Democratizing production: challenges in co-designing enabling platforms for social innovation

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Abstract

In the social innovation field it has been recognized the need for infrastructures to support the flourishing of social innovation: intermediaries that should facilitate the connections between diverse stakeholders and resources. Design research has contributed to the idea of intermediaries by developing the concept of enabling platforms. These are situated systems of human and non-human actors, which should support bottom-up initiatives and cross-sector networks by responding to the meta-technological demands of social innovation activities. In order to fulfil this scope they should be deeply rooted in the specific context where they are operating, valuing local stakeholders and resources. Furthermore they should be characterized by a certain degree of indeterminacy, which leaves to the involved stakeholders the possibility to initiate their own activities by performing design actions after the design of the platform is concluded, the so called design-after-design.

This article would like to discuss the nature of enabling platforms and how they could be designed referring to a concrete case: the establishment of the fabrication space Fabriken in Malmö, Sweden. First some reflections will be made about why fabrication spaces can be considered enabling platforms and which specific challenges they pose in supporting social innovation. Further on, the strategy of design-in-use will be presented highlighting the role that prototyping, individual involvement and long-term perspective can play in designing enabling platforms.

Keywords: enabling platforms, design for social innovation, personal fabrication, design-before-use, design-in-use, prototyping

1 INTRODUCTION

The idea of enabling platforms (Morelli 2007, Jegou et al. 2008) has been developed by design research as a tool to support the flourishing of social innovation. They can be considered intermediaries connecting people and resources aimed at developing social innovation initiatives (Murray et al. 2010). An open question is how to design and implement these platforms that should empower bottom-up initiatives (Jegou et al. 2008) and foster the creation of cross-sector activities (Murray et al. 2010).

This article presents a possible strategy to design enabling platforms using a concrete case: the establishment of Fabriken, a fabrication space in Malmö Sweden. First some considerations will be made on the reasons why fabrication spaces can be considered enabling platforms, and on the challenges that these environments pose in supporting social innovation. Further on, some reflections on the design process of Fabriken will be presented focusing on the strategy of design-in-use and the role of prototyping, individual involvement and long-term perspective.

2 DEMOCRATIZING PRODUCTION, FROM "SHARED MACHINE WORKSHOPS" TO "FABLABS"

There is a long tradition of alternative production systems: Japanese shadow factories and Chinese localized production (Carson 2010), Basque Mondagron cooperatives (Murray et al. 2010), Scandinavian industrial symbiosis (Mirata et al. 2005). All these cases are exemplifying a different way of structuring production processes in which the local context and social dimension play a stronger role than in traditional industrial manufacturing. In these distributed production systems (Johansson et al. 2005), technology represents an enabling instrument to support local communities in reaching self-sustainability (Hess 1976, Mirata et al. 2005, Carson 2010). For this reason these systems can be considered a social innovation in itself (Murray et al. 2010) but also platforms that could facilitate the emergence of social innovation.

In the seventies there have been several experiences (Hess 1976, Schumacher 1979) exploring how a more democratic access to technology could foster communities' self-sustainability. One of these experiences were the Shared Machine Shops: "The machine shop should have enough basic tools, both hand and power, to make the building of demonstration models or test facilities a practical and everyday activity.(...) For inner-city residents the shared machine shop might be a sensible and practical doorway to the neglected world of productivity as well as being a base for community experimentation and demonstration" (p.96, Hess 1976). Hess experiments were quite successful; though they were limited by two issues: the need for the users to develop a certain ability in using the tools and the necessity to acquire knowledge about the processes.

In the last years the idea of democratizing production has gained a new momentum thanks to the development of personal manufacturing machines (or fabbers): “the pint-sized, low-cost descendants of mass manufacturing machines used in factories. Different types of small-scale manufacturing machines such as 3d printers, laser cutters, and programmable sewing machines, combined with an electronic design blueprint, enable people to create a wide range of objects.” (p10, Lipson et al 2010). Fabbers seem to have the potential of changing production processes in the same way as personal computers changed informatics and access to knowledge. “ Recent rapid technological advance in personal manufacturing technology, combined with shrinking costs of machines, increasingly available design software and raw manufacturing materials (...) are tipping personal fabrication from the realm of hobbyist and pioneers to the mainstream” (p10, Lipson et al 2010). Personal fabrication opens the possibility for mass production (Gershenfeld 2005), a scenario where people could design and produce their own objects.

