The growth of digital social innovation in Europe. An Open Design approach to support innovation for the societal good.

Serena Cangiano*a, Zoe Romano*b, Matteo Loglio*c

*aSUPSI Laboratory of visual culture (CH)
*bWeMake Makerspace (IT)
*cocio studio (UK)
*aCorresponding author e-mail: serena.cangiano@supsi.ch

Abstract: Built upon the definition of social innovation, the umbrella expression “digital social innovation” was introduced to describe a wide range of projects that use digital technologies, community engagement and collaboration, co-creation strategies and bottom-up approaches to solve societal needs, in opposition to the centralized proprietary solutions owned by a few companies. Assessing how digital social innovation projects can scale in order to have a better impact, is crucial to provide a concrete European model to innovation creation that considers values beyond economic factors. This paper presents the results of a one-year training program aimed at supporting the scalability of digital social innovation projects in order to have a better impact. In particular, it describes the application of an open design approach to the design of a P2P mentoring model, and a sustainability toolkit that faces the issue of generating capacity building in emerging community of tech social innovators.

Keywords: digital social innovation, open design, toolkit, P2P mentoring

1. Digital social innovation in Europe: the network of the openness communities

Digital social innovation enables people to 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 internet-enabled platforms (Bria, 2015, p. 6). While business innovation is generally diffused through organizations that are primarily motivated by profit maximization (Mulgan, 2006, p. 145), digital social innovation serves as an emerging umbrella definition to describe a nascent field where digital technologies are used to address societal challenges and promote alternative models to the centralization of information, data and resources in the hands of a few big players in the tech industry.

A new definition emerges from the need to communicate the work of a large network of individuals, organizations and companies that are growing and spreading all over Europe and whose potential...
impact has not yet been realized, due to the lack of co-designed policies at a European level as well as the complexity of identifying consistent development models (Bria, 2015). In Europe, it is possible to count about 1400 organizations and 700 projects that create social impact as a byproduct of activities such as the invention of new ways of making goods, the distribution of more accessible and inclusive educational programs, the development of hardware and software solutions that enable large communities to monitor environmental conditions and the release of designs and architectural solutions made for all (Bria, 2015). Those organizations and projects operate in fields such as open data, open knowledge, open hardware and software and open networks in which usually the dominant value is the engagement and empowerment of people through the use of open-source tools, as well as practices based on collaboration, sharing and openness.

Given the rise of the digital social innovation network in Europe, some key challenges can be found: on one hand in the definition of policies to help this network flourish, and on the other in the creation of strategies and tools to support its growth. Those challenges lead to key questions that can be seen through the lens of design research: how can we build capacity in a network of communities that share the same values and abstract goals (societal good and change) but operate at the nexus of different disciplines? How can we support the sustainable scalability of projects that are initiated by groups of citizens, makers and associations that do not usually follow established organizational models, but are inventing new ones? What kind of approaches can facilitate growth, where the concept of scaling does not correspond merely to financial sustainability or the organization’s management?

Digital social innovation projects and organizations aim to produce positive change in terms of individuals’ and groups’ well-being, and this is the main reason why it is complicated to assess their impact (Bellini et al., 2016, p. 19). Considering these initial questions, we experimented with the opportunity to develop a series of training programs that specifically address the issue of defining what “scaling” means in the DSI context and that support the bottom-up and collaborative growth of the openness communities in Europe.

2. Experimenting sustainability strategies in digital social innovation

2.1 Building capacity by applying Open Design as a method

A business design provides well-established techniques and models to train and help organizations and companies define effective business models to reach financial sustainability (Osterwalder, 2010). Alternatively, design thinking offers methods and tools to tackle complex problems through the co-design of strategies for the delivery of social innovation projects (Brown, et al, 2010). With the diffusion of open innovation models, designers started experimenting with collaborative tools to solve societal issues such as food waste or water and sanitation in developing countries (OpenIDEO, 2012).

Following the research on the application of peer-to-peer design and user empowerment strategies (Bihanic, 2015), we proposed to use open design as a method for the definition of sustainability strategies in digital social innovation. Open design is a design artifact project whose source documentation is made publicly available so that anyone can study, modify, distribute, make, prototype and sell the artifact based on that design (Open Design Definition, 2016). Besides the reference to the paradigmatic shift in the design of physical objects on the internet and the digital fabrication age, open design can be seen as a new wave of design where collaborative practices focus on the documentation of the process of the design activity, rather than on the results. Moreover,
The growth of digital social innovation in Europe. An Open Design approach to support innovation for the societal good

Open design reflects and promotes the figure of the designer as a facilitator; a meta designer who designs a multidimensional design space enabling the user to become a co-designer, even when this user has no designer experience or time to gain such experience through trial and error (De Mul, 2011, p. 34).

