone else's technical goals and vision when they edit code, or guessing which of several similar projects has the best chance of thriving in the long term. Users combine these inferences into effective strategies for coordinating work, advancing technical skills and managing their reputation.

How is the organisation funded?

Famously self-sustaining from its founding in 2007, the company has maintained long-term sustainability by offering private code hosting starting at $7/month for five repositories, and up to $50/month for fifty repositories. Instances of GitHub can be licensed to run on private servers inside a company's firewall under the Enterprise plans ($5000/year/20 seats). These Enterprise plans are claimed to be the Github's 'big-money option.' This plan enables clients to download a version of GitHub to live locally on their servers, and cost clients millions of dollars a year. Enterprise clients include Lockheed Martin, Microsoft, LivingSocial, VMWare and Walmart.

Another revenue stream is GitHub Jobs where employers can post job offers for $450/listing. According to Peter Levine, general partner at Andreessen Horowitz, GitHub had been growing revenue at 300% annually since 2008, "profitably nearly the entire way." Overall the 'open source' culture of GitHub translates into their business model in one particularly obvious way: programmers or companies can use the collaborative platform for free as a place to build open-source software, or if they opt not to host their code in this way– favouring instead more proprietary 'closed' code–they pay a premium rate to have to code hosted in private repositories. This second option allows companies to make use of the built-in collaborative features of GitHub, but requires them to give up use of Github's 'distributed global network of talent.'

In July 2012 GitHub received its first ever external funding, when the venture capital firm, Andreessen Horowitz, invested $100 million in the company during its Series A Funding. This additional funding has helped GitHub expand its user base to over 3 million users (now over 4 million). As of July 9th the company was valued at $750 million.

What is the role of the organisation within the DSI ecosystem?

For the many DSI organisations and projects that make up the DSI ecosystem, GitHub has formed the very backbone of a number of these – encouraging collaborative coding for projects like Commons4Europe, mySociety and Open Ministry, whilst building up a community of 'user-contributors'.

On October 15th 2013, Github announced the launch of GitHub Government; a platform set up with the aim of helping governments become more open source, open data, and open government. This portal is specifically aimed at helping governments all over the world to open source datasets, legislation and information so that citizen programmers can help solve local problems.

What technological methods and tools is it using, and what did these enable that was not previously possible?

GitHub uses Git, a multi-platform version control application created for use by developers of the Linux kernel, to coordinate collaborations and to manage uploads and downloads (pushes and pulls) to GitHub. Though developed for software code, any types of files can be part of a GitHub repository, and any text-based files (including plain text, MarkDown, HTML, LaTeX, and LilyPond music notation software files) can take advantage of Git's version tracking and "merging" features. GitHub is also a kind of social network, providing collaborators an easy way to discuss issues in a project, and to follow other users and projects of interest.

Furthermore, by making use of the latest HTML5 API, activities like navigating through a code directory structure are greatly enhanced. As the system of record for software, it is natural that the rest of the software development ecosystem (bug trackers, project management, continuous integration and testing tools) are now scrambling to integrate with GitHub. This will continue to reinforce their leadership position and make life easier for developers. Travis CI gives a glimpse of what the future holds. Checking code into GitHub automatically triggers a test and integration build on Travis CI, a framework running on Heroku. This relieves developers of the tedium of integration testing and will result in better quality software.

GitHub has remodelled how programmers engage with Source Code Management (SCM) – a fundamental tool for programmers, that stores, versions and branches source code being developed by teams of programmers. While traditionally SCMs have been a highly complex, esoteric and cumbersome systems to manage; they have also been notably asocial in their nature. GitHub has thus radicalised this system's approach in two ways:

Rather than forcing every development team in the world to deploy their own SCM, GitHub runs one big SCM in the cloud and the management issues vanish.

GitHub organises projects around people rather than code.

While these changes may seem simple at first, their ramifications have been widely sensed. Because modern programming tends to be about assembling code–in the form of libraries, open source work, etc.–as well as writing it, a great deal of code (over 3 million Git repositories) have been stored on GitHub, where it has been easy to access in one central repository. In essence this people-centred approach to programming has meant GitHub has become a social networking site for programmers.

Enhancing collaboration and engagement: DSI network effect

GitHub hosts open-licensed projects and is designed for collaboration; allowing any user to fork any public project. By clicking the "fork" button, any GitHub user can almost instantaneously create their own version of an existing project. That "forked" project can be used as the basis for a new project, or can be used to work out new features that can be merged back into the original.

Yet while GitHub was originally developed as a way to share and merge software code, this same logic can be applied to any types of files that make up the GitHub repository, making it a potentially useful collaborative tool for academics, legislators and government workers. Since any open-licensed project can be hosted on GitHub for free, it can function as a publishing platform, a peer-review system, a learning management tool, and a locus for intra- and inter-institutional collaboration.

What really helps reach goals / how to overcome these barriers?

GitHub's success can be largely explained by the way it has opened up what was in the past a closed, asocial aspect of software coding. By making its coding repository far more transparent, potential contributors are likely to understand how it is GitHubbers interact and develop collaboratively. This in turn has the benefit of accelerating the time it would normally take to have someone become an engaged and productive developer, and also affords junior or novice developers the opportunity to see how more senior coders write code and communicate.

Related also to this point on collaborative learning is the fact that contributors heavily rely on existing tests in project when creating their own tests. Such knowledge can help GitHub project owners to get contributors to deliver more tested code.

Others have commended how few infrastructural barriers there are to someone making contributions to ongoing projects on GitHub (however big or small). Such commentators report that a lot of potential productivity is lost when you require users to fill out forms or register for barely usable software before they too can get involved, etc.

What were the main barriers to innovate?

Open Source vs. Closed: While GitHub has stood out as an outrider of how e-businesses might operate in an open-source landscape; the cultural and operational change needed to accompany such a paradigm shift has by no means been seamless. The case of Healthcare.gov offers an interesting allegory in this regard. Healthcare.gov is a platform intended to enable users to navigate through its site, and to choose the most suitable healthcare package. The code for the informational part of Healthcare.gov – the "frontend" of the site – was written by a Washington, D.C. startup (Development Seed) and a small team of consultants. Whereas the code for the healthcare exchange – the "backend" of Healthcare.gov – was built by more than 50 contractors at CGI Federal and was never made public. Bloomberg Businessweek has reported that Development Seed was brought in as a subcontractor specifically because it had lots of code on GitHub. The conflation of these two approaches to coding resulted in confusion and chaos – Millward Brown Digital reported that a mere 1 per cent of the 3.7 million people who tried to register on the federal exchange in the first week actually managed to enrol. On the 1st of October, all Healthcare.gov code hosted on GitHub was removed.

According to the Centers for Medicare and Medicaid Services this is because people were using the GitHub repository – which contained only frontend code – to report issues with the backend, and because the backend had extensive technical problems, the GitHub repository was overwhelmed with misdirected bug reports.

What really helps to reach goals / how to overcome these barriers?

Source Code Management: According to Preston-Werner (a GitHub founder), the main problem is the site's forbiddingly technical approach. "We've got a lot of educating to do," he said. GitHub is built on top of Git, an eight-year-old source-code management tool that most users still manage via a command-line interface. While understanding Git may pose as a barrier to innovation more recently there has been an emergence of free tools to learn Git online, and GitHub now comes with graphical interface tools that you can download and use without knowing a line of Git.

More negatively, a focus on build- and test-driven development has resulted in fewer tests for bad input: Many newer contributors have never learned to write test suites (i.e. a series of tests designed to test a software program has a specified set of behavior), but senior developers often assume the opposite. Using Behavior-driven development or Test-driven development without teaching "safe testing" leads to 'a lack of tests for invalid results and functionality, only tests to confirm that the intended results occur upon the intended input.'

Funding and business model: GitHub's 'Freemium business models' (a term which relates predominantly to the fact that organisations will pay a premium price to host their source code privately with GitHub) is underpinned by the fact that as the cost of computing, storage, and (most importantly) bandwidth has fallen over the past few years. For these reasons, GitHub has been able to offer free project hosting to millions of users. The marginal cost of each new project is likely less than $1 per year.

Goteo

At a glance:

Type of Organisation:	Charities, foundation and social enterprise
Aim:	Platform for crowdfunding for projects generate a collective return through fomenting the openness
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	14.000 registered users, launched 100 successful projects and sourced more than 700 non-financial contributions
Website:	http://goteo.org/

Organisation Name

Goteo

Short description

Goteo.org is an open source social network for crowdfunding as well as distributed collaboration based in Spain. The explicit mission of Goteo.org is to help finance and support "the independent development of creative and innovative initiatives that contribute to the common good, free knowledge, and open code". Building on this, the platform aims to facilitate 'the collective investment in open projects with social, cultural, scientific, educational, technological or ecological objectives that generate new opportunities for the improvement of society and the enrichment of community goods and resources'.

Type of organisation

Goteo is managed by the non-profit organisation – Fundacion Fuentes Abiertas (Open Source Foundation).

History and mission

The explicit mission of Goteo.org is to help finance and support 'the independent development of creative and innovative initiatives that contribute to the common good, free knowledge, and open code'. The Goteo founders have described how there were three primary drivers behind the development of Goteo.

Firstly, Goteo wanted to create a crowdfunding service for people in Spain. When they were developing the platform, Kickstarter, the leading international crowdfunding platform at the time, had a limitation of people not being able to publish projects without an American bank account.

However, secondly, and more importantly to the Goteo team they also saw a flaw with existing crowdfunding platforms and a subsequently a gap in the market for Goteo to target. The crowdfunding taking place on Kickstarter, Indiegogo and similar crowdfunding platforms very easily lend themselves to what Schulbaum and Senabre refer to as 'problematic practices of 'crowd capitalism' where crowdfunding helps raise money for a commercial venture with global production processes, with the risk of subcontracting critical tasks to global sweatshop factories.

Thirdly, Goteo identified that the majority of existing platforms didn't encourage collaboration, and broke down the relationship between people using the platform in traditional consumption relationships. On the hand were artists/producers of crowdfunded products and projects and on the other were audiences or consumers of these. Goteo saw a potential exploring crowd benefits that mixed financial as well as social ones, through creating a platform that enabled the donation of time, skills and a will to collaborate as well as financial resources.

How it all came about: The genesis for Goteo came in 2010, when Platoniq (a collective of cultural activists, open source practitioners and Internet researchers) came together to explore initiatives for giving monetary support online to different people and causes with a social purpose. This included looking at new models for financing ventures such as the micro credit site Kiva, P2P lending models and emerging crowdfunding platforms like Kickstarter. The aim of the exercise was to understand how compatible crowdfunding was with crowdsourcing lessons learned from the open source world. In the initial development phases the team organised workshops and meeting with the different communities of practice, potential project leaders, backers and institutions which could help them validate some of the ideas they had got from the initial research phase and also discover new concepts and interesting things to develop. Following on from this initial scoping of the platform the team began to write the code for the Goteo platform with the central idea of openness and collaboration in mind. This meant both replicating some features of crowdfunding from other sites, but also adding new features such as optimum and minimum costs needed, petitions for collaborations as well as monetary help, and specially the need to identify and propose some valuable collective reward apart from individual ones.

This lead to the development and launch of Goteo in late 2011.

What does it do, and how does this activity enhance social innovation?

At its simplest Goteo can be described as a social network that helps facilitate both the collective funding of and distributed collaboration or crowdsourcing of projects.

Crowdfunding: The crowd-funding platform features of Goteo follows the basic principles of most other crowdfunding platforms. The platform facilitates the sourcing of many small financial contributions towards projects that contribute to developing the commons, free knowledge and/or open source. Unlike most other crowdfunding platforms Goteo operate with two funding windows for a campaign, each with a duration of 40 days. The first is an "all or nothing" round for the minimum essential budget, while the second is for an optimum sum to carry out additional improvements.

This method of finance stands in contrast to more traditional types of financing products and projects, which typically happen through large contributions from a small set of investors or lenders.

Crowd 'collaboration': This second component of Goteo is based on a belief that that crowdfunding offers benefits beyond new opportunities for finance, and that 'everyone who contributes to a project should become part of the economic/productive/creative process they helped to improve, rather than support the generating of knowledge and resources for a private party'. Therefore, projects that raise finance on Goteo also have the opportunity to source non-financial support from backers that can help make the projects a reality. As an example, Nodo Móvil is a campaign to create a mobile wifi connection unit for social movements and public spaces. In addition to raising well beyond its minimum funding goal, it also succeeded in attracting support from developers, a hacklab space for working, a 3D printer for prototyping, volunteer testers for their prototype solutions, as well as an offer to collaborate with local authority on testing the project in a public area. Another example is how the Infinit Loop campaign to develop a reusable wrap for gifts made of high quality cloth with a QR identification code, which allows people to follow the wrap as it is used on future presents with web geolocation, was able to get support from app developers in addition to the reaching their funding goal.

What is the social impact it is seeking, including any evidence of impact to date?

A core criteria for Goteo is that all campaigns the platform helps have to meet a cultural, scientific, educational, technological or ecological objective. In addition to this projects must permit through the use of licences the copying, public communication, distribution, modification and/or use of part or all of each creation. As Schulbaum and Senabre describe in an interview with Sharable magazine, they are adamant that 'the project is transferable and reusable by other people and collectives (common good) according to the rights which govern free knowledge and which are usually regulated on a legal level through free and open licenses'. Therefore projects are built on collaborative, open source and open design principles. As an example the Infinit Loop cloth mentioned above is for example built with an open design license.

Although a relatively 'young' platform, Goteo has already experienced a significant traffic and usage of the platform. After 11 months of activity the platform had more than 14,000 registered users, with more than 9,000 daily visits, and significant social media attention as well (the platform has more than 8,000 Twitter followers and 3000 Facebook likes). Most importantly more than 100 open projects have been fully funded and supported to date via the platform, raising a total of nearly €350,000, with more than 700 offers of different types of contribution and collaboration from volunteers.

What is the role of the organisation within the DSI ecosystem?

As a crowdfunding platform focusing on the commons, Goteo has helped raise finance for a suite of digital social innovation projects. One of the more prominent of these include the Smart Citizen kit, an environmental sensor kit for citizens, built on Arduiono (case studied elsewhere is this report).

What technological methods and tools is it using, and what did these enable that was not previously possible?

To facilitate the crowdfunding of campaigns, Goteo relies heavily on the ability of people to easily transfer money online, just as social media and networks such as Twitter, Facebook, Flickr and Youtube are a crucial part of launching, promoting and engaging online communities of potential backers in Goteo projects. Goteo has used open coding platform Github to develop the code for the platform and have made the source code for the platform available for everyone to access on Github.

While not directly technologies, the project relies heavily on the open hard and software standards developed by and for the open source community, such as creative commons to set the standard for how campaigns launched on the platform should use and develop open technologies.

Modern crowdfunding and its ability to quickly mobilise large groups of often very geographically dispersed people online around a common cause, would not have been possible before the emergence of the Internet.

The projects launched on Goteo often rely on the access to low cost and open hard and software solutions to develop their products. The Nodo Móvil project campaign is, for example, built on the Arduino Open Hardware board. Other projects, like the Tuderechoasaber, an online platform for accessing and creating information requests to Spanish public bodies, relies on open data.

How is the organisation funded?

The Spanish Minister of Culture has helped co-fund (amount unclear) the early development of the Platform. All projects on the platform are funded by individual backers, who vary on a project by project basis.

What are the main barriers to innovate?

No information available

What helps to reach goals and overcome barriers?

No information available

Landshare

At a glance:

Type of Organisation:	Social enterprises, charities and foundations; grassroots communities
Aim:	Work and employment, other
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	Landshare has got 55,000 members worldwide
Website:	http://Landshare.net

Organisation Name

Landshare

Short description

At its simplest, Landshare can be described as an open platform that allows people to share land. Anyone who wishes to be involved in the Landshare project can register and to search the list of other Landshare Members to identify people who they may wish to contact to assist them (whether as a grower, landowner or helper) in setting up their own land-sharing arrangements.

Type of Organisation

Landshare is a community-based social enterprise.

History and mission

Landshare sets out 'to bring together people who have a passion for home-grown food, connecting those who have land to share with those who need land for cultivating food.'

The landshare project was launched in 2009 through celebrity television chef, Hugh Fearnley-Whittingstall's Channel 4 television show River Cottage. Since then it has grown into a community of more than 60,000 growers, sharers and helpers.

What does it do, and how does this activity enhance social innovation?

Landshare takes an entrenched social problem (i.e. the shortage of available land allotments) and sets out to solve it in an innovative, digital way; by using its site as a social network where interested D.I.Y. growers can join forces to form a growing collective, or can search for or list land that might be used for this reason. It also uses geolocation mapping tools to offer a helpful, searchable visualisation of available allotments, where users can enter their post code to explore their own locality to see what's available.

What is the social impact it is seeking, including any evidence of impact to date?

Landshare's online community is dedicated to reducing land waste and promoting home-grown food (both for its health and environmental benefits), and address the basic challenge that there are more than 100,000 people on allotment waiting lists in England alone. Landshare aims to unlock latent land assets through its digital collaboration thereby achieving its aims.

Overall, its objectives are to lower barriers people face, mainly space, in growing their own food. This initiative thereby addresses issues of 'health, food access and equality, environment, food security, and community cohesion.'

Part of the difficulty in assessing the impact of the project relates to the fact that much of Landshare's success can be attributed to the media channels from which it benefits. This has certainly done a lot to raise Landshare's profile, and has created buy-in from those who associate the project with its founder's celebrity profile. It is thus difficult to establish the impact of the digital platforms which the project uses to map and match growers with land sharers. Having said that, the site boasts over 73,000 members, and claims to have a community of over 60,000 growers and sharers.

What is the role of the organisation within the DSI ecosystem?

Landshare seeks to match interested parties up with disused land that might be used as allotments; seeks to allay potential barriers by supporting users in their efforts to secure land through local councils. Landshare's Let's Grow Campaign aims to assist in the matching up of growing groups with disused land. It informs interested parties of six or more people (who pay council tax in approved regions in the UK) of their legal right to access an allotment made available for use by their local council. It also offers them the tools to form a group for this reason, as well as tips in how to lobby their local councils (such as a pro forma letter).

What technological methods and tools is it using, and what did these enable that was not previously possible?

In August 2010, Landshare launched a free iPhone app. The app featured a 'landspotting' camera tool which incorporates geocoding technology that enables users to photograph areas of unused land and plot them on a map. They can send this to their local council to request allotment space. The app was developed by KEO Digital.

The Landshare.net website includes some built-in social networking features such as message inbox, forums, and chat functions where users can ask 'vegetable doctors' for advice on particular questions, or consult other members for any advice they might need.

Considering the project boasts over 70,000 registered users - as of November 2013, Landshare's use of open networking and crowdsourcing has evidently proven useful resource for growers, sharers or helpers interested in getting involved or joining the 'grow your own' movement.

Enhancing collaboration and engagement: DSI network effect

Users can set up groups via the app, inviting friends or people living in the same area to join Landshare. Once a group has six members, a letter can be automatically generated and sent to their local council requesting an allotment. This same feature is available to those who opt to use the website.

The website also includes a number of sharing and support platforms that promote digital collaboration related to finding or sharing land, finding groups in a member's local area, and advice for starting up a community garden or approaching local councils to try to secure an allotment. By entering in your postcode to the searchable map on the website, members are potentially presented with a number of helpers, sharers or growers in their area. This clearly demonstrates how Landshare is using digital technologies for the purpose of collaboration.

How are projects funded?

Individual Landshare initiatives have been funded using Landshare's sister site the crowdfunding platform Peoplefund.it, which, like the Landshare website and app, was also set up by KEO Digital. Peoplefund.it works in a similar way to crowdfunding platform Kickstarter. As an example the platform was used to successfully raise £4,401 (109 per cent) of the £4,030 target for the proposed Dyfi Landshare. The £4030 was intended to be used to pay for office space for one day a week; Staffing: two members of staff for one day a week; telephone line rental and call charges; printing and office supplies; website fees; travel expenses and Welsh translation services.

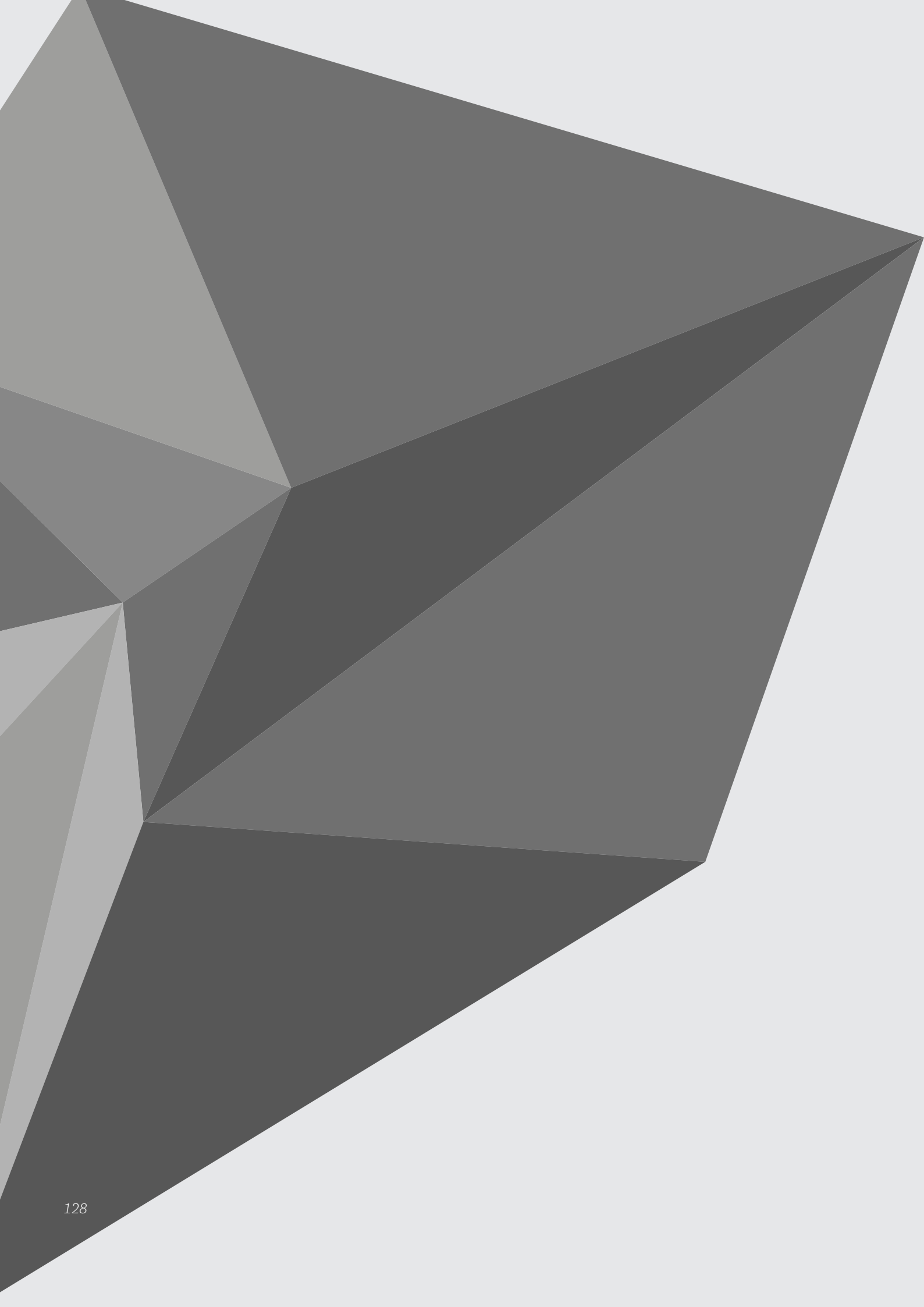
Recently, Landshare.net has decided to run a trial to test the inclusion of some 'contextual advertising' to help pay for the continued development and maintenance of its website. According to the site, the income from these adverts will help to fulfil the initiative's primary objective: to connect as many growers with available growing space in the UK and beyond.

What really helps reach goals?

Undoubtedly Landshare's success has been largely a consequence of the immense media muscle power the project has had since its inception: the initiative was born out of celebrity chef Hugh Fearnley-Whittingstall's River Cottage television show, and has the benefit of having Channel 4 as a primary partner. It is therefore difficult to know if the initiative would have had the same degree of buy-in from the public and from local councils in the absence of these important profile-raising networks.

What were the challenges they needed to overcome?

No information available



Liquid Feedback

At a glance:

Type of Organisation:	Grassroots communities
Aim:	Participation and democracy
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	Used by the pirate party in Germany to source policy from members
Website:	http://liquidfeedback.org/

Organisation Name

Liquid Feedback

Short description

Liquid feedback is free open source software which enables platforms for bottom-up political opinion formation and decision making.

