Digital technology in social innovation

a synopsis

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Introduction

About this paper

The overall objective of Tepsie project's Work Package WP8 (using online networks to maximum effect) is to examine the extent to which, how and why, online networks and other digital tools are being used by, and having an impact on, social innovation. In this paper the overall term digital technology in social innovation is used, but this is often shortened to ICT in social innovation, where ICT stands for Information and Communication Technology as a standard abbreviation. There is much evidence that ICT substantially changes the character of communication, relationship building, collaboration platforms, information access and data usage, social choices, service models, financing and much more. However, there has been little focused work to date on the relationship between ICT and social innovation. This paper attempts to provide a short synopsis of Tepsie's work in this area to fill this gap, at least partially,

Definitions and terminology

Tepsie defines 'digital technology in social innovation' as the use of ICT as online networks and other digital tools to support and/or enable social innovation. By 'support' it is meant that a specific social innovation is taking place anyway but that it is, in some way or other, significantly improved by deploying ICT. By 'enable' it is meant to imply that a specific social innovation would not happen without ICT, and could even lead to completely new types of social innovation appearing. In turn, Tepsie defines social innovation as new approaches to meeting social needs which are both social in their means and in their ends, and which engage and mobilise the beneficiaries and help to transform social relations by improving beneficiaries' access to power and resources (see Tepsie deliverable D1.4 for a full exposition of this definition of social innovation).

Tepsie includes in its approach social innovations which use digital tools alongside traditional tools and approaches, so that, for example, it is not assumed that final users and beneficiaries necessarily themselves use digital tools, but that such tools are used in significant ways by one or more actors, or in one or more parts of the value chain, to support or enable social innovation.

With the rapid growth of cheap, ubiquitous and powerful tools like the internet, the world-wide-web, social media and smart phone apps, new ways of carrying out social innovation have become possible whilst many existing ways have been strengthened. Often this means the barriers to social innovation in terms of communication, outreach and scaling have been reduced and thresholds lowered. For example, the so-called 'sharing economy' is blossoming in which people can share cars, tools, accommodation, and even their time and skills. This is now possible more than ever before using the internet or mobile apps to link, almost instantaneously and regardless of distance, people with a social need to others who can meet that need. Digital technology can also be transformational and open new perspectives on social innovation, such as the use of so-called 'big data' to collect and analyse data of what social needs are being experienced by which people in different places at different times. Using new digital technologies can also open new perspectives for locally manufactured and very cheap products for people who otherwise have no chance of being helped. For example, using digital tools to scan and analyse injuries and to develop designs for replacement prosthetic limbs, which can then be transmitted by the internet to war victims in developing countries as algorithms for local 3-D printing, production and use.

This synopsis paper draws on all Tepsie's WP8 work and particularly the case study report (deliverable D8.3) and the synthesis, gaps and recommendations report (deliverable D8.4-D8.5).

Thirty in-depth case studies were analysed in these two reports, selected after comprehensive desk research to reflect successful cases across five themes derived from the Europe 2020 Strategy[1] and the Horizon 2020 research and innovation programme[2]. Each theme is further subdivided into three focus areas:

Overview of the five themes and their focus areas

Theme	Focus Area
Employment	• Preparing for work • Finding work • Creating and doing work
Place making	• Smart places • Local community development • Civic engagement and activism
Sharing Economy	• Exchanging time and talent • Activating the value of dormant assets • Creating viable shared assets
Health	• Preventive and self help • Personalised and smart patient environments • Supporting smart infrastructure for integrated health and social care
Education	• Widening access to education • Personalised education and new learning environments and knowledge commons • A multi-partner approach to education

There are a number of common terms or abbreviations used in this report which require brief explanation:
- Standard ICT: refers generally to off-the-shelf, readily available ICT for acquisition or purchase through mainstream ICT outlets which requires no or very minor adaptation prior to or during use. This means that development costs are shared amongst all users, thus keeping the price low. It is also implies that the ICT is generally easy to use as it is can often become a standard product or service used by many.
- Bespoke (tailored) ICT: in contrast with standard ICT, is specially made or adapted (by the supplier or the user) prior to or during use to include very specific features only required by the user. This means that development costs are largely borne by the user alone, thus the price tends to be high. It also implies that the ICT generally requires special training for use as it is often unfamiliar being not a standard product or service but only used by relatively few users.
- Traditional activities: refer to activities or processes which are used traditionally in social innovations both with or without ICT, and can include physical activities as well as media tools like TV, radio, the telephone, etc.
- Physical activities: refer to activities or processes which are physical, such as human face-to-face, print media including the press, events like meetings workshops, conferences, etc.

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[1] http://ec.europa.eu/europe2020/
[2] http://ec.europa.eu/programmes/horizon2020/

The use and role of ICT

Standard and bespoke ICT

- Most successful use of digital technology in social innovation seem to take place using relatively standard off-the-shelf ICT, i.e. readily available and inexpensive ICT for acquisition or purchase through mainstream ICT outlets which requires no or very minor adaptation for use. Where bespoke ICT, i.e. which is specially made or adapted prior to or during use, is used standard ICT is used alongside it. This shows that most social innovations using ICT are not at the technology leading edge, but that the ICT is generally easy to use as a standard product or service used by large numbers of people in many different contexts and for many different purposes. In such cases, this also implies that lack of ICT skills is rarely a huge barrier and can often be relatively easily overcome, even when the beneficiaries constitute a disadvantaged group with low overall skills and low access to resources, although improving such skills may still be required in some cases.
- Most cases using mainly bespoke ICT are in health, and to some extent also in education, given ICT developments in advanced back-end systems which typically characterise their public and/or private sector origins and partnership, but these are always linked to ordinary users through standard interfaces. Health and education often exploit the so-called 'digital data dividend' as these sectors produce huge amounts of data enabling all or most routine, data- and analytics-heavy tasks and processes to be carried out digitally. This should save and/or better use resources, thereby freeing personnel to concentrate on highly varied and non-routine 'hands-on' human and personal services.