Reflecting on the mature status of open design practices and the academic discourse, we experimented with the opportunity of applying open design as a method for designing and distributing training programs to support the growth of digital social innovation communities.

The method entails the collaborative definition of best practices and strategies for supporting the sustainable growth of digital social innovation projects through workshops and events, as well as the setup of an open source digital toolkit enabling the documentation of the training process.

2.2 The experimental training programs

Since April 2016, a series of experimental training programs have been organized in different cities in Europe: Milan, Brussels, Rome, Copenhagen, Geneva and Turin. The training programs have been delivered in the format of workshops and lectures involving two different target groups:

- Representatives of communities, associations and organizations that actively work or collaborate on digital social innovation projects in Europe.
- Individuals that are developing bottom-up technologies for the resolution of problems through open hardware and open design approaches.

While the first target group includes people with knowledge of the development of projects for the societal good, the latter can be considered as new players in the field of digital social innovation, because of their interest and expertise in the development of technologies within the so-called Maker Movement (Anderson, 2012).

The workshops scheduled guided discussion sessions aimed at building capacity through an assessment activity: participants were asked to self-assess their work or assess others' projects according to a given set of indicators. The assessment activity had the goal of stimulating a collaborative reflective practice where participants:

- shared best practices; namely problem-solving tactics applied during the development of a project;
- shared scalability strategies; namely actions for improving aspects of a project to reach a better impact.

During the workshops, online shared documents have been used to document the assessment activity. In a second phase, the documentation of the results was carried out through the use of a web-based toolkit. Following the release of the web toolkit, the training programs have also been distributed in the format of online meet-ups: a series of one-to-one workshops organized via video conferencing tools.
2.3 The tools: DSI Scale and Peer Knowledge

The measurement and evaluation of bottom-up initiatives aimed at understanding their impact and growth is a long-standing issue for stakeholders and evaluators. While some numerical data can be relatively easy to monitor and measure, data related to longer term impacts like transfer/exchange of knowledge and engagement of a specific community are usually not used as indicators, because they are harder to assess. The measurement of societal impacts is problematic for evaluators, especially if we move beyond mere financial and economic indicators (Lemola, et al, 2008).

Considering the measurement issue, two tools have been designed to guide the training programs and to support the mentoring activities during the workshop sessions: the DSI scale and the Peer knowledge. The DSI scale is a tool for the self-assessment and the assessment of digital social innovation projects based on values such as knowledge sharing, technological openness and societal good. The DSI scale is a fictional assessment tool because it is not aimed at creating a scientific measurement or an assessment scale; rather, it provides a format for facilitating the mentoring of workshop participants or for documenting the results of discussions with a clear and shareable structure.

The DSI Scale consists of a blank scale that participants fill with their assessments, by assigning a meaning to a numeric scale that goes from 0 to 4. Participants can contribute to the creation of
different scales of a set of given indicators or they can also define new indicators that they consider relevant for the assessment activity. The given indicators that participants discuss in order to assign their meaning to the ratings are as follows:

- **Background knowledge.** This indicator helps to discuss about the knowledge of the domain and the context addressed by a digital social innovation project. The key questions related to the creation of a scale for this indicator are: how much do you know about your peers in your area? Who’s out there doing similar things to you? Why are they doing it? Is there a community already discussing the problem?

- **Target and stakeholder mapping.** This indicator stimulates the discussion on the relevance of mapping the people, groups and communities that can benefit from a digital social innovation project and the stakeholders of the project – including those who could support or prevent its success.

- **Level of openness.** This indicator addresses the wide range of good practices in the field of open source hardware, software and design. It puts the focus on the openness of all processes and outputs of a project, the correct use of open licenses, the quality of documentation and the transparency in the organization’s management.

- **Community engagement.** This indicator stresses the fundamental activity of the engagement of people in the development of a project. It drives the discussion on the practices for facilitating the creation of local and online groups, the use of tools for managing the community’s interactions and the horizontal management of people’s contributions to the project.

- **Quality of communication.** This indicator looks at the opportunity to apply good communication skills to reach a better social impact; it triggers a conversation on the value of a clear communication that enables social projects to compete with corporations’ advertising, to catch the attention of the larger public and to reach people interested in alternative brands and products.