Developed by the Public Software Group based in Berlin, Germany, the platform combines aspects of representative and direct democracy enabling participants in the platform to both vote directly on issues or by proxy through delegating their vote to other members of the organisation using the platform. To date the most prominent use of the platform has been by the Pirate Party in Germany and the MoVimento 5 Stelle (5 Star Movement or M5S) in Italy, who have used the Liquid Feedback to engage party members to shape and vote on the parties policy.

Type of organisation

The Public Software Group who developed the Liquid Feedback software is a not-for-profit organisation based in Berlin, Germany.

History and mission

The Liquid Feedback software was first published in October 2009 by Public Software Group. The software was first used by Germany's Pirate Party that same year, and has, amongst others, since also been used by the Five Star Movement in Italy. However the developers are fully independent from the users of the software. The Liquid Feedback software is published under an open MIT license and free for anyone or any organisation to download and use.

At the core of Liquid Feedback sit an ambition to create a platform that addresses the gap between representative democracies where people elect representatives to represent and vote for them on policy decisions and direct democracy, where one person equals one vote. The problem Liquid Democracy identified was that while the latter is considered a more 'pure' democracy, it does not scale well, and individual voters might not always be knowledgeable on the often very complex policy issues being discussed. As a response they developed the liquid democracy model where people can both vote directly by proxy, through delegating their vote to other members using the platform, as explained in more detail below.

What does it do, and how does this activity enhance social innovation?

The basic activity of Public Software is to make the Liquid Feedback software freely available to organisations interested in using the platform to create a more deliberative process around shaping and agreeing on policy initiatives. While the platform was original developed for political parties and was first used by the Pirate Party in Germany, it is also used by associations and NGOs allowing all members to participate in voting as well as developing, which can aid board members in their work. One example of the latter is the Slow Food an organisation based in Germany with more than 11,000 members. Finally, it can be used directly by government to get civic participation around local policy issues and private businesses and corporations who want to engage their employees in making strategic decisions.

At its simplest the process of using Liquid Feedback can be described as follows. An organisation, such as the Pirate party commits to using Liquid Feedback, and its members sign up to the platform to be able to use it. Once signed up, any member can propose policy. However for the proposal to be taken forward it needs to gather 10 percent quorum. Once it has been taken forward in to a 'revision period', any member has the opportunity to pitch an alternative proposal. With one or more proposals suggested it is now up to members to vote up or down on the different proposals until a winner emerges. As mentioned earlier, liquid feedback tries to address the gap between direct democracy and representative democracy and therefore allow for three types of voting.

1) Through global delegation where members give their vote to a representative on every issue. 2) In subject delegation people give their vote on specific subjects such as health or transport, only. Finally, members can choose 3) issue delegation, where a member only entrusts another member with their vote on specific issues. In all instances, when one voter gives his or her vote to someone he or she trusts would vote on their side, that person can then give his or her vote, along with all of his delegated votes, to someone else. At any given time voters can reclaim their votes. This, Ingo Bormuth from the German Pirate Party has explained is an ideal setup for the party as they 'want effective people to be powerful and do their work, but we want [the grassroots] to be able to control them'.

What is the social impact it wants to achieve?

The overarching aim is of Liquid Feedback is to create a tool and platform that encourages more bottom-up engagement in the policy-making process within political parties and similar organisations.

To date the most significant impact of the platform can be argued to be the update of the platform by the Pirate Party and M5S. The Pirate Party has experienced a rapid growth in Germany and have amongst others secured seats in the parliament of the city-state of Berlin, seats in the regional parliament of Saarland. More than 10,000 members of the Pirate Party in Germany take part in the party's use of the Liquid Feedback platform. In Italy the 5 Star Movement or M5S has also experimented with the platform.

Finally, and on a more general level, Liquid Feedback is built on an open source licence. The rationale for this is that everyone interested in adopting the platform to their organisation should be able to do so freely.

What is the role of the organisation within the DSI ecosystem?

Through providing an open platform for anyone to use, the platform seeks the easy distribution of tools that can help any organisation create a more democratic model for developing policy.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: At heart of Liquid Feedback sits an ambition to create a platform that lets people come together online to crowdsource and prioritise ideas. This type of participation would arguably not have been possible, or it would have been too costly and time consuming to work efficiently, before the advent of the Internet. Finally, the open source approach, as described above, allows the platform to be adapted by organisations that are both diverse in type and their geographical base.

How is the organisation funded?

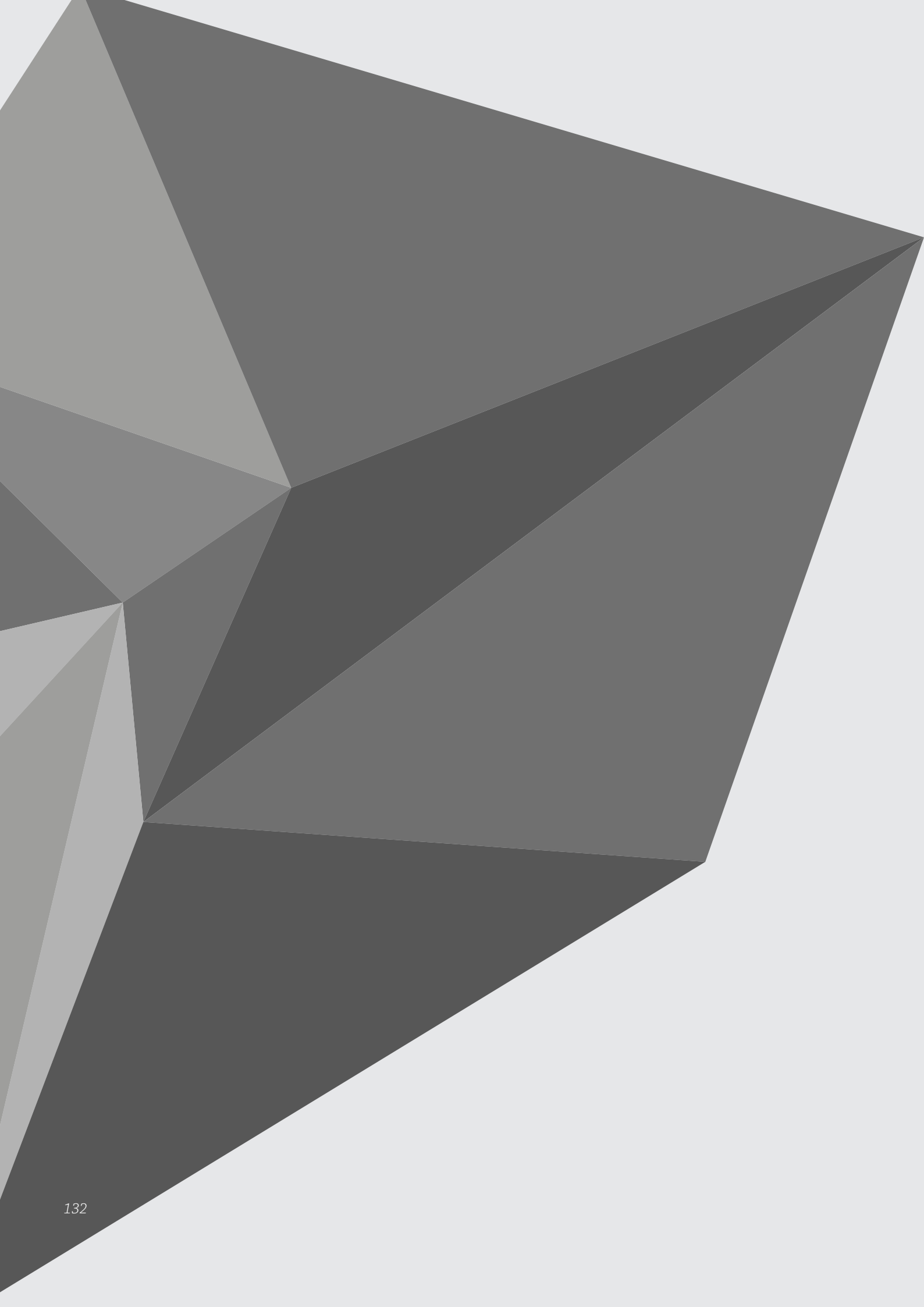
No information available

What are the main barriers to innovate?

No information available

What helps to reach goals and overcome barriers?

No information available



Makerfaire

At a glance:

Type of Organisation:	Private business, social enterprises, charities and foundations
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open hardware
DSI activities:	Organising an event
Key facts:	165,000 people attended the two flagship Maker Faires in in 2012. 30,000 people attended the Rome 2013 Mini Maker Faire
Website:	http://makerfaire.com/

Organisation Name

Makerfaire

Short description

Maker Faire is an event created by Make magazine to "celebrate arts, crafts, engineering, science projects and the Do-It-Yourself (DIY) mind-set".

In 2012 there were 165,000 people attending the two flagship Maker Faires in San Francisco Bay Area and New York, with 44% of attendees first timers at the San Francisco Bay Area event, and 61% in New York. In 2013, over 60 community-driven Mini Maker Faires are expected around the world, including Tokyo and Rome.

Type of organisation

Maker Faire is a series of events created by Maker Media, a for profit business, which publishes MAKE magazine.

History and mission

The first Maker Faire was held on April 22 – 23, 2006, at the San Mateo County Event Center. It included six exposition and workshop pavilions, a 5-acre (20,000 m2) outdoor midway, over 100 exhibiting makers, hands-on workshops, demonstrations and DIY competitions. The launch of Maker Faire in the San Francisco Bay Area in 2006 demonstrated the popularity of making and interest among legions of aspiring makers to participate in hands-on activities and learn new skills at the event. The first Maker Faire in the United Kingdom took place on March 14–15, 2009, in Newcastle upon Tyne, as a joint venture with the Newcastle ScienceFest.

At the heart of Makerfaire is an ambition to create a space where DIY makers and people with an interest in making can come together to showcase, share and develop projects. This is based on the insight from 'makers' that they often have no place to share what they do on DIY (Do-It-Yourself), as it is often invisible in the communities, taking place in shops, garages and on kitchen tables. It's typically out of the spotlight of traditional art or science or craft events.

Maker Faire is an all-ages gathering of tech enthusiasts, crafters, educators, tinkerers, hobbyists, engineers, science clubs, authors, artists, students, and commercial exhibitors. All of these "makers" come to Maker Faire to show what they have made and to share what they have learned. Maker Faire is organised and run by Maker Media. Maker Media, the publisher of MAKE magazine, and seller of DIY electronics, tools, kits, and books.

What does it do, and how does this activity enhance social innovation?

The Maker Faire events are primarily designed to be forward-looking, showcasing makers who are exploring new forms of making and new technologies. But it's not just for the novel in technical fields; Maker Faire features innovation and experimentation across the spectrum of science, engineering, art, performance and craft.

Flagship Faires: Flagship Faires is the major Maker Faires that take place in San Mateo, California, Detroit and New York. The New York Maker Faire is also known as "World Maker Faire". It is a family event, as the vast majority attend with children.

At the event there are a variety of activities taking place, such as interactive exhibits, live conversations and presentations. Topics and areas include electronics, 3D Printing, technological product demo, design, craft, sustainability and domestic arts, as well as making in education. For example the event featured demonstrations on the DIY opportunities in the Arduino open source electronic board and Raspberry Pi. Other events include presentations and workshops on collective innovation and the diffusion of open innovation, social networks, crowdsourcing and 3D printing, and the benefit of participating in such open innovation environments for DIY product designers.

In addition to showcasing opportunities for DIY making, Make also sell DIY kits that can help people easily get started on making, such as an Arduino compatible kit which can help potential DIY makers develop their own 2-player reaction game.

Mini Maker Faires and Other Events: Mini Maker Faires are small-scale Maker Faire events in local communities organised by independent event organisers, with support from Make Magazine. Mini Maker Faires have been successfully organized in UK, the Netherlands, Norway, Spain, Italy, Singapore, Japan, Australia, Canada and lots of cities in the USA. In 2013, over 60 community-driven Mini Maker Faires were run around the world.

The mini Maker Faires are usually held by local institutions, such as people from local fab labs, research centres, universities, and also individuals who are evangelical about Maker Faires and the whole maker movement. The Mini Maker Faires are community-driven, and independently organized. Maker Participants are mostly "local makers" who are actively pioneering in a variety of disciplines such as culture, technology, design, and education. The Mini Maker Faires are promoted with the Maker Faire branding while organized based on different local practices. For example, Groningen Mini Maker Faire in the Netherlands charges 2 euro for entry, whereas Bristol Mini Maker Faire is free of charge with support from several sponsors, while Barcelona Mini Maker Faire takes donation to help fund the project and to continue providing workshops and empower local makers to succeed.

One of the most successful mini maker faires to date is the Rome Maker Faire, where 30,000 people attended the four faire.

What is the social impact it is seeking, including any evidence of impact to date?

Besides making for hobby or enthusiasm, many makers are also creating new products and producing value in the community, starting companies and becoming entrepreneurs. Maker Faire and MAKE Magazine believe that this kind of grassroots innovation can be fostered in every community. They are very proud of having been and continuing to be a nurturing ground for this growing community of creative and curious people. The sheer numbers of people who participate in the Maker Faires (more than 160,000 at the last flagship faires), as well as the global spread of Mini Maker Faires to Europe, Asia and Africa goes some way to show the popularity and impact of Maker Faires on the DIY maker movement.

In addition to this, the Maker Faires can be argued as seeking a social impact in three main ways:

- Making ideas visible: Having an event that gathers people with DIY mindset, simply made it easier to see different concepts, designs and projects that people in this community are working on.
- Making ideas more valuable by sharing: Talks and presentations in the faire provide a chance to inspire makers to better develop the ideas into their next stage. Maker Faire has the ambition that the interactive exhibits, knowledge sharing and feedback in real-time, make it much more likely that people will have additional thoughts about their ideas, thus making the ideas more valuable.
- Encouraging and celebrating making: As the Maker Faire aims at "celebrate arts, crafts, engineering, science projects and the Do-It-Yourself (DIY) mindset", it functions as a big party where all makers are welcome to have fun and celebrate their mindset. This can generate a lot of motivation and thus enhance the community to be more active.

What it the role of the organisation within the DSI ecosystem?

The Maker Faire creates a real-time sharing platform that is offline. Lots of products or projects that will be shown in Maker Faire have a strong focus on using digital social innovation technology such as open hardware, but the faire provides an offline stage where makers can share their digital creation face-to-face. The highly interactive approach brings not only the chance of making the ideas more valuable, but also a party-like gathering event, which highly motivates the community.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Attendees at Makerfaire showcase and work on a wide range of soft and hardware, some of the most popular and frequent of these include open hardware such as Arduino micro controller and personal 3D printing. Several advantages of open source hardware show its importance to the Maker Faire community:

Help streamline the design Makers can reduce risk by basing designs on open-source hardware and taking advantage of a proven design that has operated successfully in the past. Thus, they can work from a known starting point and easily see what's there, what's missing, and what is unnecessary. It saves development time.

Giving back Open-source hardware is about sharing work with others for everyone's benefit. It is beneficial for all parties to provide upgrades and additions to the community whenever possible so that the next user can add other enhancements. When a user adds a function to hardware, it affects the software, which adds a reason to enhance and improve the overall performance of the software to take advantage of the new feature.

Low cost access open hardware gives grassroots audience the ability to turn their ideas into products or services, and even build business upon it. There are also many applicable business models for implementing some open-source hardware even in traditional firms. For example, to accelerate development and technical innovation the photovoltaic industry has experimented with partnerships, franchises, secondary supplier and completely open-source models.

How is the organisation funded?

Maker Faire is made possible with a variety of sponsorships. Equally, some mini maker faires are partially financed through charging fees for attending.

What are the main barriers to innovate and how are they in the domain?

Not applicable

What helps to reach goals and overcome barriers?

Not applicable

mySociety

At a glance:

Type of Organisation:	Not for profit, foundations and social enterprise
Aim:	Participation and democracy Neighbourhood regeneration
Technology Trends:	Open data; Open knowledge
DSI activities:	Advocating and campaigning; Operating a web service
Key facts:	The WhatDoTheyKnow app has helped over 130,000 Freedom of Information requests. The FixMyStreet app has helped report more than 250,000 problems reported
Website:	http://www.mySociety.org/

Organisation Name

mySociety

Short description

mySociety's key mission is to help people become more powerful in the civic and democratic parts of their lives, through digital means. Most prominently it has done this by developing a range of applications such as Fixmystreet, which enables citizens to more actively communicate issues to politicians and public authorities.

What type of organisation is it?

mySociety is legally part of the charity - the UK Citizens Online Democracy (UKCOD). mySociety is the UKCOD's main project, which is broken down into two distinct arms – mySociety and mySociety Ltd.

History and Mission

mySociety's mission is to help people become more powerful in the civic and democratic parts of their lives, through digital means.

Since 2004 they have launched various websites that made it easy to do tasks such as identifying which politician(s) represent you, writing to them about your concerns, and making requests under freedom of information laws.

mySociety was founded because its founders believed that it must be possible to build applications that could give people the 'simple, tangible benefits' that e-commerce sites give people, but in the civic and democratic parts of their lives. This belief was one founder Tom Steinberg (and others) had shared since the late 1990s, but by 2003 it had slowly become apparent that the pre-existing institutions (charities, governments or campaign groups) which one might have expected to set up such services did not see any interesting possibilities in this field. So a new organisation was required, which Tom set up after leaving his job in government in the summer of 2003.

What kind of activity they carry out to enhance social innovation?

mySociety carry out activities to enhance social innovation in primarily three ways:

Building websites that make it easy for people to write to their politicians to get potholes fixed, get public transport issues resolved and extract information from governments.

Providing consultancy, bespoke software development and software products to organisations keen to meet the expectations of digital natives.

Developing free and open source software for individuals and organisations around the world who want to build copies of the sites mySociety builds.

Some of the most prominent websites and software solutions developed by mySociety are listed below.

FixMyStreet - FixMyStreet Platform is open-source software built to help people run websites for reporting common street problems, like potholes and broken street lights. It has been used in many countries around the world, from Norway to New Zealand to Georgia to Italy - where versions based on the original UK FixMyStreet website have been built.

ALAVETELI - "Magnify the power of Right to Information laws in your country". Alaveteli is the popular 'Right-to-Know & Freedom of Information software', designed for easy re-use in any country or jurisdiction. Citizens can use Alaveteli to request information from governments, and official responses are automatically openly published for anyone to see. This can turn a request by one person into a request of use to thousands of people. In the UK, Alaveteli powers mySociety's busy WhatDoTheyKnow.com website.

MAPIT - MapIt Global's API uses OpenStreetMap data to 'establish the location of different administrative boundaries, anywhere in the world.' Boundaries data is essential for anyone creating geographic web and mobile services that rely on locating a particular point within the correct country, district, county, city or region.

POMBOLA - "Helping you keep tabs on your national parliament or congress". In 2012 mySociety worked closely with Kenyan NGO, Mzalendo, to relaunch Kenya's independent parliamentary monitoring website. The software created for this purpose is called Pombola. It's free, open source and available for use anywhere in the world. The core features of this website are:

A structured database that links people to places, organisations and roles. It's an accessible display all of the members of a particular house of parliament , all of the elected representatives of particular areas and even all of the politicians who attended a specific college.

A database of parliamentary transcripts linked to the individual speakers, making it easy to display how often a politician has spoken in parliament and what they have said

Boundary information (stored in MapIt) allows users to search any location covered by the Pombola instance and discover the elected representatives for that area

Integrated tools allow users to comment on and socially share individual pages

Twitter streams on the home page and a blog for news items

The Pombola code has been since been used to run sites in Ghana, Nigeria and Zimbabwe.

What is the social impact it is seeking, including any evidence of impact to date?

mySociety believe that strong democratic accountability and a thriving civil society are vital to our common welfare, and that these cannot survive where people do not engage with government and communities.

The mySociety work online because they believe that the Internet can meaningfully lower the barriers to taking the first civic or democratic steps in a citizen's life, and that it has the capability to do so at scale.

mySociety's UK sites are the best showcases in terms of pure volume and engagement:

FixMyStreet: Over 250,000 problems reported, with 50% of users having never reported a problem to their local authority before

TheyWorkForYou: Over 1.5m unique users a year. From surveys we know that three out of five users had never looked up information on what their MP was doing in Parliament before using TheyWorkForYou and about 90% of users said that TheyWorkForYou had improved their knowledge of their political representatives.

WhatDoTheyKnow: Over 130,000 Freedom of Information requests issued so far.

Mzalendo: One of the candidates running for President in the 2013 Kenyan Election contacted the site personally to query the data behind their scorecard rating. mySociety emphasize the fact that, if Presidential candidates care about how they are being represented on the site, then that is an indicator of impact – not least because awareness that they will be held to such a level of scrutiny in the future could help drive higher standards of behaviour.

What is the role of the organisation within the DSI ecosystem?

Seeks to promote civic engagement and enhance e-democracy (which they term as 'civic power'); uses a variety of online services and products to promote greater transparency, accountability and to promote social good.

What technological methods and tools is it using, and what did these enable that was not previously possible?

mySociety's sites are all open source. Some of the mySociety codebases have been worked on extensively to make them easy to use for the newcomer. For instance, FixMyStreet's code is available on GitHub, and there is also a detailed guide on how to start contributing. MapIt's code is also available on GitHub, another open source project which can be installed locally, and customised to user's precise needs. Others are a little more tricky and require a lot of familiarisation before you can really get started. Currently, the mySociety team are working to update the Pombola codebase so that it runs their PopIt and SayIt components. So, while the code is available on GitHub, those interested in setting up a site using Pombola in their own country are encouraged to first contact the team to get more information.

As the impact facts above should illustrate, mySociety's websites seem to have used technology to achieve their objective of holding governments more to account, while building platforms that encourage civic engagement. In 2007 they launched FixMyStreet.com, which makes reporting street problems to the local government (e.g. broken street lights) a comparatively straightforward process.

In the case of TheyWorkForYou, (which has over 1.5m unique users a year) three out of five of their users had never looked up information on what their MP was doing in Parliament before using TheyWorkForYou and about 90% of users said that TheyWorkForYou had increased their knowledge of their political representatives. It is questionable how an organisation like mySociety could have had such obvious results in the absence technological advances made with the Internet.

Enhancing collaboration and engagement: DSI network effect

mySociety actively encourages digital collaboration for its online coding. As mentioned above, all of its sites and applications use GitHub Issues for tracking bugs and feature requests, and some of them are labelled "Suggested for volunteers" (or something similar) to mark those that might be particularly suitable for civic hackers to try working on. Furthermore, developers are encouraged to contact the mySociety team directly in instances where code is less 'open' in nature – as is the case for the Pombola code.

How is the organisation funded?

According to the organisation, three pieces of early key funding were critical to mySociety succeeding in 2003/4 (the details of which are elaborated on further below).Tom Steinberg, one of the founders of mySociety, has indicated that the loose ties of this round of funding (which enabled the team to develop services that were much more 'radical' than might have been allowed had the government vetting process been more rigorous) were critical to mySociety first being set up.

Yet, while initially mySociety was financed largely via government funding streams, the disappearance of this funding channel by 2006 meant that mySociety knew it had to develop its own income streams to compensate for this. One of the benefits of mySociety being a digital NGO is that presently software development is globally a relatively lucrative profession. This means that for organisations like mySociety, it is possible to make profits doing commercial work that can be re-invest-

ed in charitable, open source projects without having to employ a huge factory of staff.

After recognising in the period following 2006 that official government funding streams had been wound down, the mySociety team thus began to explore alternative funding channels. As part of this they began to solicit commercial requests to do software development or consulting. In order to keep this activity within the bounds of UK charities law, they founded a commercial company that is 100% owned by the charity, and it is this company (mySociety ltd) that does commercial work. Today about 40% of mySociety's income is from commercial work and they work towards expanding this, while developing 'a reputation as a software company that can solve problems that more traditional web companies can't.' mySociety Ltd., this wholly owned trading arm now accounts for about half of mySociety's profits, while the other half comes from donations from donors, large and small.

What are the main barriers to innovate?

Realities of open source: Before accepting contributions to a project, the practical considerations around the overheads of testing, checking, and managing the incoming code have to be thought out.

Insecure funding environment: Funding streams normally come and go much faster than project will need them to survive. "Real change movements take years or decades sometimes to have an impact, but there will be strong pressures to deliver and wrap up a project in 6 or 12 months." Working out who and how to fund ongoing services can be a major challenge.

Measuring Impact: It is easy to start projects without having pre-defined success, rendering substantive impact hard to measure. The organisation tries to quantitatively define some outcome that counts as success in order to overcome this challenge, which is sure to lend credibility to the organisation when vying for future funding.