ICT and traditional activities

- The majority of Tepsie's 30 cases also use ICT in support of or alongside traditional activities like mass and print media, as well as physical face-to-face activities through co-creation, cooperation, socialising, meetings and other events. However, there are clear differences between themes, so that cases in the employment, place making and sharing economy themes almost always use standard ICT alongside more traditional and physical activities given they are often initiated and operated bottom-up by civil society organisations, often in contexts with a rich history of activity and achievement before ICT became more or less ubiquitous. ICT is typically not a simple add-on channel, but is instead often quite transformatory enabling new things to be done (see below), although it is generally embedded in existing human-based physical relationships and activities.
- The picture looks a bit more mixed in the health and education. Traditional and physical activities alongside ICT do not feature prominently in some of the focus areas, where, as noted above, there is also a greater tendency to use bespoke technology. In the health cases, this seems to be because users are more likely to be linked to relatively large scale and often institutional or private sector ICT systems designed to be stand-alone and highly efficient.

Overview of the use of digital technology in social innovation across five themes and their focus areas

Theme	Focus area	Standard ICT	Bespoke ICT	Tradi-tional	Online community	Offline community	Supporting SI	Enabling SI
Employment 7 cases	Preparing	✓		✓	✓	✓	✓	
	Finding	✓		(✓)	✓	✓	✓	✓
	Creating	✓	✓	✓	✓	✓	(✓)	✓
Place making 6 cases	Smart places	✓		(✓)	✓	✓	✓	✓
	Community development	✓	(✓)	✓	✓	✓	✓	✓
	Civic activism	✓		✓	✓	✓	✓	✓
Sharing economy 5 cases	Time & talent	✓		✓	✓	✓	✓	✓
	Sharing assets	✓		✓	✓	✓	✓	✓
	Creating assets	✓	(✓)	✓	✓	✓	✓	✓
Health 7 cases	Preventive	✓	(✓)		✓		(✓)	✓
	Personalised	(✓)	✓		✓		(✓)	✓
	Integrated	✓	✓	✓	✓	✓	✓	✓
Education 5 cases	Widening access	✓	✓		✓	(✓)	(✓)	✓
	Personalised	✓	✓		✓	(✓)	(✓)	✓
	Multi-partner	✓		✓	✓	✓	(✓)	✓

Note: ✓ = major feature; (✓) = minor feature

Who is using ICT

- Although most ICT is used directly by the end-user beneficiaries, this is not always the case, especially when bespoke ICT is deployed. In such cases, the ICT tends instead to be used mainly by other actors in value chain, for example when ICT specialists design customised bespoke ICT systems, but also build in simple and easy to use interfaces for the individual beneficiary, i.e. bespoke ICT in the back-end is used to provide easy to use personalised and standard ICT at the front end. There are a few exceptions, however, such as in cases where the beneficiary already possesses relatively advanced ICT skills and/or other relevant competencies.
- There are also a few cases of successful use of digital technology in social innovations in which the beneficiary, whose social needs are being addressed and at least partially met, do not themselves need to use ICT at all, neither standard or bespoke. In such cases, ICT is used in a significant way by other relevant actors, such as by social entrepreneurs or intermediaries.

ICT is both supporting and enabling social innovation

- There are two overarching characteristics of digital technology in social innovation. First, ICT is used to 'support' existing social innovations, or existing types of social innovation, which are

significantly improved by deploying ICT. For example, ICT can support unemployed people to find employers or others needing work or tasks much faster and more accurately than traditional approaches.

- Second, ICT is used to 'enable' social innovations that would otherwise not happen, and this may sometimes even lead to completely new types of social innovation. For example, ICT is creating completely new social, business and governance models and value chains without unnecessary middlemen and which empower the individual looking for employment.

Online tools and platforms

- One approach to examining the role of digital technology in social innovation is to examine the value chain of online (digital) tools and platforms. This ranges from tools which focus on creating content and identifying unmet social needs at one end, through matching assets to needs, to those which focus on identifying solutions and taking action to meet those needs, at the other end.

- In most cases, ICT is used only in early parts of the chain, and this especially applies in the employment, place making and sharing economy cases in which much of the rest of the value chain is implemented using traditional and physical activities.

- However, again the health and also some of the education cases, stand out as initiatives where most of the value chain is digitised so that traditional and physical activities, although often present, are not key components of a successful case. This observation reflects the findings above that health and education tend to deploy bespoke ICT more often than the other themes, are less likely to rely on traditional and physical activities, and are more likely to be using ICT end-to-end along the whole value chain to enable new types of social innovation.