Personal fabrication could overcome the limits of Hess experiments: on one hand shifting to a CAD-CAM system (computer aided design, computer aided manufacturing) requires less manual abilities and empirical experience than the ones required by traditional mechanical machines. On the other, personal fabrication is characterized by open-source culture, which makes easier for the users to acquire knowledge and competences. The Internet is increasingly been used for sharing blueprints and instructions for personal fabrication (www.thingiverse.com, www.instructables.com). There are also on-line experiments investigating the business potential of open-design (Van Abel et al. 2011) and collective creation (Tapscott et al. 2006, Leadbeater 2008). For example Open structures (openstructures.net) is a platform for open design that could also generate revenue for who is participating. Openwear (openwear.org) is another online platform for collaborative fashion creation, supporting micro-fashion initiatives.

The relation between personal fabrication and open-source is quite strong mainly due to the fact that the hackers’ community was the first one in understanding its potential. They initiated experiments with open-source hardware and production in their Hackerspaces “where people with common interests, usually in computers, technology, science or digital or electronic art can meet, socialise and/or collaborate. A hackerspace can be viewed as an open community lab incorporating elements of machine shops, workshops and/or studios where hackers can come together to share resources and knowledge to build and make things” (Hackerspace, 2011). Another strong promoter of spaces for personal fabrication has been the M.I.T. (Massachusetts Institute of Technology) with its FabLab: “ a small-scale workshop offering 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".” (FabLab, 2011). These spaces are proliferating both in the western and in the third world (Hackerspace 2011,

FabLab 2011) promoting experimentation with open-source production using personal manufacturing machines.

3 FABRICATION SPACES AND SOCIAL INNOVATION

Fabrication spaces seem to have great potential in developing innovation both for environmental and social sustainability.

Several personal fabrication initiatives are working towards environmental sustainability, such as the Green Fab Lab in Barcelona (http://greenfablab.org/) or the Open Farm project (http://opensourceecology.org/) where a group of engineers and farmers are developing a set of open-source D.I.Y. farming machines. Furthermore, fabrication spaces could work as hubs for local distributed production systems. According to this scenario people could access to these spaces to produce any kind of consumer goods reducing environmental impact "energy and resources associated with storage and transportation will be removed from products ecological footprint. Costs will reduce, while diversity and variety will increase and through these changes new business models, based on skilled digital crafting and bespoke production, will emerge." (Bunnel et al 2009). However distributed systems present criticalities in terms of environmental efficiency since they lack of the scale's advantages that mass production can benefit from.

Fabrication spaces are revealing a strong set of possibilities also in social innovation. "The best thing about a FabLab is the smile on the face of a middle-aged, unemployed African American male who has been very, very discouraged. That's the second best thing. The first best thing is when he holds up the thing he just made and says, what I think, I'm going to play with this and make it better" (p.10 Troxler 2010). People empowerment is mentioned by over 40% of the FabLabs as one of their main prides together with grass-root innovation (Troxler 2010). Moreover, open-source culture fosters the creations of social networks by "highly motivating social rewards which, combined with individual gain of knowledge, constitute a self-sustaining system of exchange" (p.1 Hemetsberger 2001). All these elements could be quite promising when it comes to social innovation in which "the drive is more likely to come from a wider network" (p.7 in Murray et al. 2010) and the focus is on "the individual and relationships rather than systems and structures."(p.5 Murray et al. 2010). Personal fabrication spaces seem also to have the potential to support grass-roots initiatives such as creative communities: "groups of people who cooperatively invent, enhance and manage innovative solutions for new ways of living. And they do so recombining what already exists, without waiting for a general change in the system (in the economy, in the institution's, in the large infrastructures)"(p.30 Jégou et al.2008).

It seems very likely that personal fabrication spaces could play a role as intermediaries. “Intermediaries are individuals, organisations, networks, or spaces which connect people, ideas, and resources. They can take a variety of forms – some incubate innovations by providing a ‘safe’ space for collaboration and experimentation; some connect entrepreneurs with the supports they need to grow their innovations; and others help to spread innovations by developing networks and collaborations.”(p. 124 Murray et al. 2010).