Development Budgeting: many socially focused websites set up at similar times were expected to deliver immediately, and then were killed off by virtue of short term budgets. Noting the absolutely fatal project vulnerability of project budgets that assume projects are 'finished' when they're launched, mySociety arranged itself so that money could be spent as far as possible after a product launch, so that even in the 'lean times' the organisation could afford to keep sites running for years at a time. They now consider longevity and sufficient development budget to be the absolutely critical factors required to bring any digital service to scale.

What really helps reach goals/ how to overcome these barriers?

Early key funding: According to the organisation, three pieces of early key funding and a favourable funding environment (grants with loose ties) were critical to mySociety succeeding in 2003/4. Tom Steinberg has suggested that mySociety's service offerings would not have been possible today given the stricter and tighter scope of the government's system of grant-giving. The acquisition of money, some strong project ideas, and three highly talented developers was what enabled mySociety to expand over the first two years, and exit this period with a strong enough reputation to be able to acquire further funding and business on the back of its reputation.

Commercial focus: mySociety Ltd.'s social enterprise model, means that the organisation are not solely thinking about the needs of funders - but also about clients' requirements quite often, 'which is a healthy thing for design focus.'

Technical/design aspects that have contributed to the organisation's success:

Projects that are extremely simple adding features in response to what users ask for. Thinking about the minimum possible number of features your new project could have when it launched, and then removing 50% is the approach that they used.

Re-use of other people's code, and contributing to shared tools. This allows for a feedback of improvements not possible had all code been written privately and from scratch, and encourages a community of coders to take interest in a mySociety project.

mySociety has a strong culture of user-centered design, and a culture that regularly questions whether features or projects will actually have any impact.

Beta releases and long-term developmental budgeting: Scalability: mySociety always had a focus on scalability. Their first business plan stated "Every project we build must be able to serve a million people for the same running costs it would take to serve ten" .

What does the future look like?

mySociety has future plans that relate to various different parts of their work:

To grow the open-source communities around some of their core websites and components so that they are of ever greater value to larger numbers of people.

To upgrade their UK sites to make sure that they are always serving the needs of local users as best as is possible, and to use the UK as a lab to experiment with projects that have re-use value elsewhere.

To explore technologies that enable people to collaborate to put pressure on decision makers.

To build more partnerships, especially with campaigners and pressure groups who are strong at PR and protest, but weaker at the technology side of change.

To grow the commercial side of their operation not just to grow revenues, but because they believe there are some kinds of reform (especially of government systems) that are best done by selling better quality digital systems that embed user-centred values, plus the values of openness and transparency.

To develop better impact metrics to gain a better understanding of how their services do or don't impact positively on users.

Open Government Wien

At a glance:

Type of Organisation:	Public sector and government
Aim:	Participation and democracy, Neighbourhood regeneration, public services
Technology Trends:	Open networks, Open data
DSI activities:	Operating a web service
Key facts:	Has released 160 datasets which has lead to the development of more than 109 apps
Website:	https://open.wien.at/site/

Organisation Name

Open Government Wien (Vienna henceforth)

Short description

Open Government Vienna is part of the Smart City and Open Government strategies of the City of Vienna. Open Government is defined as "the comprehensive redesign of politics and administrative activities according to the principles of modern Public Management and Public Governance." In simpler terms the Open Government Vienna project has seen the city adopt an open data policy and share data related to population, economics and science. Relevant data also comes from around the areas of statistics, geospatial, transportation and economics. This shift to transparency, collaboration and participation has seen a whole host off web and phone apps emerge to enhance how citizens engage with the city.

Type of organisation

The Open Government Vienna strategy is part of the Smart City strategy of the City of Vienna, and as such is a project that is housed with the city authority.

History and Mission

The Open Government initiative of the City of Vienna started in May 2011 with opening up datasets on data.wien.gv.at. The main targets of the Open Government strategy for Vienna are: transparency, collaboration and participation. Furthermore the data and spin-off apps that come about as a result of the Open Government Data strategy are hoped to have positive impact on citizen engagement and participation; business and research; and administration in the city of Vienna.

What does it do, and how does this activity enhance social innovation?

Open Government Vienna is part of the Smart City and Open Government strategies of the City of Vienna. To this end, the city hosts competitions with awards for innovation and development coming out from the open data generated to deal with the particular needs of citizens in the city, and encourages citizens to create apps that can be used to promote the city's Open Government Strategy. The resulting apps range from those that trace the historical location of water pipe to projected urban plans. One particularly novel application that has been created is "Fruit Fly" an app that offers users a visual map that captures data on all fruit trees on public ground in Vienna. Colour coded pins are used to illustrate different types of fruit. Crowdsourced data is also used to index which fruit is ripe or in season. The result is a quirky app that citizens or visitors of Vienna can use to navigate their way towards a free but healthy snack.

What is the social impact it is seeking, including any evidence of impact to date?

In opening its data records to the public, the City of Vienna is taking an important step towards implementing its Open Government Strategy. The Open Government Strategy was launched in 2011 in the city of Vienna 'to further make public e-services and PSI available for use for citizens and companies.'

The term "Open Government" refers to the city's decision to create administrative structures based on more transparency and participation, enabling closer cooperation with the local population, local businesses and the scientific community. Due to the new structures, the city administration makes increased use of Internet technology. A summary of the city's Open Government activities and the first edition of the Open Data catalogue are available online, to be accessed via an all-new web portal.

Presently 109 apps and visualisations have been made that make use of Open Government Data Vienna, and the community of over 500 users is made up by a diverse demographic of students, teachers and professors, professionals, makers and hackers.

Undoubtedly, initiatives like Open Government Vienna have played a part in Vienna being voted Europe's most innovative city. On a worldwide scale it ranks in third place just behind US cities Boston and New York City. According to a study by the Austrian Institute of Economic Research (WIFO), innovation has a visible impact and is clearly measurable in economic terms; approximately two thirds of Vienna's real economic growth is due to innovation.

What is the role of the organisation within the DSI ecosystem?

Open Government Vienna is embedded in an international framework of commercial and government organisations that bring forward the most important improvements with regards to technological and strategic issues in the field of Linked Open Government Data (such as strategy forms and consultation).

What technological methods and tools is it using, and what did these enable that was not previously possible?

The Open Government Vienna initiative has clearly been heavily influenced by recent technology trends around open data and open networks. As part of this city-wide effort to make Vienna a 'smart city', the City of Vienna offers 'a comprehensive range of e-government options', 'with about 600 official e-government web pages and a variety of administrative services available online.' For instance, more than 180 different applications to the city administration can be completed and submitted online. There is also a free online city map of Vienna with more than 120 layers (i.e. levels showing specific geographic information, such as the location of pharmacies, kindergartens or one-way streets) and new e-services are being added and updated continuously.

In addition to this, the City of Vienna launched an Open Data portal and an Open Government Portal in 2011. Four times a year new datasets are published – which now stands at over 160 datasets with geographic and statistical datasets in several open formats and APIs, and for the first time the aggregated data has been made open to the public as an Open Data Catalogue. Lastly 109 apps and visualisations were created by the community, some of which are of particular value to the citizens and tourists of Vienna.

A report produced by the City of Vienna,' Open Government Implementation Model' suggests that a 'focused look at public sector data management has been missing so far in Public Management' and that 'a control gap has become evident due to the trend toward the release of data in Open Government Data Portals.' It also concedes that the Open Government Data Implementation Model 'is a contribution toward closing this gap' by producing 'data catalogues, implementing evaluations in the context of internal data monitoring and the planning and implementation of approval cycles in the first stage of Open Government constitute a contribution to Data Management and Data Governance as new disciplines of Public Management.' Yet advances in public management of this sort would doubtlessly be impossible without the improvements in computing storage and high levels of Internet penetration.

Enhancing collaboration and engagement: DSI network effect

Open Government Vienna has centred itself around interaction, communication and collaboration with the community in several ways: while the Open Government project looks to more 'conventional' digital communication channels such as Twitter, Facebook and emails, there are public "life platforms" where users can chat or meet the experts of the City of Vienna, as well as an online forum. In 2012 two participation projects based around ideas of 'collaborative democracy' took place: "Schwedenplatz" (where citizens came together with experts as part of a design competition organised by the City of Vienna to draft a mission statement to regenerate the Schwedenplatz area). Likewise the "Wiener Charta" (Vienna Charter) initiative seeks to develop 'principles and rules for good coexistence'.

How is the organisation or project funded?

No information available

What are the main barriers to innovate?

Unpredictable impact: With any innovative project like Open Vienna, there is a challenge in engaging stakeholders when, from the outset, the impact of such projects remain unknown or unclear.

Data quality: data management tools like CKAN are necessary to build up a range of datasets that are of a high standard, and that can in turn generate useful cross-referenceable findings.

Data islands: transferring data over from older devices posed a challenge for the Open Government's push for open data.

What really helps to achieve goals?

Political buy-in: the scope and breadth of what Open Government Vienna has achieved would not have been possible had the city authority not voted to make open data a major priority focus.

How to achieve better European collaboration?

The model implemented in the Open Government Vienna initiative has already been used by other Authorities in Austria (e. g. Environment Agency Austria, small municipality of Engerwitzdorf, City of Graz, Region of Styria and others). Similarly its potential value has also been acknowledged by German Authorities, Trentino (IT) and others. This demonstrates that the model is suitable or many different kinds of administrations implementing Open Government initiatives.'

Avoin Ministeriö (Open Ministry)

At a glance:

Type of Organisation:	Government and public sector organisations
Aim:	Participation and democracy
Technology Trends:	Open knowledge
DSI activities:	Advocating and campaigning, Operating a web service
Key facts:	Five citizen driven law proposal have reached support from 50.000 people and have subsequently been debated in the Finish Parliament
Website:	http://openministry.info/ (The Finnish language platform is at http://avoinministerio.fi/)

Organisation Name

Open Ministry (Avoin Ministeriö in Finnish)

Short description

The Open Ministry is a Finnish non-profit, non-partisan organisation based in Helsinki, Finland. It was set up with the aim of enabling the crowdsourcing of legislation, promoting deliberative and participatory democracy and citizens initiatives.

Type of organisation

The Open Ministry utilizes crowd-sourcing in the preparation of citizens' initiatives and it is fully operated by volunteers independent of governmental organisations and political parties.

History and core mission

The overarching purpose of Open Ministry is to help citizens and NGOs with national citizens' initiatives, EU citizens' initiatives and develop the online services for collaborating, sharing and signing the initiatives.

A change of law in Finland was a major precipitating factor that made Open Ministry's mission a possibility. On 1st March 2012, the Finnish government amended the national constitution so any proposed legislation supported by at least 50,000 signatures (1.7% of the voting population) within six months must be put to a vote in the parliament. While it was proposed that citizens could submit draft proposals onto an official Ministry of Justice website due to be launched in Autumn 2012, Open Ministry came about to bridge this gap. The backdrop of the international financial crisis also played a significant role in the organisation's establishment.

What kind of activity they carry out to enhance social innovation?

Open Ministry is a flag bearer of social innovation in that it presents the average citizen with the platform and support (both within the organisation, but also externally, to circulate a campaign to a wider pool of citizens) so that a 'good idea' might be transformed into law proposal to be voted on in parliament.

There are three major stages to get an initial proposal through to a vote.

Ideation and Development: An initial concept needs to be refined into a clear proposition, including robust discussion between interested parties and lawyers helping to frame language in a way that will be acceptable to parliament.

Campaigning: To gain 50,000 votes broad campaigning on social media and beyond is required, needing directed energy from many people.

Lobbying: Once a proposal goes to parliament individual lobbying of politicians needs experience and structure to shape thinking and voting.

The Copyright Law initiative: The Open Ministry's work on the 'Copyright Law Initiative' is one example of engaging citizens actively to potentially alter Finland's legal landscape. The initiative to change Finland's copyright law was suggested to the Open Ministry by a street artist called Sampsa in October 2012. Volunteers were brought in to work on the project and to gather expert advice and opinions on the subject. During the drafting of the legal proposal, more than 30 influential people from the cultural, corporate and academic sectors joined to endorse the campaign publicly. Working within the six month window that potential proposals have to gain the necessary traction to pass through to parliament, all stages of the drafting of the proposal have been open to the public for comments and additional ideas on the Open Ministry platform, and active comments have been asked for from countless experts and copyright organisations. A number of factors surrounding copyright law in Finland demonstrate how it is an example of an initiative likely to gather the critical mass necessary for it to be voted on in parliament.

Open Ministry hopes that, in the spirit of deliberative democracy, this grassroots initiative will spur public discussion and continue to gather support and media attention.

Having been reviewed by these volunteer experts, the Open Ministry's law proposals are more compatible and thus more likely to be approved when submitted to the Ministry of Justice for approval.

While most of the initiatives do not gather enough signatures to enter the parliamentary discussion, in some cases citizen initiatives can reveal an overwhelming public support for a particular initiative that has been previously neglected or overlooked by the parliament. The network offered by the Open Ministry platform aims to support and translate these potentially valuable citizens initiatives into credible law proposals to be voted on in parliament.

What is the social impact it is seeking, including any evidence of impact to date?

Open Ministry founder, Joonas Pekkanen, has described how one of the precipitating factors that gave rise to the Open Ministry being first set up was the need to redress the democratic distancing between citizens and their political representatives brought to light in the aftermath of

the financial crisis. In some ways Open Ministry might be said to be narrowing this perceived gap. Through Open Ministry's novel system of crowdsourcing legislation, the Finnish parliament has for the first time been forced to tackle issues identified and voted for by the public outside parliament. Importantly, the Open Ministry goes further than the Ministry of Justice web platform by providing citizens with the tools and support to make potential citizen initiatives far more comprehensive, and legally-compliant; thereby meaning they are far more likely to be successfully passed. By doing so, Open Ministry in some ways offers citizens the opportunity to be co-creators of a set of laws more reflective of their values and concerns.

Supported five law proposals to date: Five law proposals have reached critical mass (i.e. have been supported by more than 50,000 signatures) and have proceeded to the parliamentary phase for debate. These include a proposal to ban the practice of farming animals for the fur trade, to change donation laws to enable crowdfunding projects, a law proposal on marriage equality, and the copyright law proposal – explained more fully above. The first proposal that reached 50,000 votes, is now being debated in parliament, while a proposal for marriage equality reached over double the threshold number of votes (100,000 signatures), in the first day, thus making it virtually impossible for the parliament to ignore the topic.

More generally, a study carried out by Aitamurto and Landemore - which looks specifically at the case of off-road legislation initiatives on the Open Ministry site suggests that crowdsourced legislative processes allow for deliberation among participants, which occurs organically (to a degree), despite there being incentives for it. The same study also found there is a strong educative element in crowdsourced law-making process, as the participants share information and learn from each other. They purport that the peer-learning aspect could be made even stronger through the addition of design elements in the process and on the crowdsourcing hardware.

What is the role of the organisation within the DSI ecosystem?

The Open Ministry offers an interesting blueprint of how digital frameworks might be used to enhance democratic participation and deliberation, and influence policy in collaboration with existing political infrastructure. As an extraordinarily wired country (Finland was the first country to make fast Internet access a legal right, and boasts an Internet penetration rate of 89.3 percent, according to data released by the International Telecommunications Union in June 2012) more needs to be done to understand some of the potential barriers that might exist if other countries with less Internet penetration were to adopt or replicate this model.

What technological methods and tools is it using and what did technology enable that was not previously possible?

The Open Ministry website was developed using a YUI API – a free, open source JavaScript and CSS library for building interactive web applications. Demographic metrics are gathered using Quantcast. The site's source code is also available on GitHub – where anyone can fork the project, contribute to it, or use it in other countries.

As part of its aim to crowdsource legislation, the non-profit organisation had been collecting signatures for various proposals in paper since 1 March, when the citizens' initiatives came in. However in September 2012, the Finnish government approved the electronic ID mechanism that underpins the digital version of the platform which went live on 1 October. To ensure the site was compliant with security standards, the National Communications Security Authority audited the site's code, its security policies and its service/hosting providers to ensure that the details of citizens are safe and can't be hacked into. The system verifies the people's identity through the APIs offered by banks and mobile operators, so that people can sign the initiatives online with the online banking codes or their mobile phones.

What did technology enable that was not previously possible?

As mentioned above, Open Ministry's model necessitates that it facilitate its mission with low capital input, and in a way that can effectively package proposals so they can reach a large pool of people, who in turn can shape and engage with this content, within a reasonably short period of time (i.e. the six month period allowed for initiatives). Undoubtedly this would not have been possible in the absence of the Internet and the online platforms that Open Ministry has been built on.

As mentioned above, the model implemented by the Open Ministry has brought a paradigm shift in the way parliament operates. This has been the first time ever it has been possible to force parliament to tackle an issue.

Enhancing collaboration and engagement: DSI network effect

The Open Ministry aims to facilitate the crowd-sourcing process and to provide collaboration tools that enable citizens to develop their ideas into actual law proposals with the help of volunteer experts. There has been some significant overlap between Open Ministry and other relevant DSI actors. For instance, Pekkanen is a member of the Open Government Partnership committee in Finland, sitting on the Open Knowledge Finland Core Team, and more generally representatives of the Open Ministry team regularly participate in a number of open government or open knowledge events (such as the OKFest), both in Finland and beyond.

How is the organisation funded?

The Open Ministry received a one-off 30 000 euros grant from Sitra, the Finnish foundation that provides funding for social innovation projects.

In terms of the day to running of the platform Joonas Pekkanen, emphasises how Open Ministry relies very much on its voluntary members for its continued financial sustainability, just as volunteers make up a body of relevant experts who can offer consultative campaign and legal advice to transform potentially good ideas into viable proposals to be debated on in parliament.

What are the main barriers to innovate?

Despite certain commentators suggesting the Finnish banks and operators were providing the use of their strong verification APIs for free, as part of their social responsibility policies, it seems this has not been uniform across all banks. Part of the functionality of the website has had to be discontinued because not all banks were enabling Open Ministry to use their ID verification for users. This meant that certain users were

able to use the site for free to sign particular initiatives, whilst others from a different bank were not. It was thus not possible to continue this feature. Instead users can now use the website to sandbox ideas, find support amongst the community of users, and collaborate in partnership with voluntary legal and campaign experts. The Open Ministry also encourages users to sign and support existing initiatives on the official Ministry of Justice website, which is where approved initiatives are hosted.

Technological Literacy: While Finland is a highly networked country, not everyone has the same technical capacity. For this reason Open Ministry started collection of signatures for particular proposals in paper forms, in collaboration with libraries, to provide easy access for people not using Internet or not yet accustomed to e-Democracy.

What really helps achieve goals?

Undoubtedly the Open Ministry's success can be understood also in the context of the Citizens' Initiative Act, passed on March 1st 2012, which allows any citizen to present a law to Parliament providing they can get the support of 50,000 citizens.

Open Ministry has relied heavily on the generosity of its voluntary legal and campaign teams for its continued sustainability.

In summary success factors were:

The Citizens' Initiative Act (passed on March 1st 2012) was central to the Open Ministry being able to penetrate the parliament.

Supporting legal framework and political support

Broad support from the public (Pekkanen has noted the perceived degree of mistrust of political representatives following the 2008 financial crisis)

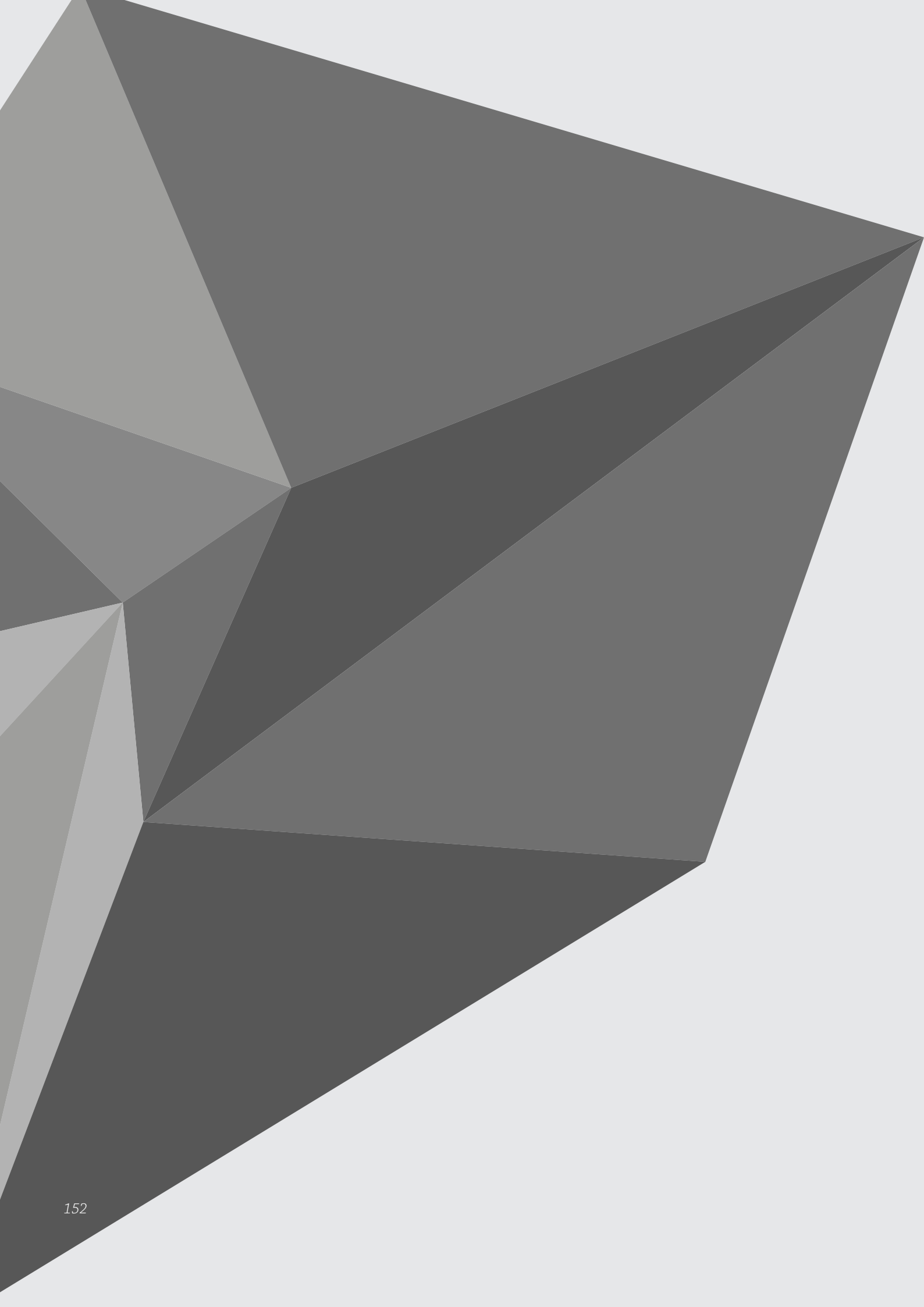
Development funding from Sitra

A highly networked country

Use of existing DSI resources, such as the Github platform, that could be used in the development of Open Ministry.

How to achieve better European collaboration?

Open Ministry is looking to expand in a number of avenues. It aims to take its federal model and apply it to Finnish municipalities. It is exploring moving laterally by applying the Open Ministry to both Slovakia and Italy, which both have existing laws for petition-supported proposals for legislation, but do not have the infrastructure to support discussion, campaigning and lobbying. Furthermore, Open Ministry is also a presently looking into the possibility of an Open Commission which will use similar approaches at the European Commission level.



Open Corporates

At a glance:

Type of Organisation:	Private business
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open data, Open Knowledge
DSI activities:	Operating a web service
Key facts:	Created open data sets with more than 60 million companies registered
Website:	http://opencorporates.com/

Organisation Name

OpenCorporates

Short description

OpenCorporates is the largest open database of companies in the world. It is a website which shares data on corporate entities as open data under the share-alike attribution Open Database Licence. It aims at creating a URL with such data for every corporate entity in the world, as well as importing government data relating to companies and matching it to specific companies. The site also shows groups of companies that are legally part of the same conglomerate, which helps provide transparency on networks of corporate subsidiaries and holding companies spread around multiple jurisdictions. Basic company information is available as open data in XML or JSON format. Today the site has grown from 3 territories and a few million companies to over 75 jurisdictions and 60 million companies, and is working with the open data community to add more each week.

Type of organisation

OpenCorporates is a for-profit company, based in the UK.

History and mission

OpenCorporates was created by Chris Taggart and Rob McKinnon, under the auspices of their company, Chrinon Ltd, and launched on 20 December 2010.

The mission of OpenCorporates is to make information about companies and the corporate world more accessible, more discoverable, and more usable, and thus give citizens, community groups, journalists, other companies, and society as a whole the ability to understand, monitor and regulate them. OpenCorporates seeks to do this through opening up data and providing tools for analysing it. To do this, OpenCorporates is not only creating a general database, but also a database that has certain focuses, and an open data community, to make the open information sharing more open, and thus effective.