Generalised social innovation value chain and the use of digital technology
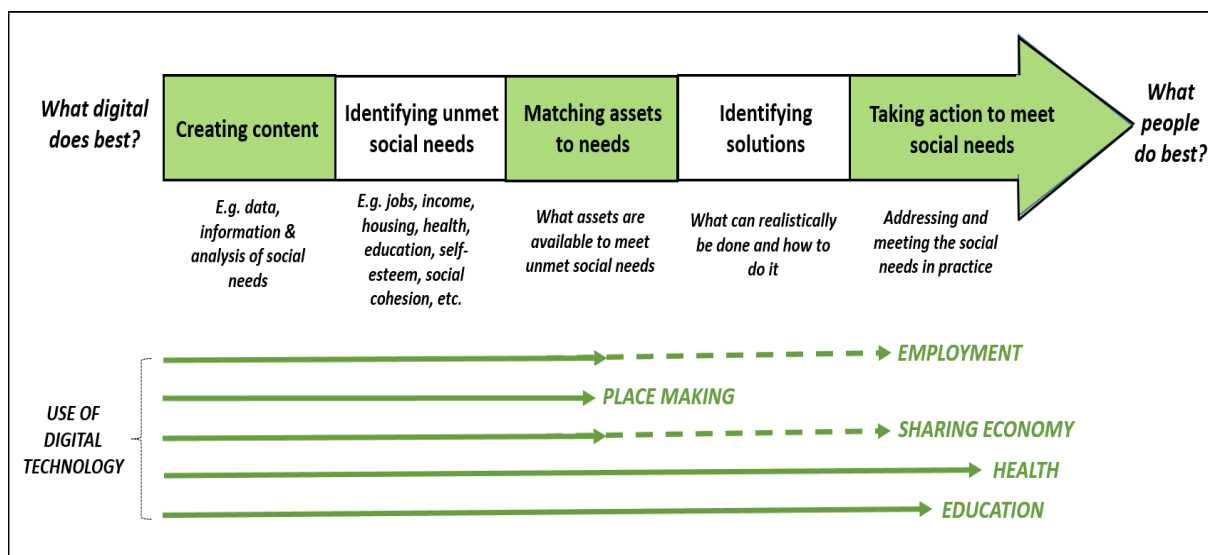
Further analysis along the value chain shows clearly that in many cases digital technology, on the one hand, and people on the other hand, seem mainly to focus on tasks which they are best suited to perform in a complementary symbiosis:

- What digital technology seems to do best:
    - Standard, rule-driven and codifiable tasks
    - Data and analytics heavy tasks
    - High speed, global reach

- Reducing transaction costs and increasing process efficiency.
- What people seem to do best:
  - Care, teaching, counselling, advising, advocacy, managing and undertaking uncodifiable tasks
  - Decision- and policy-making tasks
  - Creating, innovating, brainstorming, understanding, empathising, socialising.

Communities and social capital formation

- ICT can support and/or enable different types of communities, both online and offline, as well as different types of social capital. Again, there is noticeable cleavage between the employment, place making and sharing economy cases, on the one hand, and the health and education cases on the other. In the former group, both online and offline communities of knowledge and practice tend to develop together in mutual and complementary reinforcement, each feeding the other.
- In many of the health and some of the education cases, traditional and physical activities alongside ICT are largely absent and there is also a greater tendency to use bespoke technology along much of the value chain. For this reason, it seems, most health and many education cases primarily spawn online knowledge communities with little related activity seen in offline counterparts.
- This is also reflected in the types of social capital seen in the different types of cases. Bonding social capital, in terms of typically strong and rich ties, such as with family, neighbours, groups of like-minded people and work colleagues, tend to characterise the employment, place making and sharing economy cases underpinned by strong traditional and physical activities which complement online activity. In these cases, bridging ties as looser, more infrequent and less committed relationships often also develop, but as supplementary rather than as core feature.
- The situation is largely the reverse in the health cases and in some education cases, given that bridging ties tend to dominate in online knowledge communities, although there are several exceptions.
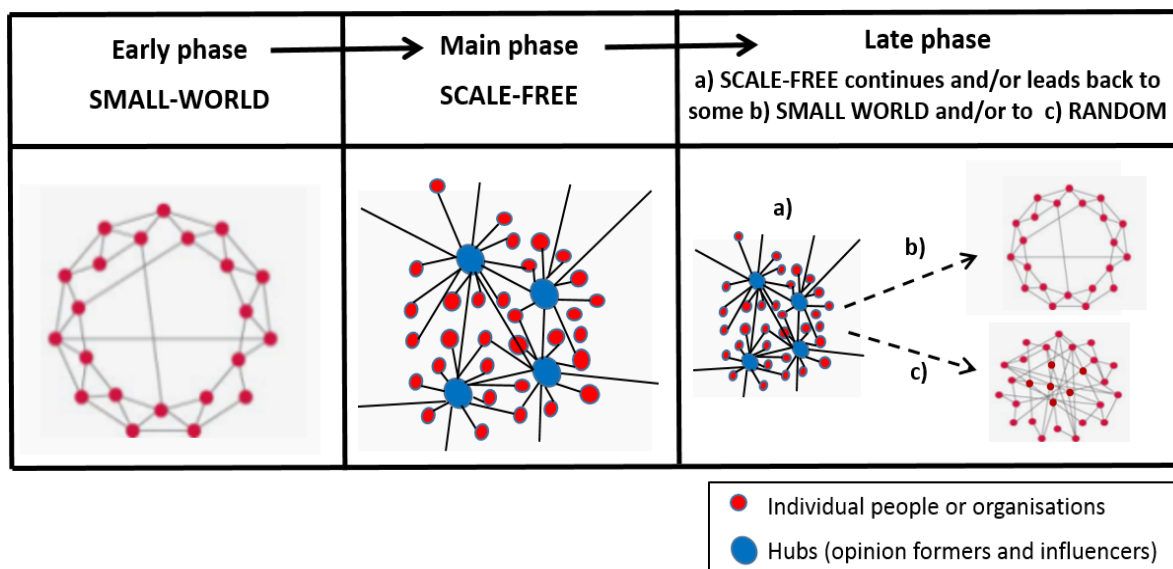
Networks and the social innovation scaling cycle

Unlike most of the above analysis, there is little difference across case themes or focus areas regarding how the network effect plays out, but instead significant similarity. A highly typical scenario is as follows.