3.1 Enabling Platforms for Social Innovation

A form of intermediaries, the so-called enabling platforms, has been proposed by design research. According to Morelli (2007) in the consumer goods sector there will be a “shift from the provision of finite solutions (products), which often relieve people of their own tasks and responsibilities, to the provision of semi-finished platforms, including products and services that will enable people to create value according to their individual needs” (p.7-8). These platforms are seen as a way to produce “solutions that are not only addressing an individual need, but also empowering individuals and other social actors (service providers, institutions etc.) to generate new social quality” (p.9 Morelli 2007).

Also Jegou et al. (2008) have presented the idea of enabling platforms “as a system of material and immaterial elements (such as technologies, infrastructures, legal framework and modes of governance and policy making), conceived to generate a favourable context for creative communities and promising cases in order to facilitate the creative communities’ possibility to appear, to evolve into lasting social enterprises and to become facilitators of the transition towards a sustainable society.” (p. 179). They list different forms of enabling platforms underlining policy opportunities and policy measures needed for implementing them. The list includes: collective spaces- shared facilities co-owned by diverse communities - multi user products - products that allow various forms of shared used - semi professional equipment- to be used in a non professional environment - connecting platforms - systems linking people to people, people to products/services and products/services to products/services - and experimental spaces for socio-technical experimentation (Jegou et al. 2008).

Enabling platforms are responding to the “technological meta demands” of social innovation (Jegou et al. 2008) as “modular structures in which the competences and roles are specified. On the basis of such platforms, different combinations (“architecture”) will be possible, and which will allow each actor to generate an economy of scope” (p. 10 Morelli 2007).

From these definitions some key features seem to characterize enabling platforms.

Ecosystems, enabling platforms can be considered networks of human and non-human actors (Dolwick 2009) situated in time and space in which both the stakeholders and the inanimate things play an active role in value co-creation. The emerging activities should lead to self-sustainability of the platform and of the developed initiatives.
Indeterminate, value co-creation is an emergent, situated and dynamic process (Kimbell 2009) and it cannot be defined a priori. Enabling platforms should be designed for supporting the actors design process the so called design-after-design (Ehn 2008).

3.2 Fabrication Spaces as Enabling Platforms?

Fabrication spaces can play a role as enabling platforms for social innovation. They represent spaces where knowledge and tools for innovation can be accessed and they are characterized by an open-source culture, which fosters the collaboration between diverse stakeholder and the creation of networks. Communities have a central role in these spaces, making them a fertile ground for social innovation. However there are also some challenges that need to be faced.

If on one side personal fabrication can be seen as the forefront of a new way of conceiving production, at the present it is used more as a tool for creating customized gadgets (see for example most of the projects on www.thingiverse.com or www.shapeways.com). This is due to the reason that some exploration needs to be done before understanding the actual potential of personal manufacturing. Furthermore, even if digitalized production processes ease the creation of things, there is still the need for competences: having the possibility to cut the pieces of a table does not imply having the capacity of designing it. Personal manufacturing will become a tool for distributed production systems only if the manufacturing process and its stakeholders will be reorganized. Supply chains need to be localized in order to reduce the environmental impact of commodities. Machineries' improvements are also required in order to improve processes' efficiency. Designers should focus on supporting people's ability of design (Fischer et al. 2004, Van Abel et al. 2011). There is the risk that personal fabrication will just become a tool for consumerism through which users "are empowered" to create their personalized gadgets without questioning the actual industrial production system.

Personal fabrication is also promising to democratize production. Fabrication spaces are often seen as open innovation (Chesbrough 2003) contexts where leading users (Von Hippel 1986) can develop innovation that, further on, could become commercial solutions from which companies could profit on. This view on democratizing innovation (Von Hippel 2005) is built on a market economy rhetoric and it is excluding the majority of population (Björgvisson et al 2010). However looking to existing FabLabs, "they were relatively passive in reaching out to potential other users. Their funding came from government or hosting institutions. They have so far

created a limited innovation ecosystem. This ecosystem, however, gets used rather rarely" (Troxler 2010 p. 9). This seems to indicate that aiming for technological open-innovation is, at the moment, not enough promising to guarantee the sustainability of these spaces and that is why social innovation should be considered as a complementary goal.