- **Quality of solutions.** This indicator focuses on the competitiveness of digital social innovation solutions in respect to the ones available on the market and developed by tech companies. It serves to reflect on the capacity building necessary to provide a good alternative to existing non-social driven projects regarding materials, user experience, usability and engineering.
The DSI Scale v 0.1

| Metric | Authors: Name Surname |
|--------|-----------------------|
| 0      |                       |
| 1      |                       |
| 2      |                       |
| 3      |                       |
| 4      |                       |

**Figure 1.** Template of the DSI Scale v.0.1. The template features five blank fields for the description of the meaning assigned to each rating.

**Figure 3.** Printed cards of the DSI Scale v.0.1. Each card features the description of the indicator and one example of scale for that indicator. An example of scale for the indicator “community engagement” is: 0 = There is no community offline or online; 1 = There are online discussions groups; 2 = Online community members participate actively; 3 = There are offline meet-ups with local groups of people; 4 = There is reciprocal exchange with the community.
Similar to the DSI Scale, the Peer Knowledge is a fictional survey aimed at capturing best practices and problem-solving tactics within the field of digital social innovation. The survey features three questions designed to collect the successful aspects of digital social innovation projects, the obstacles and the tactics to solve practical problems that slow the path towards sustainability. The three questions are:

- Something went or is going well in your project. For sure, you are doing it right and positive external factors are also influencing the process... tell everyone what part of your project is working well.
- You are probably releasing a good piece of software; you are creating job opportunities, demonstrating an alternative business model... You might be scaling, and you are not aware of that. Your project (or part of your project) could have a better impact if...
- Problem-solving tactics are fundamental to scale. A lot of projects face problems in their path towards sustainability. You've likely experienced problems during implementation. How did you solve them?

The results of the workshops and the meetups were documented as transcripts of the discussions and in the format of DSI Scale. We list below some of the results of the breakout session on Maker Movement and DSI organized in Brussels on June 29th, 2016 (DSI4EU, 2016).

“The level of openness and community engagement can be assessed by measuring the conflict that is generated within a community. Conflict is a fundamental proof, a tangible indicator of how the community is managed (if there is a horizontal communication or hierarchy) and how the community is engaged in a digital social innovation project.”

“The impact of open source projects does not depend on how much open source tools or contents or design you are using, but rather how much you are contributing to other initiatives. The impact of a digital social innovation project can be assessed by measuring how many people are contributing actively to the development of the project.”

“Community engagement should be based on the idea that people have the same opportunities. It should be democratic and promote transparent processes and procedures.”

“An important point is to have a balance between online conversation and offline engagement. Participants shared their local experiences and agreed that the step-in process is as important as the step-up process. Understanding how to become part of a community has to be as clear as how to get more involved in its growth and what type of contribution is welcome.”

During three online meet-ups organized between July and September 2016, some DSI scales were defined regarding the indicator “level of openness”. We provide some examples below:

- **DSI Scale 1 – Level of Openness**
  0 = Pictures are shared online;
  1 = Source files are shared online;
  2 = Source files and documentation are shared on a public repository and are available for forking;
  3 = The project is a forking of an open source project and has shared documentation;
4 = The project has source files, documentation online and its licensing allows for commercial use.

- **DSI Scale 2 – Level of Openness**
  0 = A documentation of a design artifact and the manufactured or final design artifact;
  1 = An open, collaborative and openly documented process that manages the whole life cycle of a design artifact;
  2 = An organization (community, company, foundation) that extends the work of the project’s founders with participation, discussion and contribution;
  3 = An open, collaborative and openly documented budget that allocates costs and revenues;
  4 = An open, collaborative and openly documented governance that manages the processes, participations and budget of the project.

- **DSI Scale 3 – Community engagement**
  0 = The dissemination is not clear at the end of the project, meaning that the previous phases are driven only by marketing;
  1 = Undefined;
  2 = There are forks of the project and copying it is allowed (as GPL GNU license);
  3 = The project provides, as side products, tools that the others use in developing their projects (the project is not a service or service provider);
  4 = The project creates a market in which other people can be active (how much the project is contributing to the creation of a market is an indicator).