- *Early phase – 'small world' network*: most social innovations seem to start through the efforts of a small group or champion with an idea which is then launched, often after some testing and piloting, within a limited area and amongst a limited number of actors and beneficiaries. Nearly all people involved have relatively small numbers of links to other people in the group, but nearly all of whom are interconnected to each other through one or more links as part of an inward-looking network with only few external links. ICT is typically used in this phase to speed up copying of the innovation and to spread awareness within the network, normally alongside traditional and physical activities. The policy and scaling implications of this type of inward looking network are to identify and target relevant groups to enhance in-group communication and change internal group behaviour on the group scale.
- *Main phase – 'scale-free' network*: once established and achieving success and impact, most social innovations start to get noticed elsewhere, by other target groups, localities and sectors and amongst other actors, whether or not this is a deliberate and conscious attempt to disseminate and scale. Normally the operators of the social innovation act as so-called 'hubs', or opinion formers and influencers who are the key actors in spreading the innovation out of

the original group. ICT is typically used in this phase to speed up copying of the innovation elsewhere and to spread awareness, with hub-to-hub interaction as the main mechanism, given that finding hubs and engaging with hubs becomes easier and faster than trying to reach the whole potential population. The policy and scaling implications of this type of expanding network are to identify and target the hubs, to convince them and change their behaviour, as well as to enhance their influence on their followers in order to maximise scale and widespread impact.

Networks and the social innovation scaling cycle

Early phase SMALL-WORLD	→ Main phase SCALE-FREE	→ Late phase a) SCALE-FREE continues and/or leads back to some b) SMALL WORLD and/or to c) RANDOM

- ● Individual people or organisations
- ● Hubs (opinion formers and influencers)

- *Late phase*: once the innovation has been spread and disseminated, the late phase tends to open up a number of different possible trajectories. First, a) this dissemination continues until it runs its course, or the innovation becomes mainstream or obsolete. Second, b) the original innovation spawns one or more new small spins-off groups or initiatives as small-world networks, perhaps as a completely new innovation. Third, c) more random and viral spreading takes place in so-called random networks which tend to be unstructured and highly open to chance events. In such networks, there are no or very few 'hubs' or 'gatekeepers' to cascade through, but once a likely innovation is identified and seems relevant and attractive, it can spread virally and very fast as it becomes more and more 'fashionable', often just because it is already popular in the first place. ICT is typically the main driver of random networks to dramatically speed up copying and to spread awareness.
- The policy implications of scaling through random networks are to focus on large scale digitally viral and other mass-media campaigns. However, given their randomness which can be more important than the innovation's fitness for purpose, the incidence of unsuccessful adoption, and thus of wasted resources, is likely to be relatively high compared with the other network types.

Social needs and social innovation outcomes

Social needs addressed span the spectrum of themes and focus areas selected

- *Employment*: work and jobs especially for the youth and people with learning difficulties, both monetised and non-monetised, tackling the digital divide, developing ICT and job skills, promoting self-esteem, and reducing social costs.
- *Place making*: place-related infrastructures, facilities and amenities; daily and long term psychological needs of the elderly and disadvantaged; poverty, unemployment and accommodation; the digital divide and developing ICT and job skills; promoting social cohesion and local activism.
- *Sharing economy*: basic daily needs tackling poverty, food, unemployment; focusing on unused and thus wasted assets, community development and activism; addressing environmental issues, new skills, the co-creation of services and goods, creating new collective assets and promoting social cohesion and transparency.
- *Health*: patient empowerment, independence, personalised health, collective experience, self- and mutual help, new skills, personal care, control over own health and life situation, access to health, and reducing costs to society.
- *Education*: learner empowerment, mass customisation, independence, personalised education, collective experience, self- and mutual help, new skills, access to education, lifelong learning, and reducing costs to society.

Correspondence between social needs addressed and social innovation outcomes achieved

- Significant improvements to prosperity, wellbeing and quality of life, and especially boosting the uniqueness and qualities of localities and places.
- Tackling problems of poverty, unemployment and all types of disadvantage and marginalisation, including loneliness and alienation, and improving personal lifestyles and confidence.
- Mobilisation and sharing of unused and underused assets of all kinds, tangible, intangible, monetised and non-monetised, with people as 'pro-sumers' and activists achieving increased voice in their own and others' cause, and developing new models for providing goods and services, intimately linked to people's needs and the capacity of the ICT network, which can be scaled up or down as necessary.
- Greater empowerment and control of both the beneficiaries' and other actors' own lives, work, communities, and activities in general, as well as improvements in personal and collective capacities and skills across all aspects of life.
- The bottom-up and grassroots nature of almost all cases, rooted in everyday challenges and finding sustainable solutions because these are 'owned' by the people involved.
- More flexibility, variety and modularisation of assets, solutions and means of achieving results, and strong moves towards the principles of mass customisation and personalisation.
- Reduced social disruption and increased cohesion, inclusion, trust and life satisfaction.

- Increased access to, and use of, local facilities and amenities, health and education services and resources.
- Many positive spill-over and multiplier effects elsewhere and on other initiatives, particularly in the employment, place making and sharing economy cases which tend to be broader in focus and scope than the health and education cases.
- All cases are scaling, disseminating or growing significantly, and the cases using ICT directly as a means of dissemination and networking, in addition to providing some or all of the basic functionalities of the social innovation, are scaling fastest.
- Objectives, participants, processes and outcomes tend to be transparent and open to interrogation, and this is also a task ICT can fulfil if appropriately deployed.

Social innovation processes and practices

The vast majority of cases have adopted many of the following social innovation processes and practices:

- A ubiquitous focus on collaboration, partnerships, relationship-building, cooperation and coopetition.
- A constant focus on building capacities, skills, motivation and self-confidence.
- A deep reliance on trust, responsibility and reciprocity in all activities and relationships.
- The prime importance of participation, involvement, activism, advocacy, campaigning, an increased voice for all and democratic processes.
- A lack of hierarchy with open decision-making and self-regulation around simple agreed and open rules, but also with flexibility.
- An awareness and building of community, localism and a sense of place, including through volunteering.
- The need to develop continuously ideas and knowledge, including through experimentation and on-going innovation.
- Mainly bottom-up and grassroots, rooted in real practice on the ground, and relatively small in scale and scope at the outset. Most cases retain these characteristics even though the majority have also have grown tremendously in scale and scope since their initiation.
- Increased beneficiary involvement, control, capacity, independence and self-esteem.