The central role of users in fabrication spaces leads to the third challenge, the relation with the local context. Community is the driver of these spaces and therefore great effort should be made in involving a variety of local stakeholders. However most of the fabrication spaces are struggling with fostering the participation of diverse communities (Troxler 2010, Grenzfurthner et al. 2005). On one side this is certainly due to the fact that a new culture and behaviours need to be established, on the other there is the necessity to understand how early users' involvement could be promoted.

4. DESIGNING FABRICATION SPACES AS ENABLING PLATFORMS, THE FABRIKEN CASE

It clearly appears that designing a fabrication space as an enabling platform is not an easy task.
It requires an effort in trying to design for indeterminacy- leaving space for design-after-design and fostering co-creation- and for ecosystems- how to integrate context specificity and developing long-term sustainability.

These two challenges have been faced in establishing Fabriken, a fabrication space in Malmö Sweden. Three local actors have initiated the project: MEDEA collaborative media initiative, an institute at Malmö University working with new media and co-production. STPLN, a N.G.O. working with youth empowerment and running the premises where Fabriken is hosted. 1scale1, an interaction design company skilled in open-source hardware and design.

The space was opened in April 2011, and here, it will be discuss the design process of the space, in which two phases can be distinguished: the design-before-use (Redström 2005) and the design-in-use (Ehn 2008). During the design-before-use some workshops have been carried on in order to create a shared vision about Fabriken and to deepen some key issues (sustainability, open-source culture and internal currency system). This first phase was structured more as a traditional design project where a defined concept should emerge from a fuzzy front-end through a process of iteration and discovery (Design Council 2007). However, this kind of approach was failing in terms of co-creation and in allowing the necessary indeterminacy for the design-after-design. For these reasons we moved towards a design-in-use

phase, still on going, that can be described as an organic co-design process where prototypes are used to design the space and to explore further possibilities.

4.1 Design-Before-Use

In order to value local resources and to involve diverse communities in the space, Fabriken was set up as collaboration between three different entities: a research body, a N.G.O. and a company. Every actor should contribute with their competences and networks to Fabriken creating connections with the local context and fostering cross-sector networks. Involving diverse stakeholders also meant that diverse agendas were brought in the process and this led to conflicts, which are quite common during participatory processes (Bødker 1996, Buur et al. 2010).

An initial workshop was used to define a general framework on the basis of the possible users' needs (image 1).

image 1

Later we decided to deepen some key elements such as sustainability, open-source and the establishment of an internal currency system to trade exchanges in the space. These issues were developed through three workshops in which the involved actors and some external experts were participating (image 2).

image 2

The workshops had the quite ambitious goal to decide some operative guidelines for the space that were never achieved. Instead they generated intense discussions and conflicts. Each actor had its own agenda for participating to the project that were partially overlapping but also partially conflicting. In order to reach a common shared vision, some agendas would have to be left behind. This led to strong tensions since the stakeholders felt that their role in Fabriken was threatened. As a result the workshops were not exploratory, instead they often degenerated in force games where each actor was defending a specific position. These tensions between diverse perspectives were growing during the design-before-use process posing a threat to the collaboration and to the involvement of different stakeholders groups in Fabriken.

Another challenge was related to the fact that the design-before-use approach was failing in terms of creating the space for future bottom-up initiatives, which are key drivers of social innovation (Meroni et al 2007, Murray et al 2010). For example, we recognized that we could not purchase the equipment before having the users in the space since the machines and the tools would have played such a strong role in empowering some activities and not others. However, without having the space it would have been impossible to involve the users. For this reason we moved to the design-in-use phase, when diverse design experiments have been performed, reviling how Fabriken can host diverse visions and perspective and how design for design-after design can be accomplished.

4.2 Design-In-Use

From the “design-before-use” phase we understood that in order to support grass-root initiatives and cross-sector connections the platform should be designed to host different agendas and built together with the diverse possible users. Variety of use could create to economies of scope, which could lead to platform’s self-sustainability.