3. From the training programs to an open source toolkit

Toolkits are common deliverables in the field of design and design research. In the context of social innovation, a series of toolkits have been released which deliver methods and techniques for teaching designers how to design in order to solve societal issues (IDEO, 2013). Other toolkits focus on collecting techniques from several disciplines (social studies, business management, design thinking, etc.) to enable non-experts to quickly build capacity through a self-learning process (Nesta, 2014). In the DSI4EU project, we decided to experiment with the possibility of transforming the training programs’ tools into interactive features of a digital toolkit. The DSI toolkit is a web-based toolkit that allows users to define their own DSI scale and to share their best practices and problem-solving tactics by interacting with an easy to use web interface.

In the DSI toolkit, the interactive version of the DSI Scale, for example, consists of a set of digital cards that feature text fields for the input of the scalability actions to which users can assign a rating from 0 to 4.

The digital toolkit works as a web interface to allow users to upload content to the popular collaborative development platform GitHub. By filling out the DSI indicator cards, users contribute to the creation of “issues pages” that are listed in a specific section of the toolkit repository on GitHub (Github, 2016). The same functionality is implemented to support users to upload their problem-solving tactics using the Peer Knowledge tool.

The DSI toolkit has been released as an open source website. The assets and the source code are hosted on GitHub and the single pages are generated as GitHub pages. Because of the absence of a database or a dedicated server, the user data is sent to the repository as issues from a bot, then organized through tags.
Through the design and implementation of the features that connect the digital toolkit with the GitHub repository, we aimed:

- to create an open digital platform to support the documentation of the results of the training programs, and to engage participants in the activity of sharing their knowledge in a public repository that is accessible to all;
- to activate an open process in which members of digital social innovation projects could potentially continue exchanging knowledge, after the end of the experimental training programs;
- to make the results of the training programs available in a raw format to other researchers and organizations that are developing studies in the field of digital social innovation;
- to provide a user-friendly interface that enables GitHub illiterates to share content and connect with a larger community of open software developers.
Figure 4. The web based version of the DSI Scale
4. The P2P mentoring model

The combination of the training programs, based on the assessment and self-assessment of projects and the use of the open source web toolkit, led us to reflect on the mentoring activity in the context of digital social innovation.

Mentoring usually refers to an educational methodology in which an expert helps a mentee in developing skills. Mentoring usually proposes a model based on the relation between those two actors, in which the first has the knowledge of a domain and the competencies to transfer this knowledge to the latter.

In the emergent field of digital social innovation, the internet plays a fundamental role in the creation of communities that collaborate to create solutions to societal problems. In projects of environmental data monitoring, for example, groups of experts such as scientists and hardware developers share instructions with non-experts on how to use tools and how to analyze data about air quality. The non-experts are citizens whose goal is to participate actively in the collaborative process of creating an alternative source of information on the environment’s conditions. The instructions on tools and data are shared online in such a way that other citizens’ initiatives can improve and reuse this knowledge to replicate the project in other cities.

Considering this example, we can state that there is a peer-to-peer mentoring enabled by the internet at the core of every digital social innovation project.
Based on this concept, we defined a model for the mentoring addressed to digital social innovators. In our model, the mentoring is the result of an off-line and on-line peer-to-peer activity among different openness communities, rather than a transmission of expertise and knowledge between the mentors (the workshop leaders) and the mentees (the workshop participants).

In the model, the organization that has the goal of supporting the growth of digital social innovation projects (authors’ reference) and the communities are placed on the same level. The organization distributes training programs to members of digital social innovation projects. These members participate in the programs by creating DSI scales and by sharing their knowledge through the Peer Knowledge tool. The results of the training programs are documented in the digital toolkit that is accessible to everyone. The digital social innovation communities access the digital toolkit and they can contribute to the creation of more DSI scales, and share more problem-solving tactics through the interaction with the interactive features of the toolkit and the repository of the open issues listed in GitHub.

This interaction among the DSI4EU project, the participants and the communities drives a process of a continuous mentoring that is horizontal, peer-to-peer and open source.

Figure 6. P2P mentoring model diagram

5. Conclusions

How to support the growth of digital social innovation in Europe? What should the digital social innovation communities learn to scale and to have a better impact? Starting from those questions, we designed a series of tools and a digital platform to enable an open process that supports digital
social innovators to communicate their own definition of scalability. We delivered training programs that aimed to build capacity through an assessment and self-assessment activity. This activity allowed to place the digital social innovators at the center of their training experience, to enable the creation of a common background among initiatives developing projects in different fields (i.e. open hardware, open data, open knowledge, etc.). Furthermore, the assessment activity helped to reduce the gap between the training programs’ participants and the mentors who played the role of facilitators of a knowledge sharing process, rather than the role of experts distributing general notions for reaching a successful scalability in digital social innovation.