What does it do, and how does this activity enhance social innovation?

The core business of OpenCorporates is to collect data on companies through web scraping tools and then visualize the data.

Web scraping data: The main activity within OpenCorporates is to collaborate with ScraperWiki, a platform for doing data science on the web, to help get the company data. The basics that are needed in order to create a company record at OpenCorporates are the company number, the jurisdiction and the company's name. People only need to write a scraper for a country if there is not standard data available for this already.

The OpenCorporates database has been built by the open data community, under a bounty scheme in conjunction with ScraperWiki, by offering a small fee for new jurisdictions opened up (explained in more detail below). Web scraping (web harvesting or web data extraction) is a computer software technique of extracting information from websites. The site also has a Google Refine reconciliation function that matches legal entities to company names.

"A bounty scheme": OpenCorporates offered a small fee for new jurisdictions opened up, in order to encourage people around the world helping them open up data sets. It offered £100 for any jurisdiction that had not yet been done and £250 for those territories that OpenCorporates saw as a priority (such as Australia, France, Spain). There's an initial cap of £2500 on the bounty pot. According to ScraperWiki, the scrapers can often be written in a couple of hours, and neither the code nor the data will belong to OpenCorporates, but to the open data community.

Data Visualisation: The main output from OpenCorporates work on capturing data is searchable maps and visualisations of complex corporate structures with multiple layers of control below the headquarter of the organisation and it in some cases thousands of subsidiaries. One example of this is how OpenCorporates visualised the complex corporate structure of Goldman Sachs's based on data from public filings and company registrations in the U.S., New Zealand, the Cayman Islands, Luxembourg and the UK. This helped visualise how Goldman has 1,475 subsidiaries registered in the U.S. and 739 in the Caymans alone . Chris Taggart, one of the founders of OpenCorporates has described the benefits of this, noting that "by visualising it by country, it shows particularly in the cases of Goldman Sachs and Morgan Stanley, just how critical the Cayman Islands is to those networks, That's the sort of thing you could have done as an academic study based on this data, but maybe half a dozen people would have read it. This is an almost automatic by-product of putting this into a single open dataset'.

What is the social impact it is seeking, including any evidence of impact to date?

When OpenCorporates was started it was to solve a real need that the founders and a number of other people in the open data community had around access to data, whether it's Government spending, subsidy info or court cases. As Chris Taggart has explained it in an interview with Wired Magazine 'Knowing what a modern corporation is an how it's all connected is absolutely critical for regulators, journalists, anti-corruption organisations and lawyers'.

The organisation has since its inception been lauded for its work on opening up data. In 2011 it won the 3rd prize in the EU funded open data challenge and was recognised by the vice president of the European Commission, Neelie Kroos as 'the kind of resource the (Digital) Single Market needs'.

To date Open Corporates have managed to grow an open database with information on more than 61 million companies in it.

Getting and Returning Data – Making open data more open: OpenCorporates inspires a social sharing concept to people who want to get data from it. All OpenCorporate's data where the company has the right to share it, is made openly available under the share-alike attribution Open Database Licence. In return, any product of that data must also be open for others to use. For organisations that don't want to give back data, they pay OpenCorporates a fee.

Innovating data driven journalism: As part of the development of their offer OpenCorporates is making a new open database of corporate officers and directors available to the world. This will enable journalists to be able to search not just all the companies with directors for a given name in a given state, but across multiple states.

What it the role of the organisation within the DSI ecosystem?

Not applicable

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open data: Open data sit at the core of all OpenCorporates work. This is both a tool to scrape, capture and analyse data, as well as a way for the organisation to release data to a community of collaborators.

Open source: OpenCorporates wants to make its product and the database accessible and scalable. It would not be possible without a huge number of open source programmes, tools and resources, such as Twitter Bootstrap and Linux. It is mostly feasible to have the open data database as well as the community accessible online. Within five years the database has expanded to over 61 million companies, without the Internet and the participation through Internet, this would not have happened.

Technical specs behind the website: OpenCorporates is built on the RubyOnRails framework, uses the MySQL and Neo4j databases, on servers running Linux. Famfamfam icons and flags, Twitter Bootstrap, and JustVector icons are also used. The ScraperWiki allows people to write scrapers in Python or PHP.

How is the organisation funded?

Chris Taggart and Rob McKinnon started OpenCorporates from their existing company Chrinon Ltd in UK. The company is being incubated in the UK Open Data Institute, and has also received a grant from the Alfred P Sloan Foundation.

OpenCorporates licence the information and database under a share-alike attribution license, allowing free and open reuse even commercially. Organisations or companies that wish to use the information on a non-share-alike basis will need to pay for a non-share-alike version (for the privilege of not releasing the resultant information to the community), thus ensuring OpenCorporates has a sustainable business model and giving an incentive to release information back to the community.

What are the main barriers to innovate?

Access to data: The main driver behind OpenCorporates is access to data on the businesses whose corporate structures they want to capture and release data on. However, accessibility to good data varies significantly from country to country, depending on governments' willingness and capability to release this. New Zealand as an example have easily accessible data sets which OpenCorporates with very simple coding can integrate into their data base, where as others release data in pdf files, which makes scraping and accessing the data significantly harder.

Linked to this is the varying quality of data available. When mapping US companies data from The Federal Reserve System is for example more granular, structured and detailed than data from the Securities and Exchange Commission. To address issues around quality of OpenCorporates assing data confidences" to links, with higher or lower confidence depending on data they were able to access.

What helps to reach goals and overcome barriers?

Just as lack of access to data can be a barrier, the easy access to open data sets from countries like New Zealand has helped OpenCorporates grow their database.

Building on this it can be argued that the ability to access a global open data community who as part of the bounty scheme helped OpenCorporates scrape data from countries around the world has played a big role in their growth of the dataset.

Finally, the incubation within the Open Data Institute helped OpenCorporates grow their business model and receive expert support from open data peers.

How does it achieve better European collaboration?

Not applicable

Open Garden

At a glance:

Type of Organisation:	Private business
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open Knowledge
DSI activities:	Operating a web service
Key facts:	3 million users in 2013, which is tripled from 1 million a year before registered
Website:	http://opengarden.com

Organisation Name

Open Garden

Short description

Open Garden is a San Francisco based start up, focusing on innovating in Internet use, through its mobile app and network building, and creating new ways to grow the Internet. The simple mobile app enables users to connect to each other seamlessly and share their Internet connection. With the largest scale implementation of a mobile Mesh Network, Open Garden is pioneering work on exploring ubiquitous connectivity.

Type of organisation

Open Garden is a San Francisco-based for-profit start-up.

History and mission

The Open Garden Mesh app was launched in Beta on May 21st 2012 during TechCrunch Disrupt in New York City.

Open Garden aims to change the way mobile users are using and sharing the Internet. The business is based on an understanding that with the ubiquitous mobile Internet, mobile consumers have become data users, and data transfer activities are constantly taking place among mobile users. Skyrocketing consumption of mobile data is becoming curbed by a finite amount of licensed spectrum and the capacity limitations of cellular networks. Capacity and spectrum limitations can impact the user experience in very important – and very negative – ways. They can result in slower or incomplete downloads for content such as games or music, and video chat sessions that are intolerable due to poor quality or incessant buffering. They can produce inconsistent data services that leave consumers wondering when and where they can access the network, and

how fast their connections will be. Seeing all these limitations, entrepreneur Micha Benoliel, Internet architect Stanislav Shalunov and developer Greg Hazel, decided to make the mobile web fit that could address this challenge.

What does it do, and how does this activity enhance social innovation?

The Open Garden App, when downloaded and installed on a smartphone, laptop, tablet or other compatible device, helps turn the hardware into a router. Working with similarly equipped devices within a range of approximately 20 meters, the mesh app then discovers, shares and coordinates access to any available Internet off ramp, optimizing users' Internet access. By crowdsourcing connectivity, Open Garden enables users to connect to the mobile web more frequently and with better results.

The Open Garden App can be turned into an open network, which improves the experience of mobile Internet users, optimizes the service of wireless carriers, as well as benefits the handset and tablet manufactures.

The Open Garden app is free for anyone to install on his or her smartphone, tablet or computer, and it also licenses its technology to carriers, device manufacturers and Organisations.

For consumers this has the potential to offer:

Seamless and Free Hotspot: It enables users to access the most appropriate connection without configuring their devices or jumping through hoops. It also enables users to access the Internet as cheaply as possible.

Faster Downloads: Users can find the fastest connection and most powerful signal without checking every available network, and can move between networks seamlessly. Open Garden provides a way to access more data at faster speeds in more locations.

Stronger Coverage: Consumers actually become part of the network, sharing connections when and where they provide the best possible access. This means higher quality streaming video and audio and faster downloads.

For carriers the benefits according to Open Garden are:

Faster Downloads and Stronger Coverage: Open Garden provides a way to access more data at faster speeds in more locations.

Use of Multiple Networks at Once: 3G or 4G and Wi-Fi: It enables seamless handoffs and simultaneous use of multiple networks, providing the strongest and fastest connection available.

Multi-Hop Wi-Fi Offloading of Their Network: Its multi-hop Wi-Fi offloading solution crowd sources bandwidth via existing residential and business Wi-Fi connections. Open Garden creates an overlay mesh network using Bluetooth and Wi-Fi connections across a range of mobile devices, from smartphones to tablets to laptops and desktops. Operators can boost their offerings even as they offload traffic from their networks, particularly in urban areas where cellular coverage can be inconsistent.

What is the social impact it is seeking, including any evidence of impact to date?

Open Garden believes that everyone should be able to access the Internet easily. On the one hand, there are still places that people have poor Internet connection, on the other hand, there are also capacity and spec-

trum limitations, which requires the network provider to go beyond the traditional mobile data solution. Open Garden therefore wishes to speed up innovation from both the technology perspective and social perspective, to create a new way of Internet sharing through users installing a mobile app, and to build up a community network where more people see the need for innovation, so that it is then possible to gather wisdom from the crowds.

Open Garden believe that Internet access is a critical component in the value chain, which is why it dedicates its efforts and resources to ensure that everyone has access to it.

Open Garden's social impact consists in making mobile Internet access ubiquitous, providing everyone with a fair chance to access information regardless of where they are. With its system Open Garden can measure: number of users, shared access / karma metrics, and user stories on how it positively impacted their community.

What it the role of the organisation within the DSI ecosystem?

Its mobile app directly and practically creates an open network, where all users could share their Internet to make it much more accessible. Together with these benefits it is creating an ecosystem among consumers, wireless carriers, and manufacturers.

With its built-up community, it also functions as a central point in an open network, where it provides the access to connect knowledge and communication.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Sensor Networks: Using technologies such as Multi-Hop, Channel Bonding, Bluetooth and Wi-Fi Direct, Open Garden's technology provides an opportunity for carriers to address the shortcomings of cellular networks even as they deliver a superior experience for mobile data users. It enables faster, more efficient data transmissions without requiring users to manually sift through available networks to find the best one available. It minimizes network traffic without the use of data caps and network throttling, which consumers abhor.

How is the organisation funded?

No information available

What are the main barriers to innovate and how are they i n the domain?

Open Garden had to overcome various challenges such as educating the market and industry players, and accessing funding from partners who are aligned with the values.

In the meantime, Open Garden has also created solutions to a multitude of challenges, such as: reducing power consumption, enabling Wi-Fi offloading, channel bonding and multi-hop connectivity.

What helps to reach goals and overcome barriers?

Open Garden has built up an online forum, which with more and more active users, is forming into a community, where everyone is granted the access to knowledge and tools for communication. With more knowledge being shared there, it also enhances the value of the app and the company, to overcome other obstacles such as financial ones.

When building trust with a community of users to use the app, Open Garden benefited a lot from what they do, and from people who have the same belief as the company. Since Open Garden aims at working on providing everyone everywhere fair access to Internet it motivates all kinds of groups to join into the community and to experiment, especially, people who live or work in areas with poor connectivity, and travellers or professionals who are often on the go. There are also other relevant people becoming community users, such as mobile data costumers, makers, hackers, the DIY community, urbanites and crowds, events attendees and organizers. In addition large numbers of users are students, teachers and professors.

Open Knowledge Foundation

At a glance:

Type of Organisation:	Social enterprises, charities and foundations
Aim:	Participation and democracy, other
Technology Trends:	Open networks, Open data, Open Knowledge
DSI activities:	Participation and democracy
Key facts:	Developed CKan
Website:	http://okfn.org

Organisation Name

Open Knowledge Foundation

Short description

The Open Knowledge Foundation is a global movement to open up knowledge around the world and to see it used. The foundation unlocks knowledge to empower citizens and organisations to build fair and sustainable societies. It does this through a host of activities, from running large events such as the Open Knowledge Festival, to developing tools such as the Ckan tool for releasing open data.

Type of organisation

The Open Knowledge Foundation is a non-profit organisation founded in 2004. The foundation has five units, including Network Unit (engaging partners and organising events), Knowledge Unit (focusing on technological infrastructure and general architecture), Long Term Project Unit (managing research and projects), Services Unit (research and development) and Operations Unit (administration). The Open Knowledge Foundation is organised in autonomous 'chapters' who each are independent non-profit organisations that are officially part of the wider Open Knowledge Foundation Network.

History & Mission

Founded in 2004, The Open Knowledge Foundation is dedicated to promoting open data and open content in all their forms – including government data, publicly funded research and public domain cultural content. The Foundation is sees itself as an international leader in its field and has extensive experience in building tools and community around open material.

What does it do, and how does this activity enhance social innovation?

All activities at The Open Knowledge Foundation, whether they are to convene communities, to develop tools, to create open material, or to see it being used to effect change, connect open knowledge to open knowledge.

Web and Software Development: Through developing software OKF are trying to create tools that support a global open knowledge and open data community.

One of the most prominent of these is the Comprehensive Knowledge Archive Network (CKAN), one of the world's leading free open source data portal platforms.

CKAN is aimed at data publishers (national and regional governments, companies and organisations) wanting to make their data open and available. CKAN also has a number of built-in features catered to data users, enabling users to browse and find the data they need, and preview it using maps, graphs and tables - whether they are developers, journalists, researchers, NGOs, citizens or professionals. CKAN also offers a powerful Application Programming Interface (API) which allows third-party applications and services to be built using the published data.

It was originally developed in 2006 by the OKF to run TheDatahub.org, a public registry of open knowledge datasets. As a powerful data management system which makes data accessible, discoverable and presentable on the web by providing tools to streamline publishing, sharing, finding and using data; its obvious usefulness has been evidenced by its wider adoption. CKAN now powers more than 40 data hubs around the world, including portals for local, national and international government, such as the UK's data.gov.uk and the European Union's publicdata.eu.

Open Data Training: In addition to building software tools for open data the OKFN also seeks to build the open data skills and capacity of governments and civil society organisations, through providing a range of open data training programmes.

Challenges: In 2011 the Foundation ran the Open Data Challenge, which was Europe's biggest open data competition to date, attracting 430 entries from 24 Member States.

Events: Finally the OKFN seeks to stimulate the debate about open knowledge through events, from small scale policy workshops and coding sessions to its annual international OKFestival and OKConference events.

What is the social impact it is seeking, including any evidence of impact to date?

The OKFN overarching goal is a vibrant open knowledge commons that empowers citizens and enables fair and sustainable societies. They describe how they aim for a social impact in the four following areas:

Better governance: Openness improves governance through increased transparency and engagement.

Better culture: Openness means greater access, sharing and participation in relation to cultural material and activities.

Better research: For research to function effectively, and for society to

reap the full benefits from research activities, research outputs should be open.

Better economy: Openness permits easier and more rapid reuse of material and open data and content are the key raw ingredients for the development of new innovative tools and services.

Impact of CKAN: The impact of CKAN is probably the most tangible impact of OKFN. The open source software is used by more than 70 organisations from Berlin to Nigeria globally to release their data in to open data sets. Some of the most prominent users of CKAN include the UK's data.gov.uk website, the United States government's Data.gov and the Australian government's data.gov.au.

Members: The buy in to the OKFN principles is also evidenced by its membership. Currently the organisation has more than 8000 members spread out globally across chapters in 40 countries.

Lastly events and challenges have helped the organisation act as a pull factor for more open knowledge activity. The open data challenge, for example, helped identify more than 430 open data entries for the challenge.

What it the role of the organisation within the DSI ecosystem?

Through creating software that can be used to enhance the use of open knowledge, it supports organisations on furthering their work on, for example, open data. Just as the engagement of tens of thousands of people in Open Knowledge events help further the debate.

What technological methods and tools is it using, and what did these enable that was not previously possible?

A variety of technologies are being used in Open Knowledge Foundation, mostly web and software development related. Naturally most of its projects rely heavily on open data, open data and open source standards. Some of these, such as CKAN are developed by OKFN itself, but it also relies on open source platforms for developing and sharing the code for its projects.

Its core activities are focusing on using the web and online technologies to better open and share knowledge. None of which would have been possible without the advance of the Internet and the ability to aggregate and distribute large quantities of data.

How is the organisation funded?

The primary funding source is from grants to provide advice or develop new web services and events related to the open knowledge agenda.

What are the main barriers to innovate and how are they in the domain?

No information available

What helps to reach goals and overcome barriers?

The attitude that helps the foundation to realise its value include:

Respect and Tolerance
Respect and tolerance are the pre-conditions for all the work at Open Knowledge Foundation, and essential to working as a collaborative community. Respect others and their capabilities and capacities. Recog-

nise differences as a creative force: when discussed openly and without aggression, it allows people to find the best way forward.

Collaborative Collaboration across the network and outside it, is central to how the foundation is operated.

Pragmatic but not fanatic People at Open Knowledge Foundation are strong believers in "open" but the commitment is animated by a desire to make change, not to establish the moral superiority. Though the foundation will never create closed knowledge it must recognise that others may do, and that, for example, being most effective may sometimes involve the use of non-open tools.

Ouishare

At a glance:

Type of Organisation:	Not for profit
Aim:	Collaborative consumptions
Technology Trends:	Open knowledge
Key Facts:	120+ articles from 70+ contributors, published in French, English and Spanish under a Creative Commons license
Website	http://ouishare.net

Short description

OuiShare is a global collaborative consumption network. It aims to empower citizens, public institutions and companies to build a society in which every person has access to the resources and opportunities they need to thrive. The network is built on the belief that an economy based on sharing, collaboration and openness can solve many of the complex challenges the world faces. Founded in January 2012, as an independent, not-for-profit organisation, OuiShare has evolved from a handful of Parisian enthusiasts to a global community spread across Europe, Latin America and the Middle East.

Type of organisation

Ouishare is a not for profit organisation, which organizes the global Ouishare network. Different members of the global network have specific areas or projects they are responsible for such as our online magazine, a local community, or international events, but there is no hierarchy within the organisation.

History and mission

The overarching aim of Ouishare is to shift the focus of the economy to one that can find new ways to connect, create and share on the web. OuiShare calls this paradigm shift and the sum of these developments 'the collaborative economy'.

The network was born in January 2012 out of a Facebook group in Paris, OuiShare now counts 400+ members from 20 countries in Europe, North America and Latin America, contributing in English, French, Spanish, Italian and German. Among them, an engaged team of 30

'connectors' (i.e. members who seek to engage the public either offline or on specific online topics) is now bootstrapping OuiShare and co-designing this collective adventure with the community. Since January 2012, OuiShare has organized 40+ events in 20 European cities.

In its early stages, the OuiShare community was a Facebook group created in April 2011 to connect people who believed in the potential of the collaborative economy and were trying to make it a reality. They began to organise meetups every month in Paris to continue their discussions about the collaborative economy in person. It was then that initiator Antonin Leonard felt he was on to 'something bigger': "My intuition was that a new culture was emerging, a culture of openness, transparency, empathy and that this culture would be the foundation of what would become OuiShare."

What does it do, and how does this activity enhance social innovation?

Ouishare.net: The online community allows Ouishare members to post articles on collaborative consumption and anyone interested in the subject to take part in online conversations. People can contribute with their own ideas and projects or simply support the ideas and projects of others.

Events: OuiShare taps into a number of events and connections with the aim of promoting more online activities such as meetups, conferences and creativity workshops. To aid the spread of collaborative consumption events OuiShare offers a 'best-practice blueprint' to those who want to create OuiShare events in their own cities.

Partnership working: OuiShare does not focus only on collaboration within the community. They also look for ways to work together with other existing networked communities, for example: P2P Foundation, Open Knowledge Foundation, MakeSense, Edgeryders, Transition Network, Open Source Ecology, hackerspaces & makerspaces.

What is the social impact it is seeking, including any evidence of impact to date?

Francesca Pick, Global Connector at OuiShare, describes how 'The big picture vision, is that OuiShare becomes a crucial vehicle in facilitating the shift to a collaborative economy by growing a strong, international network of people and projects. How exactly we will achieve this aim is an evolving process.' To date the most prominent example Ouishare's impact of is the reach the network has had through its event. In Europe alone, Ouishare managed to organise 32 events in 2013. These took place in 16 European countries where the organisation successfully engaged more than 2 000 entrepreneurs.

What it the role of the organisation within the DSI ecosystem?

OuiShare is an open network 'collaborative community' based on peer governance with active communities in Paris, London, Brussels, Barcelona, Rome, Madrid, Munich, Berlin.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: OuiShare is an open knowledge network using social networking channels to promote collaborative consumption. OuiShare draws on the input and ideas from everyone to help shape the network.

In its work on collaborative consumption Ouishare is seeking to understand how advances in technology help drive collaborative consumption models, including how:

•Collaborative makers bring on a new industrial revolution, driven by digital fabrication tools like 3Dprinters, facilities like FabLabs, open source hardware designs and DIY communities.

Peer-to-Peer Finance fuels the system through crowd funding, peer-to-peer lending, while proposing alternatives for value exchange in currencies and gift economies.

Crowdsourced and open knowledge is opening up institutions such as governments, science, education and culture, while turbo-charging the overall development of all these initiatives.

How is the organisation funded?

The organisation is a network of enthusiasts, who finance all activities on a project-by-project basis. These projects are in turn supported by sponsors and funders relevant for the specific activity, and the organisation tends to work with freelancers and volunteers.

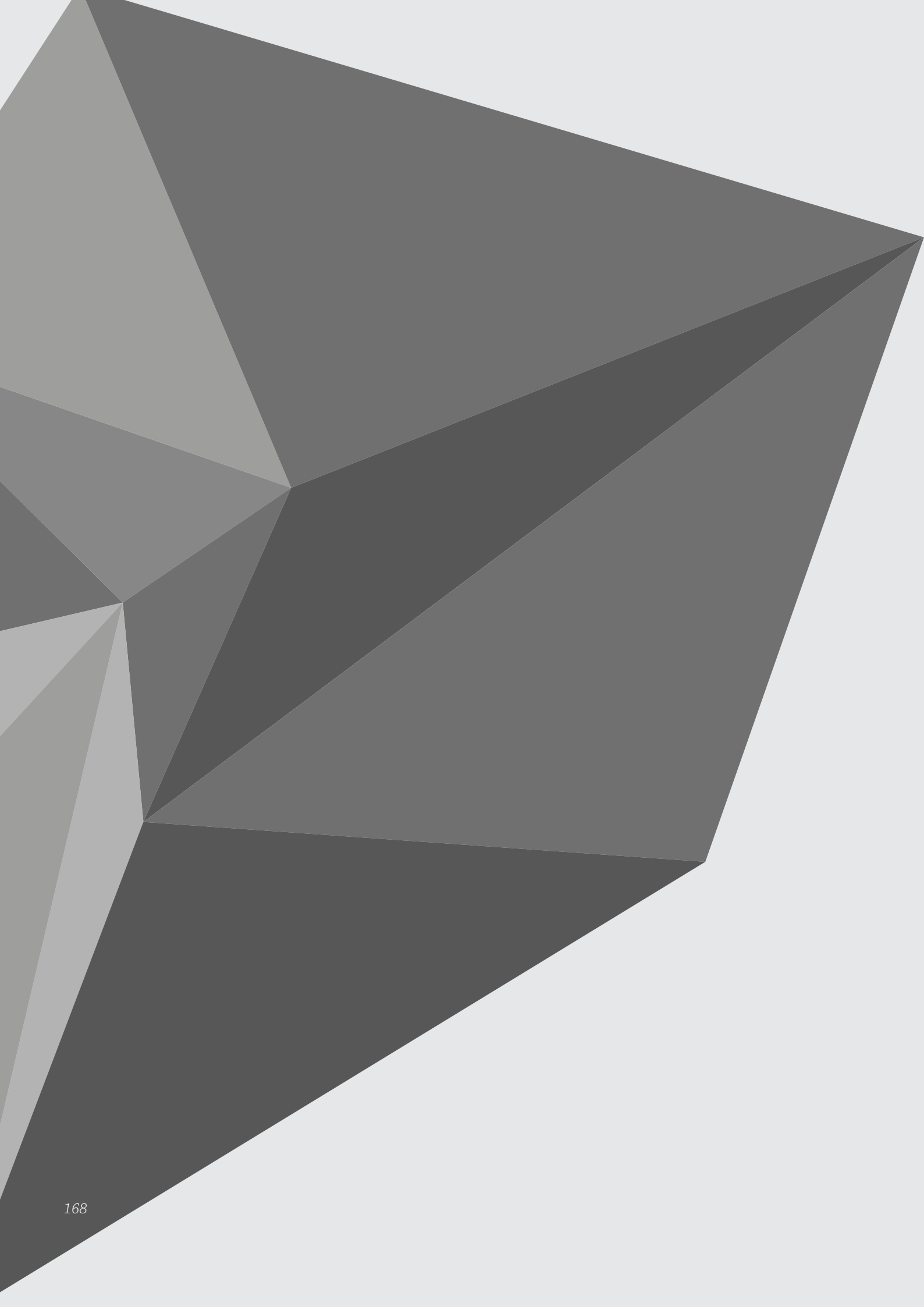
What are the main barriers t o innovate?