Governance: operations, strategy and policy

Operational and strategic issues

- Civil organisations tend more than others to be initiators and operators, and also in many cases funders. However, across the themes there is a large variety of mixes of public, private and civil sector initiation, finance and operation, which demonstrates that social innovation is indeed a multi-sectoral phenomenon.

- Organisational forms tend to be flat, informal, open, democratic, bottom-up, self-regulating and mutually supportive, even in many of the public and private sector organisations involved.
- Careful embedding of ICT is needed into the traditional activities in each theme in order to build on top of existing activities even when the potential changes brought about by ICT can dramatically change operations, business models and strategic considerations. New ways of using ICT are apparent, for example in the creating work cases where ICT is strategically deployed to align the types and processes of work and tasks to specific individuals and operationally to focus on what the individual can do rather what they cannot do.
- New strategic social and business models are typically needed based on coopetition, trust, ethics, transparency and responsibility, enabling new activities through efficiency, cheapness and flexibility. Many of these new models need to be pilot tested before roll-out, and in most themes they include the use and creation of both virtual and physical shared assets which are collectively owned and operated as both monetary and non-monetary business models. Many also involve shortening value chains and cutting out intermediaries who do not add value.

Policy implications

- A large range of social, economic and sustainability efficiencies and improvements can be made in the short, medium as well as long term. These include societal savings, both financial and non-financial, in the use of assets of all kinds, in the allocation and targeting of resources, as well as in public, private or civil sector interventions.
- Benefits also include improvements to personal lives, both domestic and in the workplace, community life and cohesion, as well as the inclusion of people, groups or localities previously excluded.
- At the individual level, involvement, participation, activism, as well as building trust, capacities, skills and self-esteem and confidence, are important.
- Developing relationships through involvement and reciprocity, both at local level through traditional activities supported by better information and connectivity, as well as through online communities and networks, are fundamental building blocks of successful social innovation. This is especially the case in situations where the two are complementary and mutually reinforcing, when ICT is used well and sensitively along some or all parts of the value chain.
- At the local level, it is important to support local visionaries and champions, including social entrepreneurs, in exploiting national and regional policies to create alternative social and economic models, both monetary and non-monetary.
- Appropriate European, national and local policies, as well as legal and regulatory frameworks, need to be conducive to the new social and business models which can deliver these benefits, including by enabling managed experimentation. However, they also need to mitigate the dangers of undermining some of the economic, social, community and individual benefits – which are fundamental to social innovation success – through exploitation, loss of rights, or loss or reduced quality of services.
- Policy and regulation must not only be appropriately conducive and wary of possible negative effects, but should also be proactively interventionist when warranted, for example in situations where specific demands need to be stimulated in relation to using open data, taking ICT training or even consuming healthy food or environmentally friendly products.
- Specifically related to ICT, focus should be on the availability, affordability, usability and quality of ICT infrastructures, products and services, as well as appropriate skills training at all levels.

Drivers and barriers

Digital technology

- Effective and affordable ICT infrastructures are seen as a driver of the use of digital technology in social innovation as it reduces activity costs if it can fit in well with many of the traditional and physical activities being undertaken. Digital technology when used appropriately enables much higher levels of personalisation and targeting than traditional approaches.
- There are generally not significant problems In terms of ICT skills and competencies, and overall there seems to be a relatively high level of digital literacy. For some groups, however, especially the more disadvantaged, there can be barriers when using ICT which is not always relevant or adequate even with simple interfaces, and there can be perceptions that ICT is an impersonal medium.
- There is some uncertainty about potential data and knowledge IPR (intellectual property rights) challenges when content is co-created, and there is concern about data security, quality and responsibility if there are specific problems. The open data ecosystem is often relatively weak, reducing its impact and, in turn, slowing the supply side. There is also reluctance and uncertainty about integrating ICT into otherwise complex traditional activities, such as in the education sector where it can be difficult to develop a sustainable online business model.

Financing and new service and business models

- Generally funding is not a huge challenge, especially for partnerships with good commercial and financial links, and often small amounts of start-up funding can be secured. However, this is likely to be at least partially because finance is not the major issue for initiatives typically involving civil organisations and volunteers and using inexpensive but powerful technology. One of the main drivers is public systems which are under pressure to save money, and the 2007-2008 crisis is often seen as the underlying catalyst of much development in this area.
- An important driver is the use of digital technology in social innovation initiatives to establish new service and business models which are both very efficient and effective, as well as have high impact. However, a big barrier is scaling up very small local initiatives to maximum impact, and it is often necessary to take risks by experimenting with new approaches.

Public policy and governance

- The majority of cases rely significantly on the driver of conducive national and local policies, and many deliberately attempt to align with these to obtain maximum benefit. However, there are also many examples where policy, legal, and regulatory frameworks constitute a barrier when they are not conducive, especially in the sharing economy theme.
- The vision and ability of local activists and champions is a critical driver in most cases. They typically initiate and operate cases and often also help fund them, as well as bring in appropriate partners and develop local solidarity. However, there are also many governance barriers in terms of organisation and the process of convincing and coordinating with partners. The trust barrier also needs to be tackled, particularly because of the mindset changes required, both in relation to social innovation itself but also in accepting that technology can be successfully used to help meet social need. Often, there are legacy issues around how work is done, the legal and administrative systems, as well as attitudes in general.