In order to carry out the horizontal mentoring activity, we designed a digital platform that enables the communities of digital social innovators to continue sharing their knowledge independently from the organization of off-line and on-line workshops. We used open technologies and open licenses to make the results of the mentoring available to the larger community of open source software and hardware development. The horizontal mentoring distributed through the use of an open toolkit led to the definition of a P2P mentoring model: the model is a proposal for the design and distribution of training programs on how to build capacity in projects that want to have a better societal impact. The model shows the application of Open Design as a method to support the growth of a diverse group of organizations, initiatives and individuals that propose solutions of digital social innovation in Europe.

References

Bria, F. (2015), Growing a digital social ecosystem for Europe, DSI report, EU commission, December 28, 2016, from http://www.nesta.org.uk/sites/default/files/dsireport.pdf

Mulgan, G. (2006), “The process of social innovation”, in Innovations: Technology, Governance, Globalization, Volume 1, Issue 2, The MIT Press, 2006, pp. 145-162

Bellini, F., Passani, A., Klitsi, M., Vanobberghen W. (2016), Exploring impacts of collective awareness platforms for sustainability and social innovation, Eurokleis Press, Roma, p. 19

Osterwalder, A. (2010), Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, John Wiley & Sons, New York

Brown, T., Wyatt, J. (2010), Design Thinking for Social Innovation, Stanford Social Innovation Review, Winter, 30-35.

OpenIDEO (2014), OpenIDEO Impact Book, retrieved December 28, 2016, from https://issuu.com/nathanwaterhouse/docs/impactbook_1_9_14_nathan_test

Bihanic, D. (2015), Empowering Users through Design, Springer International Publishing, Cham

Open Design Definition, retrieved December 28, 2016, from https://github.com/OpenDesign-WorkingGroup/Open-Design-Definition/blob/master/open.design_definition/open.design.definition.md

De Mul, J (2011), “Redesigning design”, in van Abel, B., Evers, L., Klaassen, R., Troxler, P. (Eds.) Open Design Now: Why Design Cannot Remain Exclusive, BIS Publishers, Amsterdam, pp. 34-41

Anderson, C. (2012), Makers: The New Industrial Revolution, Crown Publishing Group, New York

Lemola, T. Lievonen, J. (2008), The role of innovation policy in fostering open innovation activities among companies, Vision ERA-NET, April 2008

DSI4EU (2016), Shaping the future of digital social innovation in Europe, DSI4EU, https://digitalsocial.eu/blog/14/workshop-shaping-the-future-of-digital-social-innovation-in-europe, last visit 25 March 2017

IDEO (2015), The Field Guide to Human-Centered Design, retrieved December 28, 2016, from https://www.ideo.com/post/design-kit
Nesta (2015), *Development impact and you*, retrieved December 28, 2016, from http://diytoolkit.org/media/DIY-Toolkit-Full-Download-A4-Size.pdf

About the Authors:

**Author 1** Serena Cangiano is a researcher at SUPSI Lugano, a lecturer and coordinator of the Master in Interaction design. She obtained a Ph.D. at University Iuav of Venice on open source practices and interaction design. Since 2010 she is responsible of Fablab Lugano and the summer schools.

**Author 2** Zoe Romano co-founded in 2014 a Makerspace and Fablab called WeMake in Milan, focused on fashion and design training on digital fabrication practices, with a focus on projects with social impact. She worked for Arduino as digital strategist from ‘13 to ‘17.

**Author 3** Matteo Loglio is a designer and creative technologist working at Google Creative Lab and at the University of the Arts, London. He co-founded the ed-tech startup Primo Toys and his work was exhibited at the MoMA NY, the MIT and the V&A

**Acknowledgements:** this paper was written thanks to the support of the DSI4EU project led by Nesta (UK) and delivered in partnership with the Waag Society (NL) and SUPSI (CH). The project is supported by the European Union and funded under the Horizon 2020 Programme, grant agreement n. 688192. We would like to thank Peter Baeck, Toby Baker, Amberley Barrington-Peek, Francesca Bria, Eddie Copeland, Gijs Boerwinkel, Frank Kresin, Job Spierings, Marleen Stikker, Matt Stokes, Daniel Pettifer and all participants of DSI4EU training programs.