While Ouishare sees great 'disruptive' potential in the collaborative economy it also recognises this presents a number of challenges for the movement. Firstly, there is little knowledge about the potential impact of these new models, and little systemic vision about the change they will bring to society and the economy. Furthermore, few projects are actually collaborating; few know about each other, and a lot are still stuck in a competing mindset.

Secondly, collaborative economy needs better exposure and education, which Ouishare believes could fasten the adoption of new user practices, encourage policy-makers to support sustainable models, and drive business model reinvention by enlightened professionals. Except for a few success stories such as Airbnb and Blablacar, many collaborative consumption start-up businesses are fighting to survive or reach a critical mass of users.

What helps to reach goals and overcome barriers?

No information available



P2P Foundation

At a glance:

Type of Organisation:	Social enterprises, charities and foundations
Aim:	Sharing economy, Participation and democracy
Technology Trends:	Open Knowledge, Open Data
DSI activities:	A network, A research project, Operating a web service
Key facts:	A 'wiki' with nearly 8000 pages of information, which have been viewed over 5 million times.
Website:	http://p2pfoundation.net/

Organisation Name

P2P Foundation

Short description

The P2P Foundation is a registered institute with the aim of studying the impact of peer-to-peer technology and thought on society. A peer-to-peer (P2P) network is a type of decentralized and distributed network architecture in which individual nodes in the network (called "peers") act as both suppliers and consumers of resources, in contrast to the centralized client–server model where client nodes request access to resources provided by central servers.

Type of organisation

The P2P Foundation is a registered institute founded in Amsterdam, Netherlands. Its local registered name is: Stichting Peer to Peer Alternatives. As an organisation there are no formal operational roles, but founder Michel Bauwens produces most of the content creation and takes care of community management.

History & Mission

The aim of P2P Foundation is studying the impact of peer to peer technology and thought on society. A peer-to-peer (P2P) network is a type of decentralized and distributed network architecture in which individual nodes in the network (called "peers") act as both suppliers and consumers of resources, in contrast to the centralized client–server model where client nodes request access to resources provided by central servers. In a peer-to-peer network, tasks (such as searching for files or streaming audio/video) are shared amongst multiple interconnected peers who each

make a portion of their resources (such as processing power, disk storage or network bandwidth) directly available to other network participants, without the need for centralized coordination by servers. The foundation was founded by Michel Bauwens, a Belgian Peer-to-Peer theorist and an active writer, researcher and conference speaker on the subject of technology, culture and business innovation.

What does it do, and how does this activity enhance social innovation?

The P2P Foundation wants to be an interconnecting platform for people involved in realising the new open and free, participatory and commons-oriented paradigms in every social field. So, at the foundation people are monitoring and describing real-world initiatives, theoretical efforts, creating a library of primary and secondary material, and trying to make sense of that aggregation by developing a coherent set of concepts and principles.

The primary activity P2P foundation undertake to achive its goal is running the P2P foundation wiki, a website with with nearly 8,000 pages of information on the P2P economy. The foundation also facilitates a Ning community (Ning is an online platform for people and organisations to create custom social networks) with a few hundred members, and a number of mailing lists, of which the most active is the P2P research list, where academics and non-academics can collaboratively reach understandings. Moreover, the P2P Foundation maintains a P2P Lab based in Ioannina (Greece), a blog and a wiki in Greek, which are administered by Vasilis Kostakis.

Meet-ups: In addition to running the wiki, the foundation organises meetups between stakeholders interested in the debate around the P2P economy. To data it has organised two annual physical meet-ups in Belgium and the UK, and also have some national groups organsing meetings in Netherlands and Greece.

ChokePointProject: Finally, the P2P foundation is behind the ChokePointProject non-profit organisation and project which aims to map the entire Internet, and thereby identify vulnerable "off switches" that governments could use to pull the plug on their society's online world. The project was initiated a response to how some regimes 'turned off' the Internet during uprisings in the Middle East in 2011, thereby preventing people from communicating online.

What is the social impact it is seeking, including any evidence of impact to date?

The ultimate aim, according to the founder Michel Bauwens, is to create a powerful social movement that can support the necessary reforms for social justice, sustainability of the natural world, and opening up science and culture to open and free sharing and collaboration, so that the whole weight of the collective intelligence of humanity can be brought to bear on the grave challenges the society is facing.

The P2P Foundation addresses the following:

P2P currently exists in discrete separate movements and projects but these different movements are often unaware of the common P2P ethos that binds them, thus there is a need for a common initiative, which, 1, brings information together; 2, connects people and mutually informs them; 3, strives for integrative insights coming from the many subfields; 4, can organize events for reflection and action; 5,can educate people about critical and creative tools for world-making.

The Foundation would be a matrix or womb which would inspire the creation and linking of other nodes active in the P2P field, organized around topics and common interests, locality, and any form of identity and organisation which makes sense for the people involved

The zero node website, i.e. the site of the P2P Foundation, would have a website with directories, an electronic newsletter and blog, and a magazine. It aims to be one of the places where people can interconnect and strengthen each other, and discuss topics of common interest.

In the context of the above, the primary impact of P2P Foundation is demonstrated through traffic on the site. The wiki it self has been viewed over 5 million times, and the P2P blog alone reached about 35,000 unique users in 2012.

In addition to this the foundations work on Choke Point was recognised with a 'The Next Idea' award (previous recipients include Wikileaks) by the organisation Ars Electronica in 2011.

What it the role of the organisation within the DSI ecosystem?

In a number of ways, P2P Foundation acts as an 'interconnecting platform for people involved in realising the new open and free, participatory and commons-oriented paradigms in every social field.' For P2P Foundation, a great number of these people carry out this type of work without a full awareness that there are others who could mutually benefit from working together on these initiatives. For this reason, P2P Foundation functions as a connector within the DSI ecosystem; aggregating and compiling information that might be used by academics, non-academics and practitioners alike.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The main technologis applied directly by P2P foundation include Wiki, blog, the Ning social network platform and standard mailing list.

However, its core focus is on furthering advancements in P2P Technology - networks in which interconnected nodes ("peers") share resources amongst each other without the use of a centralized administrative system. Peer-to-peer networks underlie numerous applications. The most commonly known application is file sharing, which popularized the technology. Other applications are, such as, instant messaging systems and online chat networks for communications; Peer-to-peer-based digital currencies, electronic money that acts as alternative currency, such as Bitcoin, an open source P2P money, which uses peer-to-peer technology to operate with no central authority or banks; whose transactions and the issuing of bitcoins is managed and carried out collectively by the network.

Using P2P Technology, A peer-to-peer network is designed around the notion of equal peer nodes simultaneously functioning as both "clients" and "servers" to the other nodes on the network. This model of network arrangement differs from the client–server model where communication is usually to and from a central server.

P2P's network in practice creates a platform for 'unbounded knowledge with open sources and open access.' Thanks to technological advances, P2P Foundation has been able to make the move beyond more proprietary publishing models, with rigid intellectual property rights, to embrace Creative Commons licensing. The digital and technological aspect of Creative Commons and iCommons licensing models are significant for the reason that unlike a physical commons, digital commons are not subject to the physical constraints of scarcity.This demonstrates how the P2P Foundation has used technology to enable production and knowledge exchange in ways not conceivable prior to the advent of the Internet, and more specifically the 'digital commons.'

Enhancing collaboration and engagement: DSI network effect

No information available

How is the organisation funded?

The P2P Foundation is a registered institute founded in Amsterdam, Netherlands. Its local registered name is: Stichting Peer to Peer Alternatives, dossier nr: 34264847. Because the P2P Foundation is a volunteer-run, 'legal non-profit organisation' donations make up a significant part of the organisation's finance and business model. Users and supporters are encouraged to help support what the P2P Foundation do on a continued basis by donating in a similar way to that adopted by Wikipedia – with users being given the option to donate pre-set or other amounts through a Paypal platform.

What are the main barriers to innovate? Are they different according to different core domains?

No information available

What really helps reach goals/ how to overcome these barriers?

No information available

Patients Like Me

At a glance:

Type of Organisation:	Private business
Aim:	Health and wellbeing, Science
Technology Trends:	Open Knowledge
DSI activities:	Operating a web service
Key facts:	Online community with More than 220,000 members, has 2,000+ conditions, 35+ published research studies, and over 1 million treatment & symptom reports registered
Website:	http://www.patientslikeme.com/

Organisation Name

PatientsLikeMe

Short description

PatientsLikeMe is a free patient network where people can connect with each other to better understand their diseases, share condition and treatment information, and get support from peers to improve their health.

It is also a research platform. As patients report on their disease experiences, they provide real-world insight into diseases and long term conditons. Those insights are shared with companies, government organisations and others who use them to continuously develop more effective products, pharmaceuticals, services and care.

Type of organisation

Patients Like Me describes describes itself as “for-profit organisation” with a “not just for profit” attitude.

History and mission

PatientsLikeMe started with the mission of giving people answers, helping them connect with others and enabling every patient to benefit from the collective experience of all, or, as Ben Heywood, one of the sites founders has described it ‘Our goal ultimately is that every patient’s decision is informed by every patient before them’.

Inspired by the life experiences of Stephen Heywood, PatientsLikeMe was founded in 2004 by his brothers Jamie and Ben Heywood and long-time family friend Jeff Cole. Stephen was diagnosed in 1998 at the age of 29 with amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease. As his illness progressed, Stephen's family made many attempts to slow his disease and treat his symptoms, but the trial-and-error approach was time-consuming and repetitive. They believed there had to be a better way. They realised that Stephen's experience was like that of millions of patients around the world who live with life-changing and chronic diseases, who often have specific questions about their treatment options, and about what to expect which are best answered by people who have gone through a similar experience.

PatientsLikeMe launched its first online community for ALS patients in 2006. From there, the company began adding communities for other life-changing conditions, including multiple sclerosis (MS), Parkinson's disease, fibromyalgia, HIV, and many others. By October 2009, the number of registered users had grown to more than 45,000. In April 2011, the company expanded its scope and opened its doors to any patient with any condition. By June 2011, PatientsLikeMe had hit a new milestone of 100,000 members.

What does it do, and how does this activity enhance social innovation?

The primary service provided by PatientsLikeMe is a social network for people living with a long term health condition. Once they have created a profile, PatientsLikeMe allows members to input real-world data on their conditions, treatment history, side effects, hospitalizations, symptoms, disease-specific functional scores, weight, mood, quality of life and more on an ongoing basis. The result is a detailed longitudinal record – organized into charts and graphs – that allows patients to gain insight and identify patterns. Answers come in the form of shared longitudinal data from other patients with the same condition(s), thus allowing members to place their experiences in context and see what treatments have helped other patients like them.

Research: In addition to being a direct service for people living with a long term health condition, PatientsLikeMe is a clinical research platform that can provide real-world, real-time insight into thousands of diseases and conditions. Its research professionals have completed studies with real-world data that have helped refute and pre-empt traditional randomised clinical trials. On June 9, 2011, PatientsLikeMe announced that it was releasing a tool, which would show a list of trials from ClinicalTrials.gov, a US government funded site which provides access to information on publicly and privately supported clinical studies to members of their system, tailored to their condition and demographics. The list of available trials is refreshed each night from the open data from ClinicalTrials.gov, which is released in the public domain. Members of the site can search for trials for which they are eligible free of charge; the company also offers a commercial service to actively message potential participants for clinical trials.

Sharing and selling data: Both a part of PatientLikeMe's business model as well as its mission to create better treatments for its members, PatientLikeMe sells aggregated de-identified health data from patients to relevant parties such as companies that are developing or selling prod-

ucts to patients. These products may include drugs, devices, equipment, insurance or medical services. PatientsLikeMe tells members exactly what they do and do not do with their data. Memebers, PatientsLikeMe argue, are compelled to get involved as their sharing of this information, not normally accessed in conventional encounters with medical practitioners, and has the potential to advance medical research on their respective disease or health issue. Some of PatientsLikeMe's past and present partners include UCB, Novartis, Sanofi, Avanir Pharmaceuticals and Acorda Therapeutics.

What is the social impact it is seeking, including any evidence of impact to date?

As described above, PatientsLikeMe works towards a creating a platform and, in the long-term, a health care system, where information is openly shared between patients, doctors, pharmaceutical companies, researchers and the health care industry. To date the network has gone some way in achieve this, with more than 220,000 members, covering more 2,000 conditions, it has helped published more than 35 research studies based on its patient data and it has generated over 1 million treatment & symptom reports. In the United States, approximately 10 percent of newly diagnosed ALS patients register on the site each month, and 2 percent of all multiple sclerosis patients in the country participate in the community.

Improving the traditional treatment procedure: PatientsLikeMe creates a community where patients place their experiences in context and see what treatments have helped other patients like them. It means that patients and doctors can get extra information, assistant or help, which improves the quality of the treatment process.

Assists, helps, and also drives research: With its community's growth at PatientsLikeMe, the practical and individual data and information from patients becomes extremely useful for clinic research, which was difficult to generate in the past.

"Openness philosophy": PatientsLikeMe is more excited about the Openness Philosophy then its Privacy Policy. The Openness Philosophy is what drives its ground-breaking concept. At PatientsLikeMe it is believed that sharing healthcare experiences and outcomes is good, because when patients share real-world data, collaboration on a global scale becomes possible, new treatments become possible, and most importantly, change becomes possible. PatientsLikeMe is passionate about bringing people together for a greater purpose: speeding up the pace of research and fixing the healthcare system.

What it the role of the organisation within the DSI ecosystem?

Operated as a web-based community where it shares open knowledge and generates an database that is being used to return the benefit to the community.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The main technological feature of PatientsLikeMe is the creation of an online social network that specifically targets people living with a long term health condition. The team mainly code in Ruby on Rails, the platform is built with also a group of UX practitioners, to create it an environment with ease, where patients share data about their treatments, symptoms, and disease outcomes.

Internet: PatientsLikeMe has used to Internet to cooperate online and to allow for greater democratisation of patient medical data.

Social Networking and Community Power: Peer-to-peer networks are becoming the cornerstone for a new era of patient-centered health care. PatientsLikeMe allows people to directly report on their disease experiences. As patients come together to share treatments and symptoms in a structured way, they learn from each other about how to improve their care. Information flows freely so that everyone can learn from the collective. The result is that patients get support from others, come to understand their illnesses, and become empowered to work with their health care team to manage their condition.

Real-time research platform: Different online social networks involve different social contracts for participants and different sets of tools. PatientsLikeMe's tools allow people to manage their health, compare where they are against others like them, learn about new treatments, and contribute data directly to research. PatientsLikeMe also combines an enhancing collaboration with the actual measurement of medicine, which amplifies the value of the networking. So it is a patient network, but also a real-time research platform.

Enhancing collaboration and engagement: DSI network effect

PatientsLikeMe is only a valuable resource for patients and researchers, because people living with a long term health condition use it to log and share their personal health data. The more data generated from users, the more detailed insights the network can garner from the data and in return provide a higher value service for its members.

How is the organisation funded?

PatientsLikeMe has been funded by a group of philanthropic organisations and investment companies such as CommerceNet, Omidyar Network, LLC ,and Invus.

CommerceNet was an key part of PatientsLikeMe's success as they provided the seed capital, guidance, additional management experience, and key connections to help kick start PatientsLikeMe. CommerceNet's investment and support model combines the elements of a research lab, startup incubator and public interest initiative.

What are the main barriers to innovate and how are they in the domain?

Difficulty in medicine regulations: Innovation in health care is extremely hard. In addition to having a good idea, it requires to be both innovative around a business model and be able to meet the standards of medicine. It's an almost impossible set of barriers that are very hard to navigate.

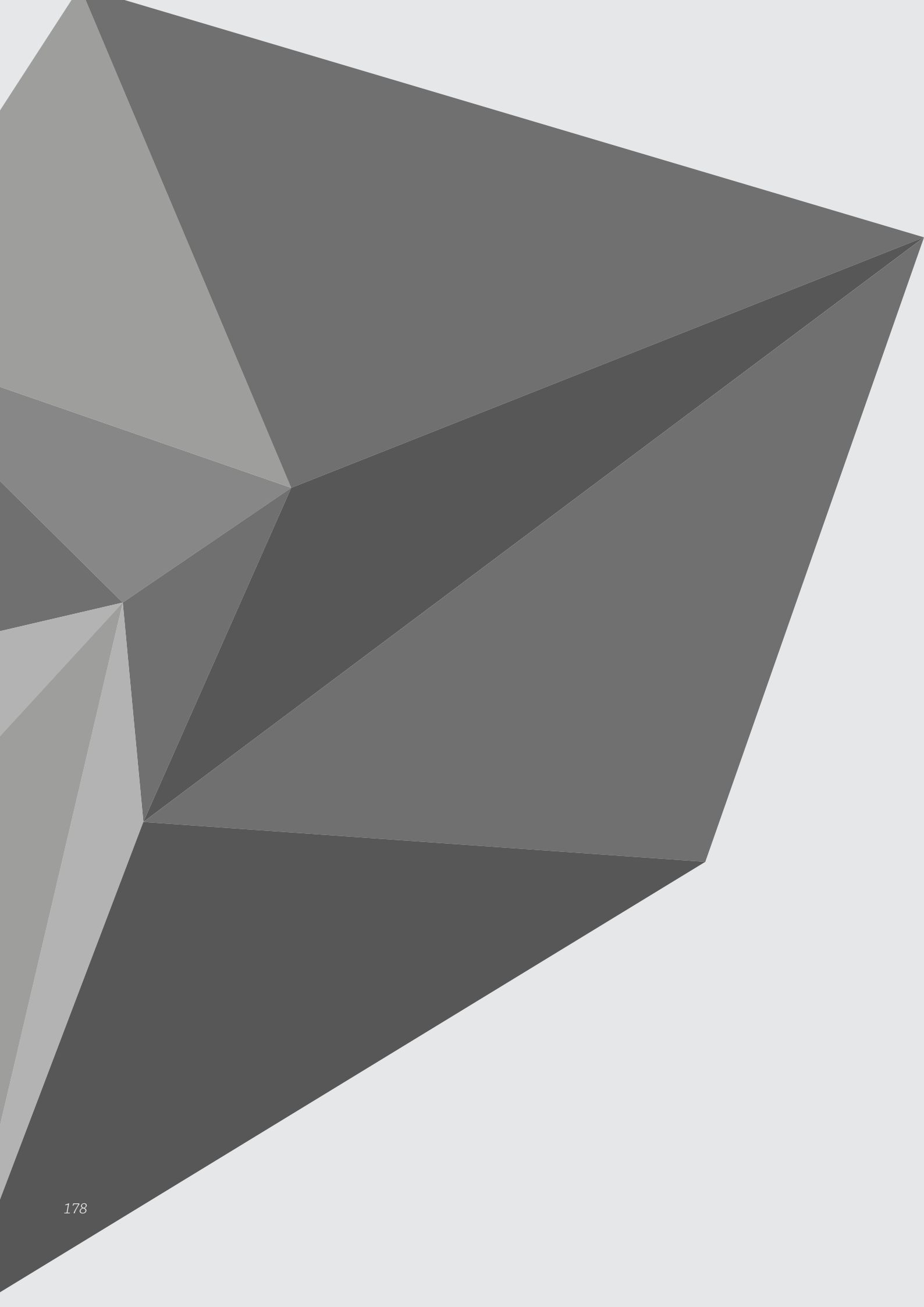
Try to make patient value drive the value of products and services in the

healthcare market: Another challenge is the healthcare market, which in the words of PatientsLikeme 'is kind of broken', as it is not a market where if you make people better you get paid for it. Most time hospitals do not have data or keep a long-time track of information from patients that they treated. Information is fundamentally different if it comes from a patient. If they bring it into the health care and medical research system, it will drive change faster.

What helps to reach goals and overcome barriers?

Currently, most healthcare data is inaccessible due to privacy regulations or proprietary tactics. As a result, research is slowed, and the development of breakthrough treatments takes decades. Patients also can't get the information they need to make important treatment decisions. PatientsLikeMe believes that it doesn't have to be like this, if people share data, and open up the healthcare system. In this way people can learn what's working for others, improve the dialogue with doctors, and best of all, help bring better treatments to the market in record time.

In spite of the structural barriers in accessing patient medical data, PatientsLikeMe's fast uptake illustrates the obvious need for services of its kind.



Peerby

At a glance:

Type of Organisation:	For-profit business
Aim:	Neighbourhood regeneration, Sharing economy
Technology Trends:	Open Data, Open Knowledge
DSI activities:	Operating a web service
Key Facts:	About 15,000 members in September 2013
Website:	https://peerby.com

Organisation Name

Peerby

Short description

Peerby is a Dutch for-profit start-up that operates a peer-to-peer sharing service for products. Users can share or request items from people in their neighbourhood online, via the Peerby website, their mobile or social media channels. The platform was launched in Beta as a service targeting people in Netherlands in August 2012, although it also has active communities of users outside in Netherlands.

History and Mission

The basic idea of Peerby is that having access to a product is more important than owning a product, as its founder, Daan Weddepohl, puts it "We strive for a future where value is no longer just defined in money". Building on this, Peerby believes that neighbourhoods should be places where the residents know and interact with each other. The goal is to re-establish this connection between neighbours, in this case with the usage of new media, and in the most comfortable and convenient way possible. This is based on a belief that people do not always know that they have the possibility to help their neighbours, which limits the chance to enable the collaborative consumption.

Peerby was founded by Daan Weddepohl in 2011. Daan is an ICT entrepreneur and actor who was looking for new opportunities. He wanted to work on something he really believed in. Daan explains how he realized that 'people' made him happy, and how he wanted to facilitate this for others by creating a website for the neighbourhood that would allow people to meet and engage with each other. His thinking behind this was inspired by Rachel Botsman and her concept of collaborative consumption, and the fact that there was no other working peer-to-peer sharing platform existing in the Netherlands. This lead to Daan to develop the prototype for the Peerby platform.

What does it do, and how does this activity enhance social innovation?

The core service of Peerby is the online platform which enables users to borrow and share anything from trumpets to laptop chargers with their neighbours.

Peerby's uniqueness lies in its proactive approach: activity on the platform begins with people posting requests for things they need, rather than people offering items they would like to share. This approach Daan has explained is based on the simple principle that that is how borrowing is most often facilitated off line 'If you borrow a cup of sugar, you knock on your neighbour's door and ask for it. The neighbour doesn't come to you and say 'Hey, here's a bag of sugar, do you need some?'. Once a request has been posted using either the Peerby website or app the Peerby seeks to further encourage the matching between people looking for an item and people who might have this. Using a smart search algorithm the platform immediately asks the 100 closest Peerby neighbours if they have the item right after a request has been logged. This Peerby argues, is the reason why the platform can achieve a higher success rate than any other sharing platform - Peerby claims that over 80 percent of its requests are fulfilled by Peerby members within 30 minutes of their posting.

While it currently focuses primarily on growing in the Netherlands, the platform also has active communities using the platform in London, Berlin, Spain and New York.

What is the social impact it is seeking, including any evidence of impact to date?

Since its birth in 2011, Peerby has demonstrated the popularity of its service through attracting 15,000 plus platform members.

There are two overarching social purposes behind Peerby. Firstly, the platform seeks to create a more sustainable environment, where people instead of purchasing products borrow or share products already bought by people in their local area, and thereby help to decrease CO_2 emissions. As an example Peerby describe how an electric drill is used for 13 minutes during its lifespan, making it an ideal item for collaborative rather than individual consumption.