Synthesis

An overarching synthesis concerning digital technology in social innovation from Tepsie's WP8 work leads to the recognition of three main types of effect:

1. Supporting: digital technology is an important supporter of existing types of social innovation by increasing efficiency and effectiveness, facilitating better social innovation through greater connectivity, simplicity and convenience. In other words, it permits existing types of social innovation to function better with improved outcomes.
2. Enabling: digital technology enables new types of social innovation which deliver new impacts and new opportunities through the use of different combinations of online platforms, and the configuration of online communities and their relationships with offline communities. It also enables new network effects at a scale not possible without digital technology which enables collective, dispersed and large scale intelligence. By facilitating new types of bottom-up and decentralised forms of collaboration, they potentially open vast new fields of social innovation, which we have only recently begun to glimpse but yet not fully understand.
3. Transforming: digital technology can dramatically change and disrupt governance and framework structures in society, and help configure new types of social and business models not otherwise possible. This can be highly transformative of existing processes, roles and relationships, particularly because their forms and impacts are unpredictable. The potential is enormous as it re-balances the playing field in favour of a broader range of actors, even those who do not use ICT given that the role of intermediary civil organisations and communities is strengthened enormously.

According to a recent Global Innovation Index report[3], disruptive innovations that come out of nowhere are very rare —most are incremental changes built on the underpinnings of other knowledge, technologies or platforms. What is important for most innovations to occur is a set of enabling conditions that trigger people and groups with the right knowledge and skills to recognise (even serendipitously) an incremental step that can be taken at that moment in time. Digital technology, and especially the Internet, is now for the first time in history providing a quantum leap in these enabling conditions on an unprecedented and global scale. According to this Global Innovation Index report, we are now entering an era of 'inevitable', 'permission-less' and 'boundary-less' innovation enabled by digital technology. Key to digital technology in social innovation is the collective social and intellectual behaviour that arises out of interconnected networks of people who can make these networks perform like rapidly evolving organisms. This phenomenon is only just beginning to be understood in a new and emerging scientific discipline called 'network science' that seeks to understand the principles and behaviours governing networked behaviour. Some of the impacts of this behaviour have been sketched in this paper.

However, digital technology should also be put in context. Given the often small scale, low e-skills and limited resources of many social innovation initiatives, it is often not leading edge but existing off-the-shelf technologies that are used. Technology is also, of course, not always involved or needed in social innovation, and many other factors are often equally or more important, such as organisational and financial conditions, available skill sets, the prevailing institutional and social landscape, political issues and priorities, as well as culture, norms and values. Thus, the technology must always be seen in its intimate mutual relationship with the actual world of people, things and

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[3] The Global Innovation Index 2012: Stronger Innovation Linkages for Global Growth, INSEAD, Paris: www.globalinnovationindex.org

places, and not least the digital skills which social innovators, and sometimes their target groups as well, have or do not have. That said, given the low and reducing cost, the increasing user friendliness, the analytical and visualisation power of digital technologies when used well, plus their reach and increasing ubiquity in many parts of Europe as well as globally, they are becoming quite standard in many social innovation initiatives at all scales and across all sectors.

Despite the fact that many social innovations may be behind the leading curve in ICT use, at least compared with the comparatively well-financed commercial sector, the way the technology is likely to change over the next ten years is very important. This is because the last ten years has seen technology transform our societies as well as the nature of social issues and problems, and this has also had a strong impact on the way social innovation is carried out. Given the fact that the pace of technology development is accelerating in power and reach, as well as continuing to reduce dramatically in cost and ease of use, we can confidentially expect the impact of digital technology on, and use by, social innovation will also strengthen considerably.

Main recommendations

Research recommendations

Given the importance of digital technology to many types of social innovation demonstrated in this paper, both in terms of the beneficial impacts it supports or enables in relation to meeting social needs as well as the inclusive and empowering manner in which this can be done, further research is needed in the following areas.

1. There is a need to further examine the **different combinations and types of digital technology in relation to traditional and physical activities**, and the social innovation outcomes which can be delivered, building on the insights already presented in this report. For example, examining the locus of the innovation, i.e. is it in digital technology itself, is it in how this technology interacts with other activities, is it in how social needs are being met, and/or is it a combination of two or more of these?
2. In this context, additional research should include examining **how digital technology changes the value and process chains**, as well as what sort of social innovation outcomes are being achieved in different situations. This should include looking further at the different types of online tools and platforms being used and the impacts they have, as well as how both online and offline communities are formed and function, and the social and other types of capital formation involved in this.
3. There has been insufficient attention paid to **the role of networks and the network effect**, as well as the specific role of digital technology in this, in the context of social innovation, and especially in relation to scaling, spreading and dissemination effects. A start has been made in the work undertaken by Tepsie, but because the effects are clearly significant, more work should be done in this area. For example, is it possible to use the power, speed and reach of viral random networks whilst also minimising failure and optimising local embeddedness, ownership and participation which are important hallmarks of social innovation? This also applies to social and ICT platforms, communities and networks in social innovation, both as a tool for spreading and sustaining a social innovation as well as growing social innovation ecosystems which are themselves engines of innovation, adaptation and change.
4. Further research arising from this set of findings would be useful concerning the different combinations of **actors, roles and relationships** in different types of social innovation, as well as which actors use what types of ICT and in which ways in these different types.

5. More research is needed to investigate *inter alia* how ICT is changing the social and business models of social innovation, the sorts of social innovation outcomes resulting and the benefits experienced by the different actors, as well as the drivers and barriers involved.

6. In many social innovation contexts, more work is required on the role of digital technology in social innovation in **balancing between the 'real relational local', on the one hand, and the more 'virtual, impersonal digital global' on the other**. How can we avoid that ICT degrades and impoverishes human relations leading to worse or sub-optimal social innovation outcomes, as is often believed or supposed? What does digital technology do best and what do humans do best, how can these attributes be best combined and how is the changing relationship between the two to be managed? In this context, does ICT reinforce large centralised structures, can it spawn and sustain decentralised models, or can it foster a local re-integration within large-scale networks where real relationships are also enabled by ICT?