Another strategy was adopted, by initiating prototypes aimed at involving possible users in the design process. These small-scale experiments have been a series of events and later on, when the premises were available, having Fabriken open once a week. Focusing on prototyping has dramatically eased the co-design process as it has already happened in other cases (Emilson et al. 2011).

Prototypes work like boundary objects (Ehn 2008): they temporary align (Suchman 2000) the participants in synchronous design games, which means that they allow the diverse stakeholder to work together without sharing a common vision. Instead of discussing on a theoretic level, the actors were cooperating for a precise goal. In this way temporary common grounds were created where the diverse agendas were co-existing: it became possible to explore diverse positions without a dogmatic approach.

Moreover, prototypes have been used as a tool to involve the possible user communities in the design process. Through the events and the weekly openings, users have been organically engaged in the facility and in its design process. For example, the machines and tools are being bought gradually according to the emerging needs of the users populating the space.

When it comes to the nature of these design experiments some considerations can be done. Events seem to work better when they address a specific community and less when they are an open happening. For example, to attract users in the space, a hackathon (hackers marathon) and a weekend of different workshops related to sustainability were organized. The first one (image 3) was quite successful in involving new users, since it was targeted to the Malmö hacker community (Forskningsavdelningen).

image 3

The second one had good results in fostering connections between the diverse groups already present in Fabriken and in getting media coverage, but it failed in bringing in new actors.

Another promising strategy is to work more on an individual level and with a long-term perspective (Emilson et al 2011). For example, the textile community (Tantverket) operating in Fabriken was established by starting weekly meetings driven by a woman interested in textile techniques and with a wide social network (image 4). These meetings are slowly growing and bonding Fabriken with the local craft community through word of mouth.

image 4

This kind of approach is also creating some space for design-after-design where users themselves take design initiatives, since they easily feel to be part of an ongoing open process. An actor - who was participating to the hackathon and to the weekly openings - has started his own project on cooking and sustainability in the kitchen of the premises (image 5).

image 5

In this case, it was important to give a quick and concrete response to his proposal, such as some small funding for buying cooking equipment. Another key issue was to support him in the kick-start of his project by involving him in an already planned event.

At the present the space is populated just by lead users (Von Hippel 1986): most of them have a job and they come to Fabriken in their spare time to dedicate time to their main passion (which could be more or less connected with their profession). They are really important in a fabrication space because of their highly competent knowledge and they will to share it (image 6).

image 6

Though to foster social innovation other kind of users need to be involved (such as companies, NGOs, non-leading users) in order to create the conditions for cross-sector fertilization (Murray et al. 2010) from which new sustainable initiatives could emerge. For example, in the next months the textile group (Tantverket) will collaborate with a N.G.O. of immigrant women, which is investigating how they could use their sewing skills to create a sustainable business.

Prototyping as a strategy for co-design enabling platforms has been quite successful in allowing the possibility to integrate diverse agendas as well as leaving space for users' design, the so called design-after-design. Also individual involvement in a long-term perspective seems quite promising when it comes to create relations with the local context.

5. DISCUSSION

Fabrication spaces have the potential to become enabling platforms for social innovation. They are infrastructures of people, machines and tools that can respond to the meta-technological demands of social innovation initiatives. By gathering diverse users they can foster cross-sector networks and value local resources. Embracing a variety of use can also create economies of scope that can lead to spaces' self-sustainability. Moreover these platforms can promote the establishment of local production systems. However some challenges have to be face: the relation with the local context, the creation of design-after-design opportunities, the environmental inefficiency of distributed systems and the need of redefining the stakeholders' role in the production process.

Design-in-use seems to be a promising strategy for designing enabling platforms for social innovation. Through prototypes, the co-creation process is eased by allowing different and concurring agendas to co-exist, furthermore, they can be used to initiate users' design actions. However, working with design-in-use means that the process is not under control. Even if a general direction has been established and design interventions are performed towards it, it is not possible to decide in advance how users will approach the space. Moreover, since the process becomes so organic it is difficult to decide when the design phase will be finish. It seems that Fabriken will live in a constant process of refinement and reiteration (Burns et al. 2006).

Long-term perspective and individual involvement seem also to work when it comes to mobilize local networks and resources. However they require a slow perspective that can be conflicting, for example, with the need of reaching economical sustainability in a short time.

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