Secondly the platform seeks to create more social cohesion and trust in neighbourhoods. Daan explains how most people feel an attachment to the place where they live, but not always to the people who live nearby. For Peerby, encouraging sharing and establishing contact with neighbours, is therefore not just about helping people save time, money, and storage space, but also about creating a fun way for people to explore their neighbourhood and meet their neighbours.

What it the role of the organisation within the DSI ecosystem?

Peerby started its service in Amsterdam, the Netherlands and is expanding to other cities in the country, as well as across Europe. At this moment active cities include Berlin, Germany and London, UK.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The primary technology in Peerby is the P2P renting platform. Peer-to-peer renting refers to the process of an individual renting an owned good, service, or property to another individual. It is also referred to as Person-to-Person rental, P2P renting, Collaborative Consumption, the sharing economy and Product Service System.

The fast development of this market is due to a combination of the following trends:

Networking infrastructure and high-bandwidth penetration reaching a level allowing Social Networks and Consumer-to-consumer marketplaces,

Limited storage space in dense urban environment preventing consumers to keep all the goods they occasionally use,

Increasing environmental concerns of consumers leading towards limitations of waste of resources and overconsumption,

Evolution of consuming behaviours from owners to users.

In the P2P model, which is also being used by Peerby, individuals transact directly with other individuals on a two-sided marketplace platform maintained by a third party. In two-sided marketplaces, the development, maintenance and policies of the platform are maintained by the third party, which can be an organisation, a business or a government. These are not strictly P2P systems in the technical sense as there is generally a central market platform that enables the transactions.

The service is based on Internet and the principles of open knowledge and the sharing economy. Thanks to the social web, people can now share anything with anyone in the world. Individuals have been renting from each other for decades, particularly in the real estate domain, however, with the Internet acting as a facilitator, there is a growing trend of websites that offer to facilitate peer-to-peer rental transactions. All of these sites are encouraging something academics call collaborative consumption, in other words, peer-to-peer sharing or renting.

Enhancing collaboration and engagement: DSI network effect

The value of Peerby increases as more people are using the platform to borrow and exchange products.

How is the organisation funded?

Peerby has received investment from a number of philanthropic as well as private investors including Stichting Doen, Agentschap NL, Sanoma Media and Green Challenge. Peerby decided to find financial support via investors rather than subsidies. Subsidies require too much reporting, Peerby would rather spend the time on research and development. Besides that, according to Peerby once a subsidy has been granted, the proposal is often already out-dated. The experience is that the subsidy requirements are too binding, whereas Peerby need to be flexible to be able to continue.

What helps to reach goals?

Incubation and mentoring: To be able to grow Peerby benefitted from a number of different incubation and mentorships schemes they got to take part in, including the Founders Institute (this was also the place where Daan met two of his companions), and the incubators Rockstart and TechStars. In these accelerator/incubator programmes for start-ups they learned how to build a company, how to pitch, and how to convince financial investors. Daan believes that further access to a network of peers where he and his colleague could receive further business mentoring could help them substantially in the further development of the platform.

The innovative development process and long-term scalability thinking: Peerby carried out several pilot studies and prototypes before launching the platform, which helped Daan and his team develop strong evidence that the platform was credible and the principles behind it worked. The first members helped Peerby show potential investors that the concept worked.

Although Peerby believes it has great potential, Daan describes how starting up a company is extremely time-consuming at the start and quite an investment that doesn't pay off immediately (in salary). Almost all employees of Peerby own a piece of the company through stock options and through these have a direct stake in its successes and failures, which incentives the team to invest much of their time and effort in to the platform.

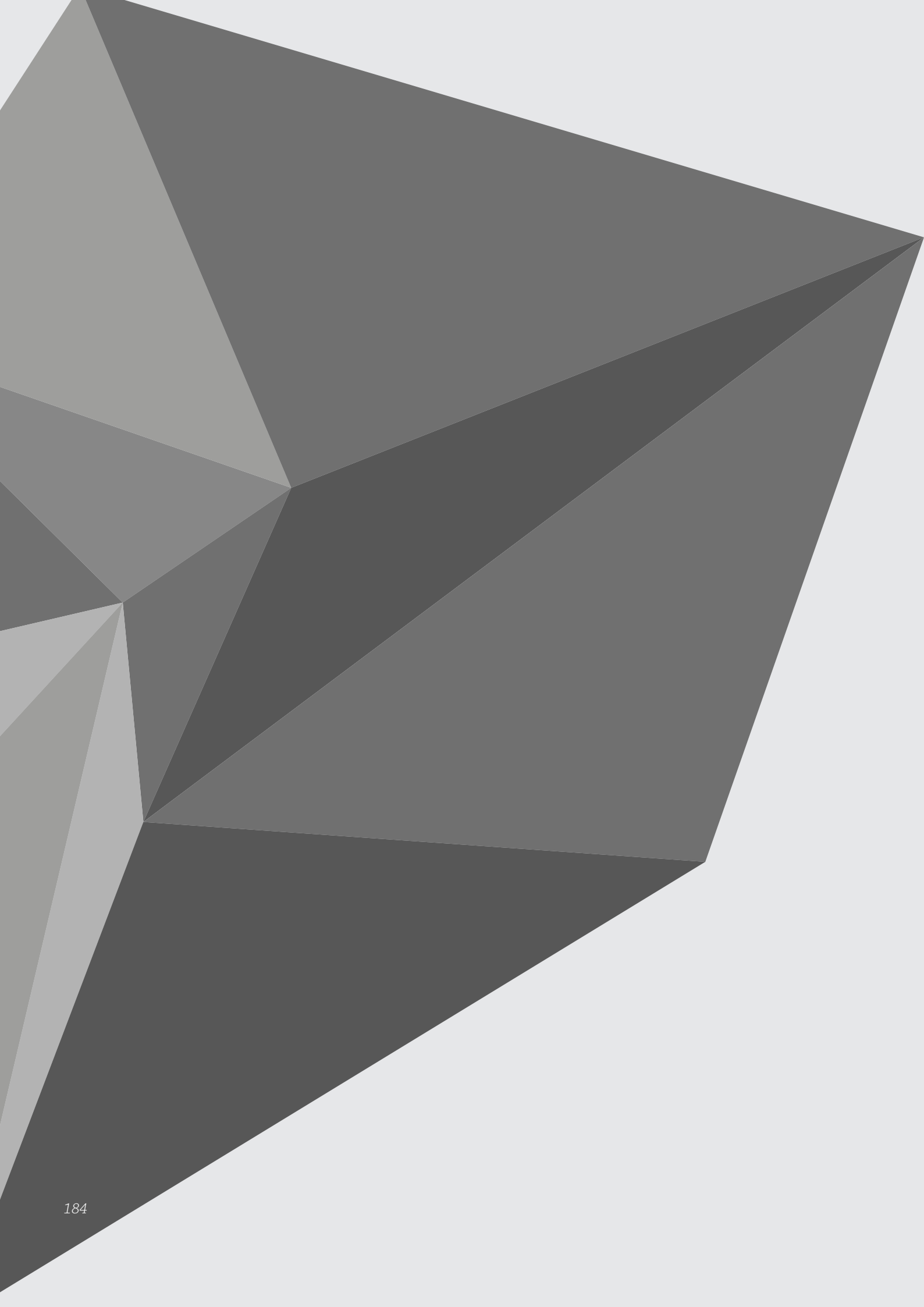
What are the main barriers to innovate and how are they in the domain?

In addition to the obvious challenge of getting engagement in the platform the two main challenges for Peerby has been developing a sustainable business model, trust in the platform and developing the right team and diverse skill sets to run and further develop the platform.

Building trust in the platform: The challenge that worries everyone in the sharing world is trust. Sharing only works when there is reputation involved. Most sharing platforms try to combat this issue by building a self-policing community. Almost all require profiles for both parties and feature a community ratings system. For Peerby, if user lent something out but do not get it back, they will work hard and try everything in their power to help. So far, Peerby has never had an issue with this, and in order to ensure that it will also not happen in the future they are developing a feedback feature, which will allow Peerby members to rate each other after a transaction. The goal of this is to ensure that people who do not treat the belongings of others with the respect and care that they should will not be able to rent something in the future.

Getting the business model and team right: Daan explains how "What we do is new, we can therefore not resort to existing business models. The funding we received through contests and investors is therefore spent on exploring new business models." Peerby's goal is to be a self-sustaining company, and they are exploring ways to make money from the platform. Crowdsourcing, a 'thank you' shop and insurance are all options they have explored. The last service seems to be most promising, although a lot of research still needs to be done in this area. Building on this Daan emphasises how a constantly evolving business and business model sets big challenges for the skills of him and his team 'We need to be flexible, since we are constantly changing. This also means that everyone needs to be multi-skilled (..) What we have experienced regularly is that in a week everything has changed. Skills should be interchangeable; what was essential the other week can be useless a week later'.

Linked to this is how to deal with the growth of the platform. Peerby is growing rapidly and have shown that the platform works on small scale. The next challenge is to understand how it could work on a larger scale; the platform is currently exploring product strategies that are scalable in existing markets.



Raspberry Pi

At a glance:

Organisation Name:	Raspberry Pi
Founded:	2006
Type of organisation:	Academia and research organisations; social enterprises, charities and foundations
Aims:	Education and skills
Tech Trends:	Open Knowledge
No. of units sold worldwide:	Over 2 Million

Organisation Name

Raspberry Pi

Short Description

Raspberry Pi is an ultra-low-cost credit card-sized fully-functioning computer. It was designed to bring about a paradigm shift in the way young people engage with computing – with the hope of transforming them from passive consumers into active creators.

Type of organisation

The RasperryPi is developed by the Raspberry Pi Foundation, a not for profit charity.

History and Mission

The Raspberry Pi Foundation was set up in 2006 by Eben Upton, Rob Mullins, Jack Lang and Alan Mycroft, a team based at the University of Cambridge's Computer Laboratory. The idea behind the RaspberryPi came about as a way to try and challenge the way kids were engaging and interacting with computers, as the team was concerned about the year-on-year decline in the numbers and skills levels of prospective undergraduates applying to study Computer Science. Upton has hypothesised that this drop in skills and interest was related to disappearance of open, common platforms and devices, which from the late 1980s had come to be replaced by fixed function devices and that this change in turn has had the effect of reducing the pipeline of potential computer programmers.

"The Maker Movement is, I think, a manifestation of a very encouraging trend towards democratisation of access to high-technology tools. By attacking economies of scale, platforms like Arduino and the Pi allow individuals, small teams and small companies to compete with large established players; this is a very positive development from the point of view of encouraging innovation, and giving users (and small businesses...) a chance to find their own destiny." Eben Upton

To remedy this shortfall of high-calibre progamming recruits, Upton and the Raspberry Pi team sought to develop a tiny, cheap computer for kids which would encourage programming experimentation and encourage a new generation of students to pursue computing science scholarship, which would become the RasperryPi.

What does it do, and how does this activity enhance social innovation?

Raspberry Pi is a simple computing device that looks like a motherboard with the mounted chips and ports exposed (something you'd expect to see only if you opened up your computer and looked at its internal boards).Although seemingly basic in design, it has all the components needed to connect input, output, and storage devices and start computing. When switched on, users are first greeted by a command line code (which in recent years has tended to remain in the background of closed software programmes), meaning that from the point of startup users are encouraged to begin tinkering and experimenting with the device. While a user's skill level will naturally vary from person to person there's a user forum on the Raspberry Pi site, and a whole host of tutorials and other materials are readily available online.

Raspberry Pi readily partners and collaborates with other relevant digital education actors. For instance, the Raspberry Pi supports MIT's Scratch platform – meaning kids can gain a deeper knowledge of computer game programming by building their own game while using their Pi. Cooperative collaboration of this sort between organisations (particularly those who might in the more proprietary business models of the past have been 'competitors') demonstrates a deep commitment to bringing about social innovation in the way educational tools are delivered.

What is the social impact it is seeking, including any evidence of impact to date?

As is suggested above Raspberry Pi seeks to inspire an emerging generation of young people to become more engaged with computer programming (and Science, Technology, Engineering and Mathematics education more generally– STEM education henceforth). Yet the impact of Raspberry Pi's vision seems to have been sensed more widely. Some commentators involved in humanitarian and development work have also noted the Raspberry Pi's application as an educational tool in developing countries for the following reasons:

Very low cost puts it into the category of "semi-disposable" device, and a ready addition to many other innovations without requiring large upfront investment.

Its robustness and low maintenance requirements make it particularly suitable for harsher environments in many developing countries.

Its small size and portability make it suitable for applications that other computers can't reach.

It has very low power consumption, so can work more easily in electrical off-grid environments.

Other than the fact that the demand for the Raspberry Pi computers have far exceeded the team's original predicted figure of 10,000 (with over 3 Million units having been sold worldwide as of 2013); Heeks and Robinson have also examined the impact of Raspberry Pi amid an emerging class of computing devices they refer to as ultra-low-cost computing (ULCC). These are defined as devices that wrap computing peripherals around a cell-phone hardware core; meaning that such devices can be produced for just a few tens of dollars.

For this reason Raspberry Pi computers have already been as used as learning tools in the context of various developing countries such as Afghanistan, Cameroon and Bhutan. While the UNDP-backed One Laptop Per Child programme demonstrates that more rigorous assessment is needed to verify that the ICT (Information and communications technology) packages like the Raspberry Pi are directly contributing to positive and measurable outcomes as a learning tool for students in developing countries. However as the case of Bolgatanga in the Upper East of Ghana, the results have reportedly been very positive when such platforms are combined with other educational materials. In 2013 a Raspberry Pi ICT learning environment was installed at Dachio Primary and JHS Schools, which included 6 Raspberry Pi's. These have been networked via a switch to a wireless router to facilitate access to RACHEL (one of the Raspberry Pi's dedicated educational servers). So far, the feedback from both teachers and pupils regarding this RACHEL material has been encouraging, and students can now access large amounts of educational content with having to rely on poor and expensive Internet connectivity.

Furthermore, the charity's continued success (financial and otherwise) has been marked by an important milestone for the organisation; On 18th of November it was announced that over 2m Raspberry Pi computers have been sold globally since going on sale for around £30 in February 2012.

What is the role of the organisation within the DSI ecosystem?

Raspberry Pi aims to promote interest in STEM education evidenced by a series of partnerships and collaborations (including a recent partnership with Wolfram Research it is already used at Khan Academy and supports MIT's Scratch platform. It actively encourages collaborative coding – for instance the open source coding for its collaborative project with Google, Code, is hosted on GitHub. Overall, Raspberry Pi aims to build an ecosystem of more engaged creator-users, and seeks to redress shortfall of computer programmers.

What technological method is it using?

The Raspberry Pi is based around a 700MHz ARM11 system on chip (SOC) with a powerful graphics co-processor. Typically this sort of processor was used in mobile phones five years ago. Apart from the graphics processor, which is propriety to Broadcom, the Raspberry Pi is completely open source, which helps to keep costs down. From the circuit schematics to the applications and the operating system, anyone can examine and contribute online. The Foundation provides a version of Debian Linux that presents users with a basic text login rather than a slick GUI

by default, with the entire operating system and user files stored on a swappable SD card.

How has technology enable that was not possible before?

With regard to Raspberry Pi's hardware, the board's low cost was made possible thanks to advances in integration that have effectively shrunk all the components of a desktop computer into a single silicon chip.

Furthermore, thanks to advances in technology, Raspberry Pi, unlike conventional PCs, has very low power consumption. This means that it work more easily in electrical off-grid environments, making it an ideal device for educational purposes in developing countries, etc.

Enhancing collaboration and engagement: DSI network effect

Due to Raspberry Pi's programmable and simple open source model, a variety of Pi projects have emerged on the Web. These range from making your own retro Pi-powered arcade machine to adapting your Raspberry Pi to log all relevant data in your own weather station. Significantly, the Pi community's focus on re-use and 'shareability' has meant that these projects are replete with comprehensive guides so that these projects can be readily adapted or developed further by anyone.

Yet collaboration does not just occur amongst the Raspberry Pi community, but rather is occurring on an organisational level too between key digital education actors. On November 23rd, 2013, Raspberry Pi Foundation announced a new partnership with Wolfram Research that will see a free copy of Mathematica and the Wolfram Language installed into future Rasbian images, making Raspberry Pi devices a first-class platform for teaching computer-based mathematics techniques to children of all ages.

Current Raspberry Pi users can also avail of this joint recent collaboration. Community members that have at least 600 MB of free space on their SD card can install both Mathematica and Wolfram Language by typing "sudo apt-get update & sudo apt-get install wolfram-engine."

Raspberry Pi has also recently collaborated with Google to deliver a new open source coding tool called Coder. With Coder, users can develop their own apps for the web and then host them on a miniature server located directly on the Raspberry Pi. The overall cost for the DIY programming project, using Google's recommended materials, is under $50 – and, importantly, all of the educational materials are free. After procuring a Raspberry Pi, eager students simply follow instructions to download information onto an SD card, plug it into the tiny computer, and connect to a shared Wi-Fi to access Coder through Chrome. The whole process, according to the developers, should take just 10 minutes.

This joint venture also situates both organisations comfortably within the DSI ecosystem –as a completely open-source project, Coder's code library is available for editing on GitHub, and comes with a few simple projects to get novices involved. Coder is also designed to work alongside instruction from other programming websites like Codeacademy and Khan Academy. When projects are complete, users can host their own websites via Raspberry Pi or zip them to share with friends.

How is the organisation funded?

Raspberry Pi founder Eben Upton has noted how in the initial phase of the foundation's establishment, he and the team were completely unable to convince any of the usual sources of loan and matched funding (banks, the old regional development agency) that they had a saleable product, and equity finance was unavailable as Raspberry Pi is a charity.

In the end the start-up of Raspberry Pi was financed by some of the organisations trustees who contributed unsecured loans totalling approximately £100,000 to get the business off the ground. The loans were repaid within a couple of months.

Currently all Raspberry Pi manufacturing is done at a Sony-owned manufacturing plant in Pencoed. The arrangement between the manufacturer and RasperryPi is a royalties-based model, where the manufacturer; RS Components and Premier Farnell oversee manufacturing and worldwide distribution, while Upton and his team benefit from a percentage on every device sold. As of October 1st 2013, Raspberry Pi has received roughly $4m of royalty income. This licensing model has been consciously adopted despite meaning Raspberry Pi has forgone potential earnings. As a business within a charity, all surplus made from royalties is re-invested back into helping Rasperry Pi achieve the organisation's key social objectives of encouraging children to programme.

Raspberry Pi is also supported via grant funding. In late January 2013, Google announced it was giving the Raspberry Pi Foundation a grant worth an estimated £670,000 to put 15,000 of the devices into UK schools and help develop educational material to go with the technology.

What are the main barriers to innovate (and how were they overcome)?

Technical Engineering Challenges: Beyond securing initial funding, there were no real challenges involved in setting the organisation up. However, in the early stages, the team had a number of technical engineering challenges bringing the product to market at the target price point, but thanks to the involvement of particularly competent engineers, these obstacles were quickly overcome.

Licensing Model: If one were considering the usual considerations of traditional business model, the licensing model of the Raspberry Pi technology might be deemed a disadvantage: a lot of other companies are making money from value that Raspberry Pi Trading has forgone. Two companies that make external cases for the device already accrue more revenue and profit than Raspberry Pi. In defence to this however, Raspberry Pi have indicated that their goals are clearly set on achieving their key (non-financial) objectives – which this licensing model has enabled them to work towards.

Offline Environments: While the Pi's design ensures it is suitable for off-grid environments, this alone does not overcome other infrastructural barriers, such as there being limited or no Internet access. For this reason Khan Academy Lite was developed as an offline version of Khan Academy's curriculum of free learning materials. With the Pi, a 64GB SD card to put all the learning materials on (which actually costs about twice what the Pi you'll need to run it on does) and a Wi-Fi dongle, allowing for the MP4 lectures that make up the core of Khan Academy's material to be brought to areas with poor Internet connectivity. This has been adopted in Bhutan; where the Internet didn't come until 1999, and coverage is still very minimal, so an offline solution like this is vital.

What really helps reach goals?

Raspberry Pi's success has been the largely the result of the board's very low price and open design (which was a conscious shift from the fixed function, commoditised products they felt had left an emerging generation as being unable to penetrate the system's interface to experiment with programming.)

Safecast

At a glance:

Type of Organisation:	Grassroots communities
Aim:	Health and wellbeing, Energy and environment, Participation and democracy
Technology Trends:	Open Networks, Open Hardware, Open Data, Open Knowledge
DSI activities:	An event, A network, Running/hosting maker spaces and hackerspaces, Operating a web service
Key Facts:	In 2013 over 10,000,000 individual data points collected.
Website:	http://blog.safecast.org/

Organisation Name

Safecast

Short description

Safecast is both the name of a Geiger counter built by the open source community as well as a global sensor network where Safecast owners can map and freely share their radiation measurements in open data sets. The overarching aim of Safecast is to encourage people to actively contribute to the generation of a body of data that might alleviate environmental problems. The original impetus for the Geiger counter and network was the lack of good and open hard and software solutions for citizens to contribute to the mapping of radiation levels in Japan following the accident at the Fukushima Daiichi nuclear power plant in 2011.

Type of organisation

Safecast is a joint project between Tokyo Hackerspace, CrashSpace LA, MIT Media Lab and Keio University, and is set up as a private non-profit organisation.

History & Mission

Safecast was founded by Sean Bonner, Joi Ito and Pieter Franken after March 11th, 2011, when a 9.0 earthquake hit Japan, and triggered a destructive tsunami which hit the Fukushima Daiichi nuclear power plant. In an effort to help, the partnership decided to take part in surfacing data on radiation levels across Japan, caused by the meltdown at the power plant. However, the Safecast team quickly realised that most of the devices used by the public to map radiation were of poor quality and there were massive holes in the public radiation data sets available. As a response to this, the team developed the bGiegie Geiger counter, imme-

diately after the disaster. The team turned to the crowds via crowdfunding platform, Kickstarter, to finance the device and help launch a sensor network where bGiegie owners could share the data they were collecting. Safecast then worked with Hackerspaces and used grant funding to update the counter, which amongst others enabled users to mount the counter on the outside of a car and use GPS technology to timestamp the data and log the location.

Harnessing the power of collective intelligence: The history of Safecast is very much one of global network of people using social media and open tools to come together around a common cause. The team behind Safecast initially connected on Twitter, and have in interviews described how they managed to connect with people through social networks whenever they were trying to address a new challenge in the development of Safecast. For example, Dan Sythe, who ran International Medcom - a high quality geiger counter manufacturer, and people at the Tokyo Hackerspace took part in the initial twitter discussion about building the device. Later on Ray Ozzie a data expert based in Boston joined the conversation when the question of how to release and analyse the data arose.

Looking beyond Japan: While Safecast was initially focused on mapping radiation levels in Japan the network has now gone global. In 2012 the network was rewarded a $399,999 grant from the US based Knight Foundation to build a network of low-cost air quality monitoring devices and data collection in Los Angeles and Detroit, and scale radiation monitoring globally.

Spread information via Social Media: While Geiger counters make it possible to produce narratives of nuclear risk as numbers, measurement data per se cannot be a useful resource for nuclear risk knowledge production. Volunteer Geiger counter users and social media users among others are necessary to produce specific type of nuclear risk knowledge. To date, Safecast volunteers have mapped radiation levels of over 11 million data points, providing a comprehensive and accurate dataset that was inconceivable before the Safecast project.

What does it do, and how does this activity enhance social innovation?

Safecast can be described as consisting of three main components.

A low cost Geiger counter: At the heart of Safecast is the physical Geiger counter which helps volunteers map radiation levels. The functionality of the Geiger counter has since been expanded to also map air pollution. The majority of data is captured through the bGeigie mobile sensor. A Geiger counter designed to be mounted on a vehicle, as one drive can help map up to 10,000 data points. However, in addition to the bGeigie the team have developed multiple other sensors with different functionalities (some are for handheld use, while other prototypes can be linked to a mobile phone). These counters are available at different costs, depending on a user's preferences. Experiments at a recent hackathon included developing future versions of the sensor, mounted on to a drone.

A Radiation Level Map: All data captured via the Geiger counters is captured and released in an open data set, and the radiation measurements are color-coded and plotted on a radiation level map which lets people easily understand the radiation level in a given geographical area. To date Safecast has captured more than 11 million data points.

A community of volunteers: While the Safecast team along with a wider open source community is providing the hard and software behind Safecast, the engine behind the success of the project is the large group of volunteers who use the Geiger counters to capture the data that makes the platform a valued resource. Safecast either send volunteers cheap Geiger counters to measure local levels of radioactivity, or they can purchase a unit anywhere from $200 to $1,000, or even build their own using a $450 kit.