7. Research is also needed into the many **new and emerging digital technologies and platforms** which have great potential relevance for social innovation, and indeed are already starting to be used in this context. For example, at one level the Internet of Things is starting to connect many different 'internets' together, not only the familiar data and information internet, but also now physical objects, people and places through the use of sensors and other embedded devices, as well as an internet of transport and logistics and an internet of energy. Once all these are connected, the potential for 'limitless' and 'inevitable' innovation increases many times. (Rifkin 2014). At another level, there is not only the great potential of open and big data, apps and APIs (application protocol interfaces), as well as open online support platforms like *Twine* and *wikis*, etc., but also physical manifestations of digital technology designed for inexpensive innovation, like the products *Raspberry Pi* and *Arduino*. More research is needed into these new digital technologies for social innovation.

Recommendations for wider action

8. Given the importance of the three types of digital technology in social innovation sketched above, **it would be wrong to try to 'over-engineer' the future** of ICT-based or ICT-enabled innovations. History has already demonstrated the remarkable creativity and surprising development-oriented innovations that have emerged once access to ICT is made available. A more productive path would consist of, first, enabling innovative individuals to flourish, develop, and succeed locally, and, second, organise 'serendipity' by fostering multi-stakeholder and interdisciplinary approaches as often and in as many different areas as possible. Policy should shift from a focus only on technological 'pipes and plumbing' (however important these remain) to the critical importance of enabling an interconnected world of creativity, ideas, and knowledge that can trigger an 'age of inevitable innovations'.

9. On this basis we need **21stC metrics for innovation, social innovation and the use of digital technology**. It is critical to complement traditional measures with new ones that take into account the full range of innovative activity that is taking place online. Robust data are the bedrock of public policy, and we cannot measure digital technology in social innovation by using industrial society metrics. Innovation is not a zero sum game – it grows the economic pie and gives more people a seat at the table. To measure that growth, it is important to update and adapt appropriate metrics. Innovation today is far more de-centralised, dispersed and often informal, and digital technology is strengthening this trend, so the metrics need to cater for this in smart ways. This includes taking account of infrastructures, tool availability, incentive structures, legal frameworks[4], etc., but also social innovation outcomes and processes, as in this report. This is a very challenging measurement problem, but there is some low-hanging fruit. For example, the numbers and levels of activity of the people involved online, how easy

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[4] For example, as researched and documented in Tepsie work packages 1 to 7 (www.tepsie.eu)

and fast it is to start a new online social enterprise, what are the transaction costs and time-to-launch for starting a new online content service, as well as more intangible outcomes like satisfaction, well-being, life expectation, etc.

10. Especially for policy makers, **robust evidence is essential**, but much of the debate around social innovation, and in particular the use of digital technology, is anecdotal, making it difficult to clearly demonstrate outcomes and impacts. Much 'harder' evidence is required to the extent possible, so work should be done to develop a system that can enable social innovators to track their own progress in order to demonstrate the difference they are making. In other words, social innovators should keep track of their impact – for example, we have used online tools to match 25 young citizens with elderly residence of London, thereby preventing 25 senior citizens having to move into care homes, saving this much money and helping 50 citizens (25 young / 25 old) live more independently. This might involve abandoning methodological and scientific purity in the short-term in order to provide simple tools like dashboards for real-time tracking, but with suitable caveats and an openness to using experiments like this to build better tools in the future, this will be fully justified. At the same time, social innovators should try to find ways to connect with each other, either by city, region or nation – or even Europe-wide – to demonstrate their collective impact. Only through these kinds of evidence gathering approaches can social innovation emerge as a field that will catch the attention of top political leaders and finance ministers. And only that will ultimately give the sector the scale that it will need to really have a transformational impact on societies.

11. Although the empirical evidence analysed in this and earlier reports shows that **skills and finance** are generally not significant barriers to the successful use of digital technology in social innovation, especially in the early start-up phases, they clearly are in some cases. These include in the health and education themes where much of the value chain is often digitised, as well as in other cases using more bespoke technology. The scaling and dissemination of successful cases also often does require external financial support.

12. It is clear from the research presented in this report that digital technology in social innovation requires somewhat different types of **support frameworks** than more traditional and mainstream social innovation, although as this report has also demonstrated, there are also many commonalities and shared requirements. Some of the differences stem from the three main types of effects outlined above, and derive from the potential scaling and large spatial range of digital technology which means it encompasses a huge spectrum of social, economic, cultural and political conditions and contexts, not just in Europe but also globally. Support policies and frameworks for digital technology and social innovation therefore need to be investigated more comprehensively with a view to providing better support to maximise impacts. Thus, policy should develop support frameworks to incentivise ICT use including through specialised ICT intermediaries and those which span over a large geographic scale. Given that even so-called 'standard' ICT is still a 'black-box' for many, specialised skills and strategies are required, particularly to ensure that the tasks which ICT does best are digitised but in a manner which ensures careful embedding in support of those tasks which people themselves clearly do best. The wider social innovation purpose and context needs to be the central goal, rather than for example efficiency for its own sake, so that positive alleviation of the social needs of the beneficiaries and their empowerment remains paramount.

13. The evidence gathered by Tepsie also indicates that **digital technology in social innovation needs a twin approach**. First, arising from a clear social need and the attempts to find and apply appropriate solutions, especially drawing on the supportive, enabling and transformative potential of digital technology and focusing on the real underlying need rather than trying to improve existing solutions. For example, the Kenyan mobile money MPESA application for mobile phones did not try to provide Kenyans with an online bank account in a traditional bank, but simply addressed their need to transfer money easily, cheaply and securely whether

or not the sender and receiver have a bank account. Second, a more un-focused and serendipitous approach, not guided by a specific social need but by experimenting and innovating using new digital tools and assets, such as open data and people's skills, enthusiasm and dedication. For example, running so-called 'hackathons' using open government data, as well as crowdsourced and other data, to develop apps and to curate ecosystems of providers and users of digital tools for social innovation purposes. Such hackathons typically result in many more 'unusable' applications than ones which can immediately be used in real-life situations, but they are hot-beds of innovation and experimentation over the longer term, typically spinning off new avenues of innovation which themselves lead to usable applications.

14. Digital technology in social innovation is not only about applying ICT tools directly to social needs, but is also increasingly underpinning **the development of other technologies which can support social innovation** and this also needs policy attention. Prime examples include the burgeoning development of 3-D printing and other additive manufacturing technologies, for example in the rapidly expanding 'makers-movement' and the 'FabLab' network across Europe and elsewhere. Here, digital technology in the form of algorithms is used to design and transmit new types of physical products which can be used for social innovation purposes. For example, using digital tools to scan and analyse injuries and to develop designs for replacement prosthetic limbs, which can then be transmitted by the internet to war victims in developing countries as algorithms for local 3-D printing, production and use.

15. Digital social innovation is the same as social innovation, but it just might make it faster, cheaper, better – more socially innovative – if undertaken well. Thus digital social innovation like social innovation is **a transversal issue across all policy fields, social needs and societal themes**. In this context, a set of policy enablers is required to equip and empower social innovators with relevant skills and understanding, to ensure that the public sector is itself digitally and socially innovative and can support social innovators, and that wider partnerships (such as characterised by the quadruple helix of private, public and civil sectors plus research institutions) are in place to curate the use of digital technology in social innovation.

16. In terms of overall policy frameworks, it is important to **support local visionaries and champions**, including social entrepreneurs, in exploiting national and regional policies to create alternative social and economic models, both monetary and non-monetary. Appropriate European, national and local policies, as well as legal and regulatory frameworks, need to be conducive to the new social and business models which can deliver the benefits of digital technology in social innovation, including by enabling managed experimentation. However, they also need to mitigate the dangers of undermining some of the economic, social, community and individual benefits – which are fundamental to social innovation success – through exploitation, loss of rights, or loss or reduced quality of services. Policy and regulation must not only be appropriately conducive and wary of possible negative effects, but should also be proactively interventionist when warranted, for example in situations where specific demands need to be stimulated in relation to using open data, taking ICT training or even consuming healthy food or environmentally friendly products.

17. In terms of digital technology policy, there is currently a big global, as well as European battle concerning so-called **'network neutrality'**, i.e. whether the various internets, and the integrated Internet of Things, will continue to be equally free for all to use, or whether it will become increasing commoditised. If the latter happens, it will favour large commercial players with considerable financial resources who will increasingly push smaller players, including those typically involved in social innovation, to the back of the line and maybe exclude them altogether. This is a critical battle for digital technology in social innovation and is part of the European Union's plan to establish an Internet of Things Platform to support the single market.

Annex: example cases

Finding Employment: ESLIFE (Spain) ▲ EsLife

SERVICIO DOMÉSTICO DE CONFIANZA
para la limpieza de tu hogar

Encarga tu limpieza

Más de 2.000 profesionales a tu servicio

- Flexible matching of workers with households needing tasks done and reducing unemployment
- ICT matching tools & traditional activities
- Mixed funding, private operation
- >1,000 jobs in 7 cities, rising to >25 cities in 2014

## Creating & doing work: Mission Leben (Germany)

- Giving work to people with learning disabilities, improving life & self esteem
- ICT workplace adaptation with easy interfaces, & traditional activities
- Mixed funding, civil operation
- 700 sheltered work places in Germany

Mission Leben

Place making: Hackney CAB Crowd Map (UK)

WELCOME TO HACKNEY CAB CROWDMAP

Share your story on the Hackney CAB Crowdmap and make your voice heard!

Family move due to Housing Benefit shortfall.
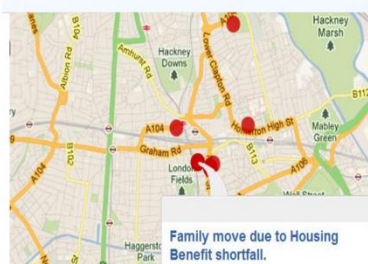
- Online crowd-sourced campaigns
- Website, social media, mobile & traditional activities
- Mixed funding, civil operation
- Help to 3,000 low income households losing €127/month housing benefit, boosting community activism & participation

Place making: In Our Back Yard (USA)

ioby new york city — Now in your back yard!

by the numbers

$1,179,548
TOTAL GIVEN

361
PROJECTS SUCCESSFULLY FUNDED

$35
AVERAGE DONATION

2
AVERAGE MILES MOST DONORS LIVE FROM THEIR PROJECTS

87%
FUNDING SUCCESS RATE

100
CITIES WITH AN IOBY LEADER

- Strengthening neighbourhoods through local development projects using grassroots donations & volunteers
- Online crowd-sourcing & crowd-funding with website, social media, mobile & traditional activities
- Founded by 3 activists in New York & since spread over USA
- Mixed funding, civil operation

Sharing time & talent: Athens TimeBank (Greece)

yay! TIME BANK Yeehaw!

its time has come...

- Meeting all types of daily needs for people in poverty and unemployment
- Web/mobile platform for matching time & talent, traditonal activities
- Civil funding and operation
- Copied from & to elsewhere across Greece, 1,800 users

Creating new shared assets: RepairCafé (Netherlands)

Repair Cafés are conquering the world

Kort | Satellit

- Co-creating repair skills in local centres, save money, increase re-use, strengthen social cohesion
- Web & social media stories, news, dialogue, advice & traditional activities
- Civil funding & operation
- Started 2007, over 650 worldwide 2014

Health: Patient briefcase (Denmark)

- Personalised at-home health monitoring by patient
- Linked by mobile broadband device, live video & audio
- Public & private funding, private operation
- Staff costs down 66%, less transport, 89% improvement in patient quality of life

Education: Professor Why (Poland)

- Personalised anytime anywhere chemistry courses
- Website, social media, audio & video learning, augmented reality
- Public & private funding, private operation
- Started May 2014, >200 users