What is the social impact it is seeking, including any evidence of impact to date?

Creating awareness network of "citizen help themselves" As mentioned earlier, the main drivers for Sean Bonner and his Safecast cofounders was a belief that people needed more and better radiation data, and that currently a lot of governmental data is not adequate or transparent. Building on this Safecast intends to bring the attitude of "citizen help themselves" where the government "failed". Safecast has gone some way in demonstrating this is possible by creating a process where citizens have done everything, from crowdfunding, designing and developing hardware, building a community, collecting and sharing open data, as well as educating, without input from government. To date, this has enabled Safecast volunteers to map radiation levels of over 11 million data points, providing a comprehensive and accurate dataset that was inconceivable before the Safecast project. The quality and public value of the work done by Safecast was further evidenced when, on September 15, 2012, it was announced that Safecast's radiation measurements were partially adopted by Fukushima Prefecture to create a radiation map.. As a pro-data organisation, Safecast generates nuclear risk knowledge by harnessing measurement data in multiple ways. Safecast initially claimed not to "work with any government and government agency directly" precisely because they try to "remain independent and uninfluenced by politics of any kind".

Open Data: As mentioned earlier, a cornerstone of Safecast is its commitment to open data, which means that anyone with an interest in global radiation can freely contribute to and access the large data sets created by the Safecast community.

In addition to this, the team behind Safecast also seek a social impact by conducting radiation measurements on request, conducting seminars, and developing open hardware and software.

Safecast describes itself as not being anti nuclear, or pro nuclear – but pro data. The goal is to provide more informative data where it didn't exist so that people can make more informed decisions based on facts rather than the fear and speculation that comes from uninformed sources. The goal is not to single out any individual source of data as untrustworthy, but rather to contribute to the existing measurement data and make it more robust.

What is the role of the organisation within the DSI ecosystem?

As described in more detail below, Safecast relies heavily on working on and with several open source hard and software solutions. Open hardware such as Arduino forms part of the actual build of the Geiger counter, crowdfunding platforms such as Kickstarter have been used to raise funding for developing different versions of the Geiger counter and open coding platforms such as Github have been used to develop the code behind Safecast.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The team behind Safecast has taken advantage of a broad spectrum of the free and open technological advances available to social entrepreneurs.

Open Hardware: The hardware developed by Safecast is open source and, in their own words, people who buy it are free 'to open, manipulate, hack, break and or improve anything', and it uses open hardware such as Arduino in the build of its sensors. As described earlier it has used Hackathons at Tokyo Hackerspace to design and build devices, such as the bGeigie.

Open Knowledge: Whilst it has used open hardware and open source approaches to develop the original prototype Geiger counters, Crowdfunding has been crucial in the funding and scale up of the Geiger counters. Safecast successfully ran campaigns on crowdfunding platform Kickstarter (it raised $36,900 with an original target of 33,000) to finance its first Geiger counter in 2011. It returned to Kickstarter again in 2012 to finance the Safecast, and raised $104,268, well beyond their original $4,000 target.

Following on from this Safecast has used open source platforms such as Github to develop the code that sits behind the platform.

Open data: Safecast provides an Open Application Programming Interface (API), allowing people to access raw measurement data. More importantly, Safecast presents useful information on measurement data such as geo-location information and time of upload. Such information not only makes it possible to locate when and where each datum was captured and uploaded, but also allows people to process the huge volume of raw measurement data for their own ends.

Social Media: Social media has helped Safecast in two main ways. It was through Twitter that many of the first connections were made between the original founders and developers of Safecast. Building on this, it is through social media channels such as Twitter that Safecast publish their findings.

Engagement through visualisation and apps: Finally, Safecast visualizes measurement data on the Safecast Map in six coloured layers. This provides information for people on the level of nuclear radiation in areas across Japan.

None of the activity described above would have been possible without the advance in technology, and in open technologies. Building on this, one case study of Safecast from researchers at University of Southern California describe how the collaboration around Safecast through

social media and open source platforms in many ways can be seen as an example of digitally enabled collective intelligence. As it relies primarily on volunteer engagement and contributions, Safecast needed low cost platforms and tools that could help them easily engage and manage a global community of Safecast makers and doers. The web-based online platform also enabled a sharing of data collected by citizens, to citizens, at a scale not possible before the advance of the Internet.

Enhancing collaboration and engagement: DSI network effect

As described throughout, the Safecast community is one large global network. The richness of radiation data grows as people use and share radiation data. Equally, the variations and development of different Geiger counters grows, adding value to the overall service, as DIY makers develop new types of counters which can be used by the network.

How is the organisation funded?

As mentioned earlier, Safecast has used two rounds of crowdfunding on Kickstarter to fund the development of its devices. In addition to this the project has also been funded by several private donations, which were given to the project in the aftermath of the Fukushima disaster.

Safecast has received a number of grants to fund the development of the platform. The most significant of these is a $400,000 grant from the US based Philanthropic foundation the Knight Foundation, to develop a real-time map of air quality in U.S. cities.

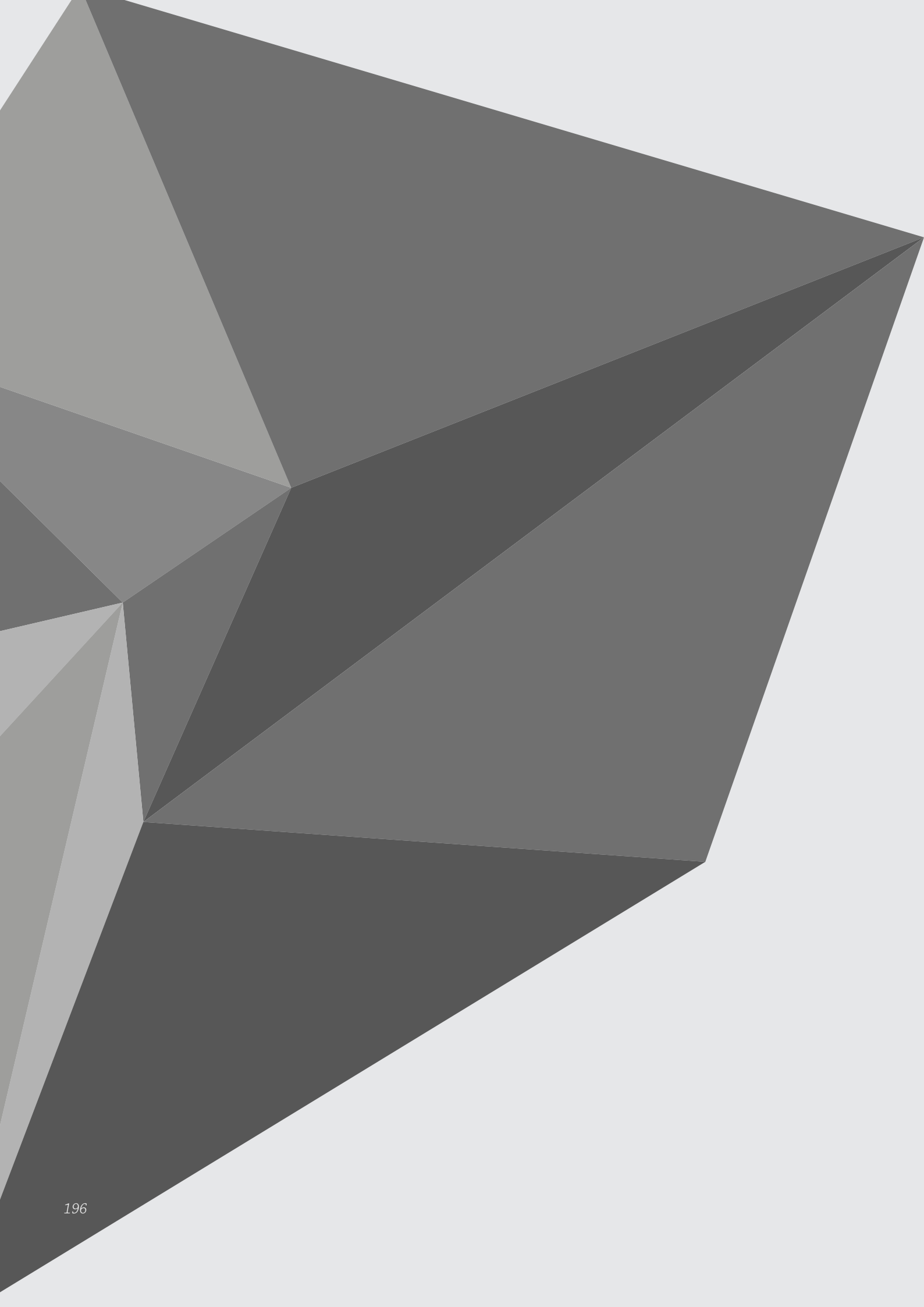
In addition to this Safecast collaborates with, and receives nonfinancial support from, other institutions such as Scanning Earth Project at Keio University, Uncorked Studios, and Global Survey Corp, among others.

What are the main barriers to innovate?

Safecast does not work with the Japanese national government due to a lack of the transparency of the information provided by them.. This provides a barrier in access to public data as well as distribution of data through public channels. However, while this one hand can be seen as a barrier it was this challenge that lead to the development of the Safecast approach.

What helps to reach goals and overcome barriers?

Needless to say the access to open soft and hardware as well as social media has been instrumental in the success of Safecast. In addition to this, it can be argued that the success of the network was a combination of the identified unmet need, a lack of open and accurate measurement data, combined with intense media attention in the wake of the Fukushima disaster. This helped 'get the word out' and mobilise a large community of backers and volunteers around a common cause.



Smart Citizen Kit

At a glance:

Type of Organisation:	Academia and Research Organisations
Aim:	Health and wellbeing, Energy and environment
Technology Trends:	Open Networks, Open Data, Open Knowledge, Open Hardware
DSI activities:	A network, operating a web service
Key facts:	More than 400 active users and more backers
Website:	http://smartcitizen.me/

Organisation Name

Fablab Barcelona

Short description

The Smart Citizen Kit is a set of tools (mostly sensors) built on an Arduino open hardware platform. These tools enable anyone who purchases the kit to contribute to the collection of environmental data, which it is hoped can be used to generate useful research and analysis.

The Smart Citizen Kit project creates a platform to generate participatory processes of people who own the kit. Through connecting data, people and knowledge, the objective of the platform is to serve as a node for building productive and open indicators, and distributed tools, and thereafter the collective construction of the city for its own inhabitants.

Type of organisation

Smart Citizen Kit is a research organisation. The project is born within Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia, both focused centres on the impact of new technologies at different scales of human habitat, from the bits to geography. It was developed in collaboration with Hangar, an AAVC (Association of Visual Artists from Catalonia) initiative that legally belongs to the AAVC Private Foundation.

History and mission

There are two core aims of the SmartCitizen projects. Firstly, it wants to produce new types of data and information which people previously couldn't get good access to. For example what are the real levels of air pollution around your home or business? Or what are levels of noise pollution and humidity? Secondly, the projects aims to empower citizens to participate in making the city better environmentally.

Organized by the FabLab Barcelona, based at the Institute for Advanced Architecture of Catalonia (IAAC), an international team of scientists, architects, and engineers are experimenting with ways to humanize environmental monitoring, and bringing the capture and analysis of city data as close to the public as possible. Tomas Diez, who directs Fab Lab Barcelona, and faculty at IAAC, who initiated the Smart Citizen project, is an urbanist specialized in digital fabrication and its implications on future cities' models. His research focuses on the use of digital tools for the transformation of physical reality to find a more fluid relation between machines and humans. Therefore he has always been interested in different data that is around the city, as well as how citizens interact with it. Believing that citizens can interact with the city data more often and in an easier way, Tomas and a group of people started to look into the existing products sensors and devices, but couldn't find solutions on the market that were both good and cheap. As a result they decided to build the devices to collect and share data themselves, and make this a tool that could be used by citizens. At the IAAC Tomas met a group of people who were working on similar project prototype. Together they formed the initial team of project Smart Citizen Kit.

What does it do, and how does this activity enhance social innovation?

The Smart Citizen Kit is based on two core components; the 'kit' itself and the platform used to share data between people operating a kit.

The Smart Citizen Kit itself is a an electronic board based on the open hardware solution Arduino, equipped with sensors that can capture data on air quality, temperature, noise, humidity and light. The board also contains a solar charger and a WiFi antenna that enables the direct upload data from the sensors in real time to the online platform

Anyone who has owns a kit, eventually becomes part of a wider network of users, who will capture, collate and share their data online on smartcitizen.me/pages/sck online platform. The platform is open to anyone, as is the date captured and uploaded to the platform.

The IAAC team behind the platform is very research oriented, and their aim with the kit is a focus on the use of digital technology and open hardware for the development of a citizen based platform for the city. With the sensors the team tries to make it possible for citizens to know the data, share it instantly and compare with other places in the city in real time, and thus help improve the environment quality.

What is the social impact it is seeking, including any evidence of impact to date?

Smart Citizen sees itself as acting as a bridge between more typically technical and non-technical citizens, both seeking to solve environmental challenges in unconventional ways.

Let the citizen know better of the city, motivate citizen to and to be able to participate.

The true value of the Smart Citizen effort is to provide a tool for citizens to participate in environmental monitoring.

This citizen-led approach, dubbed the Smart Citizen project, fosters participation of the general public in the process of producing open data used for the purpose of monitoring the environment. It focuses the impact of new technologies at different scales of human habitat, from the bits to geography.

While the focus is on citizen generated data, the Smart Citizen Kit has attracted the attention of cities across Europe, such as Barcelona and Amsterdam, who are interested in using the Smart Citizen Kit in the city's work on improving urban environments. The Amsterdam Smart City project is, in partnership with Waag Society, planning on deploying the kit around the city in early 2014.

What is the role of the organisation within the DSI ecosystem?

The project team researches, designs and develops open hardware, which is also open source. The team also operates an open network, where all the sensors and kit-owners can share and compare data and information in real time. On a grander scale, however, the very ideas underpinning the Smart Citizen project is one that is being readily adopted in a number of cities across Europe, such as Barcelona.

What technological methods and tools is it using, and what did these enable that was not previously possible?

The Smart Citizen project is based on geo location, the Internet and relies on a range of open hard and software tools.

Open Hardware: The Smart Citizen Kit itself is built on the Arduino open hardware board.

Open Data and Open source: The web platform is developed with OpenStreetMap, Leaflet, Raphaël, jQuery, CakePHP, and many more. The actual project is open source and available on the open source platform Github. The fact that it is open has already led to replications of the kit for other purposes, such as the "Whale" project, where people placed the sensors in the sea to detect its condition.

Open Knowledge: As described in more detail below, the original financing of the kit happened via crowdfunding platform Goteo.

A number of technological developments have been fundamental in making the kit a reality, including:

Advances in technology which mean that there are now low economic barriers for users to purchase functional sensors

Easy capture and distribution of data

The generation of analysis and further research as a result of this open data being generated

Enhancing collaboration and engagement: DSI network effect

The Smart Citizen Kit itself is just a board with sensors attached to it. It is only when it is connected to a network of other sensors owned by people and organisations around the world that the kit and the smart citizen platform start to grow in value.

Building on this, the crowdfunding of the kit demonstrated the collective interested in a tool and service such as the kit.

How is the organisation funded?

To finance the project the Smart Citizen Kit team turned to the crowdfunding, via the Spanish Goteo crowdfunding platform. In June 2012, backers on Goteo raised 13,700 Euro for the project to make the very first 200 kits in March 2013. The project had to bootstrap in its initial phase, but was aided by the funds generated through crowdfunding platform.

The team returned to crowdfunding using platform Kickstarter in May 2013 once again, where it managed to raise $68,000 from 517 backers. The second round of crowdfunding helped the Smart Citizen team achieve their aim of purchasing bulk orders of hardware components to offer kits at the lowest possible costs, developing additional features for the smartphone app to interact with the hardware, and finalizing a 3D-printable, resilient enclosure.

What are the main barriers to innovate and how are they in the domain? What helps to reach goals and overcome barriers?

To be sustainable in working the data, motivate users to send data

Smart Citizen kit has its own community, where users collect and share the data online. But to keep users being motivated and therefore to keep the community active, is essential to what Smart Citizen Kit wants to achieve. In response to this challenge, the team is frequently designing new features and creating new activities on the online platform to engage the users.

To make the data and the technology meaningful: The team consider their Smart Citizen Kit as very effective data producers. The next step is to find how people can make use of the data and how the data can help people to participate. To achieve this, Tomas believe that it is necessary to make more and more people aware that they all can do something good with the data. “I think for Smart Citizen Kit it is important that people will feel it as a big name, like same important as IBM, otherwise it won’t work.” On one hand, the project is now slowly by slowly generating more attention, through people who are already participating. On the other hand, Tomas and his team are also working hard to get big companies and investors to support Smart Citizen Kit project, and to expose the idea to the public, letting more people know the name and be interested in becoming part of it.

Tor

At a glance:

Type of Organisation:	Non-profit
Aim:	Internet freedom and security
Technology Trends:	Open networks
DSI activities:	Operating a web service
Key Facts:	Tor has a staff of 30 paid developers, researchers, and advocates, plus many dozen volunteers who help out on a daily basis. In a year Tor has grown from 500,000 daily users worldwide to more than 4 million users.
Website:	https://www.torproject.org

Organisation Name

The Tor Project

Short description

The Tor project is a non-profit organisation that conducts research and development into online privacy and anonymity. It has developed software tools designed to stop people – including government agencies and corporations – learning web users location or tracking their browsing habits. It offers a technology that bounces Internet users' and websites' traffic through "relays" run by thousands of volunteers around the world, making it extremely hard for anyone to identify the source of the information or the location of the user. The software – the Tor browser bundle – can be downloaded and used to take advantage of that technology, with a separate version available for Android smartphones.

Type of organisation

The Tor Project is a US 501(c)(3) non-profit dedicated to research, development, and education about online anonymity and privacy.

History and Mission

Tor's strategic agenda is positioned to meet the privacy needs of the global online community, whilst continuing to leverage research and academic advancements in circumvention tools.

Tor, or The Onion Router, is a cryptographic technique first implemented by US Navy research to permit intelligence agents to use the Internet without being traced, by encrypting and routing communications through many different Internet servers. Subsequently, Tor has been developed by the US University MIT and by the California Internet rights watchdog the Electronic Frontier Foundation. Today, it is used every day

for a wide variety of purposes by normal people, the military, journalists, law enforcement officers, activists, and many others.

When it launched in 2002, the Tor project's emphasis was on protecting Internet users' privacy from corporations rather than governments. "We were increasingly concerned about all these websites - in the 2000/01 dotcom bubble, everyone was offering free services, and by free they meant 'we take all your information and sell it as many times as possible'," executive director Andrew Lewman told the Guardian in April 2012. "We wanted a way to give the control over your information to you, the user, not to have all these companies take it by default. And let you take decisions about do you trust Google, do you trust Amazon, do you trust the BBC, whatever."

The Tor project team explain how its users fall into a few main groups: normal people who want to keep their Internet activities private from websites and advertisers; those concerned about cyberspying; and users evading censorship in certain parts of the world. Tor notes that its technology is also used by military professionals – the US navy is still a key user – as well as activists and journalists in countries with strict censorship of media and the Internet. Campaigning body Reporters Without Borders advises journalists to use Tor, for example. Tor also cites bloggers, business executives, IT professionals and law enforcement officers as key users, with the latter including police needing to mask their IP addresses when working undercover online, or investigating "questionable web sites and services". For more mainstream users, it could mean running Tor so that your children's location can't be identified when they are online, or could mean a political activist in China, Russia or Syria could protect their identity.

After the NSA surveillance revelations in 2013, a new wave of users joined the service. Between 19 August and 27 August alone the number of people using Tor more than doubled to 2.25 million, according to Tor's own figures, before peaking at nearly 6 million in mid-September. It has since slipped back to just over 4 million.

What does it do, and how does this activity enhance social innovation?

Tor is a network of virtual tunnels that allows people and groups to improve their privacy and security on the Internet. It also enables software developers to create new communication tools with built-in privacy features. Tor provides the foundation for a range of applications that allow organisations and individuals to share information over public networks without compromising their privacy. The Tor network's 3000 volunteer relays carry 16 Gbps for upwards of half a million daily users.

Building on this, the team behind Tor describes themselves as undertaking four main activities:

Advancements in Tor's core technologies including real-time voice and video over the Tor network, improving usability, security and anonymity, stronger cryptography capabilities and exciting new tools designed to probe for censorship on the Internet. Supporting these technologies is the ongoing expansion of the Tor help desk volunteer pool, capabilities and languages to serve an even wider community.

Research that expands the understanding and challenges in privacy, censorship and freedom of expression online while creating state-of-the-art technology solutions.

Increasing awareness and understanding of privacy in an online world. Tor's team actively seeks out opportunities to attend conferences, facilitate conversations and provide teaching tools on the importance of information sharing in safe, productive environments.

Growth in Tor relays and bridges resulting in improved capacity, span and reliability of the Tor network. Tor is instituting several initiatives to expand the current pool of relay volunteers; with the goal of reaching more than 4,000 relay operators by the end of 2013.

What is the social impact it is seeking, including any evidence of impact to date?

Internet freedom and anonymity: The Internet offers exciting new opportunities for individuals to express their views, parody politicians, celebrate their favourite movie stars, or criticize businesses. Not everyone feels the same way though. Anecdotal evidence suggests that some individuals and corporations are using intellectual property and other laws to silence other online users. Ongoing trends in law, policy, and technology threaten anonymity as never before, undermining our ability to speak and read freely online. These trends also undermine national security and critical infrastructure by making communication among individuals, organisations, corporations, and governments more vulnerable to analysis. Using Tor protects you against a common form of Internet surveillance known as "traffic analysis." Traffic analysis can be used to infer who is talking to whom over a public network. Knowing the source and destination of your Internet traffic allows others to track your behaviour and interests. This can impact your chequebook if, for example, an e-commerce site uses price discrimination based on your country or institution of origin. It can even threaten your job and physical safety by revealing who and where you are.

For example, if you're travelling abroad and you connect to your employer's computers to check or send mail, you can inadvertently reveal your national origin and professional affiliation to anyone observing the network, even if the connection is encrypted.

The strongest evidence of the impact of Tor to date, is the fact that it has gone from around 500,000 daily users worldwide to more than 4 million users in 2013 and more than 3000 volunteers support the rerouting traffic which is fundamental to service.

What it the role of the organisation within the DSI ecosystem?

Recent revelations of the NSA's expansive surveillance programmes harm user trust in the digital ecosystem, stifle innovation, and lead to a harmful balkanization of the Internet. Internet users around the world must be able to trust that their information, communications and documents are safe and secure. The alternative is a race to the bottom where only those users who seek out complex, bolt-on security tools get protected communications, or worse yet become reluctant to use digital communications and avoid services that both improve their lives and drive commerce. Those of us in the technology sector, citizens at home, and constituents globally are asking what can be done to regain user trust.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Sensor Networks: "Onion routing" refers to the layers of the encryption used. The original data, including its destination, are encrypted and re-encrypted multiple times, and are sent through a virtual circuit comprising successive, randomly selected Tor relays. Each relay decrypts a "layer" of encryption to reveal only the next relay in the circuit, in order to pass the remaining encrypted data on to it. The final relay decrypts the last layer of encryption and sends the original data, without revealing or even knowing its sender, to the destination. This method reduces the chance of the original data being understood in transit and, more notably, conceals the routing of it. Needless to say, the connection between a global network of volunteers who help reroute traffic would not have been possible with technological advances in sensor networks and the development of the web itself.

Open source: The Tor software itself is open source and free for anyone to download and use.

Enhancing collaboration and engagement: DSI network effect

The strength of the Tor network relies on being able to relay traffic through a large network of routers owned by a global network of volunteers. As more routers are connected the strength of the network and its ability to provide privacy grows.

How is the organisation funded?

Tor's success is in large part thanks to the funding partners, including the Knight Foundation, The Broadcasting Board of Governors, SRI International, The United States Department of State, the Swedish International Development Agency and many individual donors. In addition to this Tor received support from research partners at the University of Waterloo (Canada), the University of Cambridge (United Kingdom), Georgia Institute of Technology and many others around the globe. Tor is able to leverage research and academic advancements to develop circumvention and privacy solutions.

What are the main barriers to innovate?

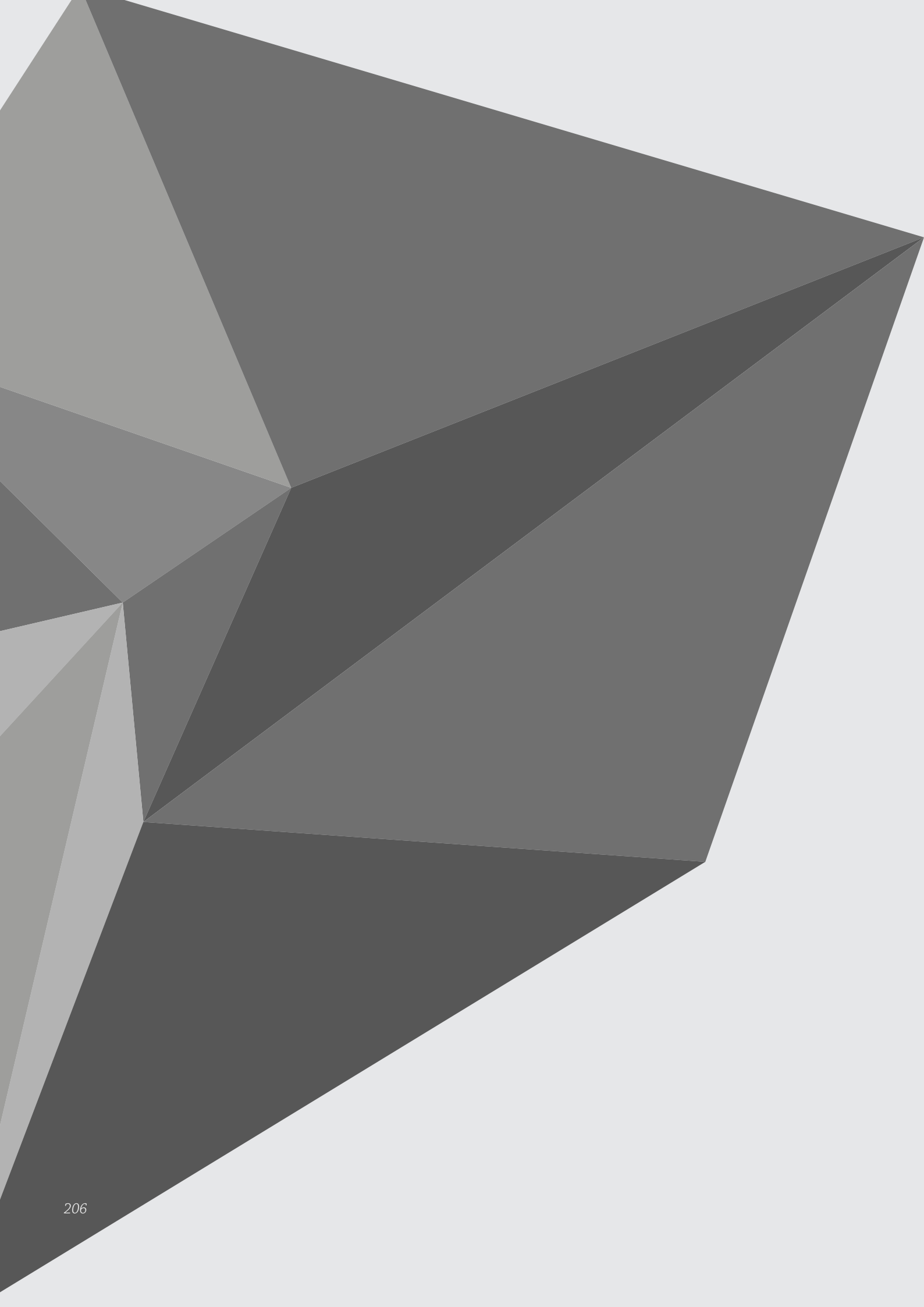
Naïveté: The majority of people using Tor are citizens who may simply want to stop advertisers from following them around the web. It's an issue that people are just beginning to think about now – especially in the context of sites like Facebook that attract advertisers with personal data that people opt to share.

Dark web: The cloak of anonymity provided by Tor makes it an attractive and powerful for criminals. Tor can mask users' identities, but also host their websites via its "hidden services" capabilities, which mean sites can only be accessed by people on the Tor network. This is the so-called "dark web" element, and it's not unusual to see Tor pop up in stories about a range of criminal sites. "We work with law enforcement a lot," Lewman told the Guardian. "They are fully aware of bad guys on Tor. However, the criminals already have all the privacy they could ever need, because they're willing to break the laws: they're willing to steal identities, they're willing to hack into machines, they're willing to run botnets." In a recent blogpost responding to the Freedom Hosting news, Tor also pointed out that hidden services aren't just used by criminals, pointing to organisa-

tions using the technology to "protect dissidents, activists, and protect the anonymity of users trying to find help for suicide prevention, domestic violence, and abuse-recovery."

What helps to reach goals and overcome barriers?

The main enabler behind Tor is the access to a global network of volunteers who make the out the network, that is the backbone of the service.



Ushahidi

At a glance:

Organisation Name:	Ushahidi
Type of organisation:	Grassroots communities; Businesses; Social enterprises, charities and foundations
Key Aims:	Participation and democracy; Other
Technology Trends:	Open data*; Open Knowledge

Organisation Name

Ushahidi

Short description

Ushahidi is a non-profit tech company that specializes in developing free and open source software for the collection, visualisation and interactive mapping of information. Some of its product offerings such as Crowdmap enable users to operate outside of traditional communication barriers to potentially monitor elections, map crisis information or curate local resources.

What type of organisation is it?

Ushahidi is a non-profit tech company.

History and mission

"Ushahidi", which means "testimony" in Swahili, is a website that was initially developed to map reports of violence in Kenya after the post-election fallout at the beginning of 2008. Since then, the name "Ushahidi" has come to represent the people behind the "Ushahidi Platform". In the aftermath of the election the Ushahidi was used to collect eyewitness reports from 'citizen journalist' of violence reported by email and text message and placed them on Google Maps. This website had 45,000 users in Kenya, and was the central to the Ushahidi team realising there was a need for a platform based on it, which could be used by others around the world.

Since early 2008 it has grown from an ad hoc group of volunteers to a focused organisation. The current team (of 22 full-time staff) is comprised of individuals with a wide span of experience ranging from human rights

work to software development. It has also built a strong team of volunteer developers primarily in Africa, but also Europe, South America and the U.S. Ushahidi describe itself as a 'disruptive organisation' willing 'to take risks in the pursuit of changing the traditional way that information flows.' To this end, Ushahidi builds technological tools for democratising information, increasing transparency and lowering the barriers for individuals to share their stories.

What does it do, and how does this activity enhance social innovation?

The main services provided by Ushahidi are three free software products that enable social activism and public accountability, through crowdsourcing of information from citizen observers by mobile phones or the Internet. The three Ushahidi products are:

The Ushahidi Platform: The Ushahidi platform was built as a tool to easily crowdsource information using multiple channels, including SMS, email, Twitter and the web

The SwiftRiver Platform: SwiftRiver is an open source platform that aims to democratize access to tools for filtering & making sense of real-time information

Crowdmap: When you need to get the Ushahidi platform up in two minutes to crowdsource information, Crowdmap will do it for you. It's the hosted version of the Ushahidi platform.

Ushahidi's platforms gather information from a variety of locations (and for various purposes), which is then verified by administrators and visualised on a map or a timeline. Previous applications of the technology range from monitoring elections in the Congo, India, and Mexico to tracking the availability of medical supplies in Kenya, Uganda, Malawi, and Zambia, as well as assisting the coordination of disaster responses in Haiti, Chile, Palestine and Russia.

What is the social impact it is seeking, including any evidence of impact to date?

After a devastating earthquake hit Haiti in 2010, the Ushahidi platform was used to report locations of collapsed structures, damaged schools and roads in the nation's capital, Port-Au-Prince. Alongside this the platform allowed people to highlights fires, contaminated water supplies and trapped people.

In an evaluation of the Ushahidi Project Haiti (UHP), involved stakeholders described how lives were saved as a result of the platform. In terms of figures gathered in this regard, upwards of 40,000 reports were processed through the platform, and 3,584 events have been mapped in Haiti. Of these, 80% were mapped in the first month and 72% of all points were mapped in Port Au Prince.

Other examples that illustrate its relevance during the Haiti crisis include:

The Department of State analysts for the USG interagency task force used Ushahidi in at least one case to help triangulate conclusions about the situation on the ground

US military organisations used Ushahidi data feeds along with other sources in a similar manner to inform their early situational assessments

There is also some evidence of the information being used for specific operational and tactical actions targeting specific communities (and to a much lesser extent, individuals).

US marines used the information to identify "centres of gravity" for deployment of field teams to areas of need, for example.

The organisation NYC Medics were able to identify the Albert Schweizer Hosptial as an institution with capacity to use the doctors and supplies that the organisation was able to mobilise.

There is also evidence that the volunteer geo-location services offered by the UHP core team were useful for SAR efforts, for example through the resourceful geo-coding efforts of Anna Schultz at Tufts University, among others.

What is the role of the organisation within the DSI ecosystem?

Ushahidi seeks to enhance good governance (through greater transparency around elections, etc.); democratise the dissemination of information in real-time, and allow for greater efficiency in disaster response.

What technological methods and tools is it using, and what did these enable that was not previously possible?

Open Knowledge: At the heart of Ushahidi is the use of online map services to crowdsource the mapping of local information. The site allows the use of OpenStreetMap maps in its user interface, but requires the Google Maps API for geocoding. Ushahidi is often set up using a local SMS gateway created by a local FrontlineSMS , a free open source software that can be used to distribute and collect information via text messages.

The case of the Ushahidi Project Haiti offers an interesting illustration of the potential of collaborative technology in instances of human disaster. The UHP information was used primarily because it was the only map aggregator of information coming from the affected area during the early days after the earth quake. The credibility of the project and project team was often cited as a reason for the continued use of the information, and high levels of trust built through common graduate academic programmes and pre-existing professional networks such as the International Network of Crisis Mappers cannot be underestimated.

Enhancing collaboration and engagement: DSI network effect

Collaboration through digital technology is critical to the sustainability of the Ushahidi's mission, as the organisation relies wholly upon the collaboration of 'citizen journalists', with the digital infrastructure built by the Ushahidi team enhancing their information-sharing mission.

How is the organisation funded?

Ushahidi relies on grants and donations from foundations, other charitable organisations and individuals who share a belief in the company's mission. Donations can be in cash or in kind – for example, people can volunteer to assist with various aspects of Ushahidi's operation. Volunteers with "coding chops" are particularly highly prized by the company.

In 2009, Omidyar Network invested $1,400,000 to enable Ushahidi to establish a Nairobi base with an expanded team; develop new technologies to enhance its platform; and grow its partnerships with media organisations and NGOs.

On December 1st 2011, Ushahidi has also received funding from the Ford Foundation. The Ford Foundation provided a $500,000 grant to Ushahidi over 2 years. This funding was secured to help Ushahidi to increase their community engagement capacity, scale the Crowdmap platform and provide operational support in 2011 and 2012.

Consulting Services

As a result of the extensive experience the organisation has gained in customising their platform for multiple purposes worldwide, Ushahidi have adapted their business model to offer new opportunities for collaboration through information-sharing – offering technology customisation and strategic consulting services to a wide range of clients (including Al-jazeera, the World Bank and the United Nations).

What really helps achieve these goals?

Ushahidi has announced the development of a USSD (unstructured supplementary services data) app to reduce the time it takes to process reports and manage the flood of SMSs coming through its platform to allow for greater efficiency in their management of information. According to Ushahidi, this USSD app could go a long way in reducing the amount of time it takes to process reports that come in via SMS, through the simple structure it provides.

Sustainability

In the case of Haiti, the UHP has made a great effort to transition the work they started, and continues to be a resource to the emergency response community there. A Haitian partner, Solutions, was identified to take over the website including overall management of the call/SMS centre function, and a micro-tasking NGO called Samasource that focuses on providing jobs in poor and disaster-affected communities through micro-tasking continues to support the project from a centre near PaP.

At an international level, the UHP experience has propelled crisis mapping and the International Network of Crisis Mappers to a larger response community and has resulted in dramatic growth in the crisis mapping community. Furthermore, evidence of sustainability can also be found in the deployment of similar but improved crisis mapping activities in more recent disasters, such as the quake in Chile and floods in Pakistan later in 2010. The sustainability of the crisis mapping community has also been enhanced by the strong links that Ushahidi and the crisis mappers have established with academia, and it should also be noted that a Standby Volunteer Task Force was launched at the International Conference on Crisis mapping (ICCM) 2010 precisely to aid in sustainability and preparedness.

What are the main barriers to innovate?

Detailed research has been carried out on the deployment of Ushahidi in the case of Haiti. For this reason it will be used to illustrate some of the challenges encountered by the organisation:

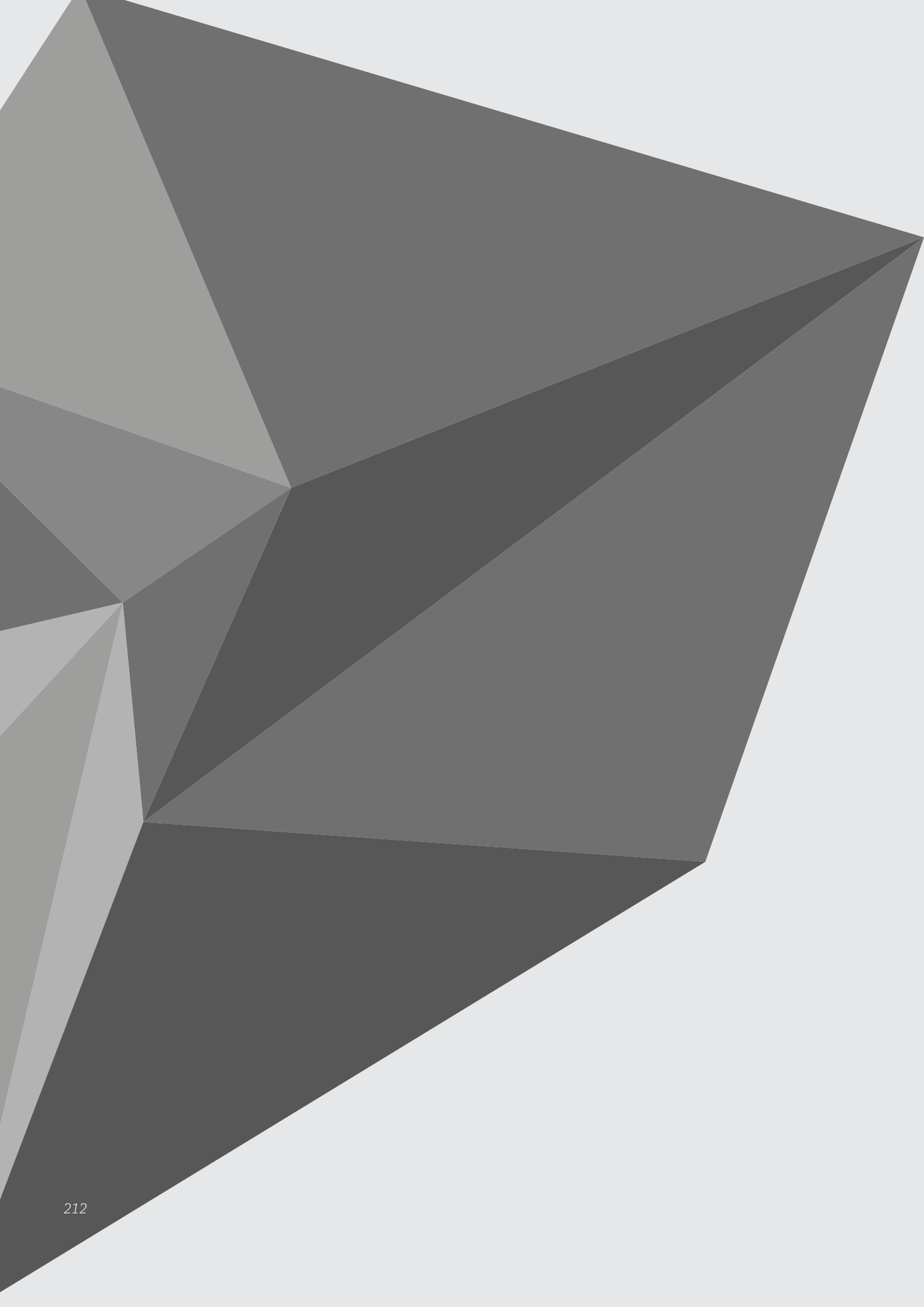
In the initial stages, "event data" generated by UHP did not meet the rigid requirements of traditional crisis response organisations. The UHP team indeed made efforts to adapt to these requirements but it is still cited as a significant obstacle to use throughout the early response. Information overload remains an issue in general for these responders (USSD app should allay this problem somewhat)

Use was also limited due to apparent low awareness of the project within the humanitarian community in Haiti, along with low knowledge of and capacity to use the crowdsourced information and the indistinct "corporate identity" of the organisation.

Interviews also revealed some general "suspicion of the crowd" and related questions about the representativeness and quality of the data.

Several technological limitations to information use. USG staff cited outdated computers, browsers as well as Internet communication security policy as significant obstacles to accessing the UHP website and data streams. Limited bandwidth was cited by organisations on the ground in Haiti.

Finally, lack of Internet connection and mobile phone networks that are down (which was the case in parts of Haiti after the earthquake) has also been cited as a barrier to using the platform in rural areas and areas hit by a natural catastrophe.



Zooniverse (citizen science web portal of CSA)

At a glance:

Type of Organisation:	Academia and research organisations
Aim:	Education and skills
Technology Trends:	Open knowledge
Key Facts:	More than 878, 000 of Community Members Worldwide (as of 30/10/13)

Organisation Name

Citizen Science Alliance

Short description

The Citizen Science Alliance is a collaboration of scientists, software developers and educators, who collectively develop, manage and utilise Internet-based 'citizen science projects' in order to further science itself, and the public understanding of both science and of the scientific process. These projects use the time, abilities and energies of a distributed community of citizen scientists who act as collaborators. CSA's projects are housed on Zooniverse – the 'home of Citizen Science on the web.'

Type of organisation

Zooniverse is a project of the run by the Citizen Science Alliance (CSA) via its web portal. The CSA is a collaboration of scientists, software developers and educators primarily coming from universities and public institutions.

History and mission

Zooniverse grew from the original Galaxy Zoo project first launched in July 2007. Galaxy Zoo set out the blueprint used throughout Zooniverse's applications, by crowdsourcing the analysis of astrological datasets to the public. Following Galaxy Zoo's visible success, the applicability of this 'open knowledge' model is evidenced by the fact that the Zooniverse site now hosts more than a dozen projects which allow volunteers to participate in scientific research. Unlike many early Internet-based citizen science projects (such as SETI@home) which used spare computer processing power to analyse data, known as volunteer computing, Zooniverse projects require the active participation of human volunteers to complete research tasks. Projects have been drawn from a diverse range of disciplines including astronomy, climate science, ecology, humanities and cell biology.

What does it do, and how does this activity enhance social innovation?

The Citizen Science Alliance's mission is principally to create online citizen science projects to involve the public in academic research. Yet looking to the circumstances that gave rise to the project's launch, it is clear that Galaxy Zoo (Zooniverse's pilot project) first came about as a means of handling the enormous volumes of data by enlisting the help of public volunteers.

Over-burdened academic departments very often have neither the time nor the resources to dedicate to processing this backlog of data. Similarly, a growing challenge for scientists is analysing large datasets – tens or hundreds of thousands of images, records, or pieces of information that together make up a major research project. Some of the most important data is in forms that computers still can't process, but that human beings can.

This is where the uniting of 'citizen science' and open data forms a powerful synergy; using the web to provide a means of reaching a much larger audience willing to devote their free time to collaborative projects through crowdsourcing initiatives like Zooniverse. Here volunteers give their time to help with a range of scientific projects, such as the formations of galaxies, patterns of climate change and the classification of cancer cells.

In recent times, Zooniverse has adapted its design model somewhat. With the launch of Zoo Tools (discussed more fully below) volunteers who seek to interact with the data in a deeper way are given a greater platform to do so. Likewise, with the shift to an open source development model (as of February 2013) it is hoped that a community of volunteer developers will be able to assist in the localisation support of the site (translating the content into other languages) – thereby having a positive impact on the outreach of the Zooniverse projects.

The Cell Slider project exemplifies the potential of Zooniverse's citizens science projects to be used for positive social outcomes. Cell Slider, which is a collaboration between Zooniverse and Cancer Research UK, aims to harness the collaborative force of crowdsourcing to help advance cancer research, which has been restricted in recent years by the sheer abundance of 'big data.' Volunteers are presented with a series of image or 'slides'. Each of these images is a tiny tumour sample from a huge dataset. By identifying and classifying the coloured sections of the image

using prompts, volunteers are directly assisting cancer research scientists to accelerate the analysis of this data and 'bring forward the cures for cancers.' The palpable social impact of this project has certainly been a factor in its wide uptake: almost 2 million images have already analysed.

What is the role of the organisation within the DSI ecosystem?

Zooniverse partners with a number of other academic and research organisations to customise citizen science projects, and advance research through open knowledge and open data.

What technological methods and tools is it using, and what did these enable that was not previously possible?

In the Zooniverse there's a clear separation between the API (Ouroboros) and the citizen science projects that the community interact with. Ouroboros is a custom-built, highly scalable application built in Ruby on Rails that runs on Amazon Web Services and uses MongoDB, Redis and a few other technologies.

Scalability: Pretty much all of the site's requirements point to having a shared API (Ouroboros) that serves a large number of projects. Running a core API that serves many projects relies very much upon the maintenance and health of that application. Should Ouroboros encounter technical difficulty, then the API would currently take out about 10 Zooniverse projects at once – and this is only set to increase. This in turn necessitates a lot of thinking about how to scale the application for times when the site is busy while also spending significant amounts of time monitoring the application performance and tuning code where necessary. The cost of running such an operation has been cited as a factor – running a central API means that when the Zooniverse is quiet and there aren't many people about, the number of servers they're running can be scaled back to a minimal level ('automagically' on Amazon Web Services).

The actual citizen science projects that people interact with are these days all pure JavaScript applications that are hosted on Amazon S3 and they're pretty much all open source. They're generally still bespoke applications each time but share common code for talking to Ouroboros.

The case of Galaxy Zoo offers an interesting anecdote of how technology might be used to tap into previously overlooked resources (i.e. opening up data analysis to the public) to process big data sets quicker, while simultaneously advancing scientific research. As mentioned above, the project was launched in 2007 to help process a data set made up of a million galaxies imaged by the Sloan Digital Sky Survey, who still provide some of the images in the site today. With so many galaxies, it was assumed it would take years for visitors to the site to work through them all, but within 24 hours of launch the site received almost 70,000 classifications an hour. In the end, more than 50 million classifications were received by the project during its first year, contributed by more than 150,000 people.

Furthermore, data analysed through crowdsourcing in this way provides quantitative estimates of error thanks to multiple independent interactions with the data.

Enhancing collaboration and engagement: DSI network effect

The very success of Zooniverse's projects relies upon the time, abilities and energies of a distributed community of citizen scientists who act as collaborators. It is this collaboration of 'citizen scientists' (i.e. voluntary public users) with research institutions (academic and otherwise e.g. CRUK) that allows the massive volumes of data to be processed through a platform of open data.

Yet since the very first days of Galaxy Zoo, projects have seen volunteers go well beyond the main classification tasks to offer amazing contributions to their respective fields. For instance, the data collected from the various projects has led to the publication of dozens of scientific papers. With the launch of Zoo Tools users have been given yet another platform to collaborate with the data generated even further. This application will offer community members tools of analysis to enable them to interact more deeply with the data generated.

In addition to this, the decision February 2013 to start making Zooniverse "officially" open source has allowed for new avenues for collaboration to be pursued other than the analysis of data. While Zooniverse had not made the move to open source a priority (because behind the scenes they had been willing to share their coding with anyone who had approached them –"often talking them through the thought process that led [them] to design our software in a particular way") – the decision to move to an entirely open source paradigm was made so as to broaden the tools available to enable people to start projects of their own.

This open source development model allows a community of developers to flag any bugs to the Zooniverse developers; to contribute towards the creation of new projects; but also to assist in the site's localisation support (translating sites into multiple languages). This latter point demonstrates how this process of collaboration can aid in the scaling up and doing outreach on the organisation's mission.

What really helps achieve goals?

Presenting the public with the opportunity to play a part in scientific research seems an integral part of Zooniverse's overall success. Take for instance the case of Galaxy Zoo. While it the origins of the initiative might be principally thought of as a means of handling huge volumes of data, a survey carried out with Galaxy Zoo volunteers in 2009 revealed that of the 10,000 respondents surveyed the primary self-reported motivation was to contribute to research. This suggests that there is a latent desire to help with scientific research, and indeed public response to these projects can be enormous; (an estimation offered by Zooniverse suggested that while it was a team of two alone employed at Galaxy Zoo throughout a period of 14 months, the total power offered up by volunteers was the equivalent of employing a single classifier for more than 110 years.