Sustainable collaborative services on the digital platform: Definition and application

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Abstract

Information communication technologies (ICT) have emerged as an enabling solution that facilitates grassroots social innovations. Among them are collaborative services in which the final users collaborate to provide solutions to their unmet social needs. These alternative solutions aggregate to result in radical innovations towards a sustainable society (Meroni ed., 2006). Examples of collaborative services on the digital platform include Hitchhikers, a service created by hitchhikers to connect people with empty seats in their cars and people in need of a ride, thus allowing them to meet new people and reducing carbon footprint; Vicini Vicini, a service that aims to strengthen social fabric in Rome by helping people to organize parties with neighbors; Peladeiros, a service in Brazil that helps people to organize soccer matches; GROFUN, a service organized by people in Bristol to promote urban gardening, share the produce and dine together.

We introduce the notion of collaborative service and showcase the examples of collaborative services supported by ICT, mainly web-based. The cases studies reveal that collaborative services have a common structural system and that they can be classified into seven categories based on their meta-function. Collaborative services produce two elements – a solution and a social network. Based on theories of social network analysis, we argue that the two elements influence the formation of each other, i.e., a solution generates a social network as a byproduct and the social network in turn become a medium to diffuse innovations and creates opportunities to start new collaborations and that this virtuous cycle is amplified by ICT.

Keywords

Social innovation is moving from the margins to the mainstream with the launch of President Obama's new Office of Social Innovation and a new push in Europe from President Barroso to link innovation strategy to social goals (The Young Foundation, 2009). However, this is not because social innovations have suddenly grown in number. What has changed is people's attitude. They have become more conscious of alternative and sustainable solutions due to the failing system of the current paradigm. At the same time, technologies that can democratize and accelerate innovation have diffused to our everyday life. These two conditions create a favourable condition to diffuse social innovation with an urgent need for designers to participate. One possible role of designers is to facilitate the on-going transition by creating conditions for people to use creativity and innovate at the local scale and that of design researchers is to provide designers with a theoretical ground by understanding the environment in which collaborative services are created, developed and replicated and supporting them with appropriate methodologies.

This research discusses issues on design for social innovation and sustainability which specializes in service design for social innovation at the grassroots level and sustainability. Social innovation is defined as "innovative activities and services that are motivated by the goal of meeting a social need and that are predominantly developed and diffused through organisations whose primary

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[1] The paper was prepared by the three authors together. Manzini wrote a part of section 3.1 and 3.2 and Rizzo wrote a part of section 3.3 and 3.4. Baek wrote the rest.

purposes are social" (Young Foundation, 2006). Design for social innovation and sustainability is a domain of design that deals with services for people whose social needs are not met and their relation to sustainability. A role of a design researcher in this field is to understand the phenomenon of social innovation at the grassroots level in various contexts, identify its relation to sustainability and to design conditions that empowers people to use their creativity to ideate, implement and disseminate the solutions for their needs as Manzini claims, transition towards sustainability is a social learning process that requires active involvement of social constituents (Manzini in Meroni ed., 2007). How social innovation at the grassroots level contributes to sustainability is not discussed exhaustively here but it can be stated in summary that the radical innovations of local systems, i.e. discontinuities with regard to a given context, that challenge traditional ways of doing things introduce a set of new, very different and intrinsically more sustainable ones and that these micro-transformations become the groundwork for great systemic change (Manzini in Meroni ed., 2007).

With this in background, a series of projects have been conducted to collect the cases of social innovation at the grassroots level around different parts of the world. In 2006, the cases of so-called creative communities were collected in Europe (Meroni ed., 2007). Creative communities are groups of people who creatively solved social problems around them rather than complying with existing solutions that were proven to be ineffective. Similar research was conducted in developing contexts such as China, Brazil and India (Manzini & Jègou, 2007) and finally in Africa (work in progress). Although these cases consist of a wide range of ideas from diverse cultural and technological contexts, they share one thing in common in that they are social services in which the final users collaborate to produce solutions to a wide range of social needs that have failed to be met by existing solutions. For this reason, they are called collaborative services and the people who designed them are called collaborative organizations (Jègou & Manzini, 2008).

Collaborative service is distinguished from other services in that it requires relational qualities as a prerequisite to function. Relational qualities as the expressions of the "genuine dialogue" established between the participants of collaborative service and include trust, intimacy, friendship and a common identity (Cipolla, 2007). Figure 1 is a matrix that illustrates where collaborative service is positioned in relation to other services.
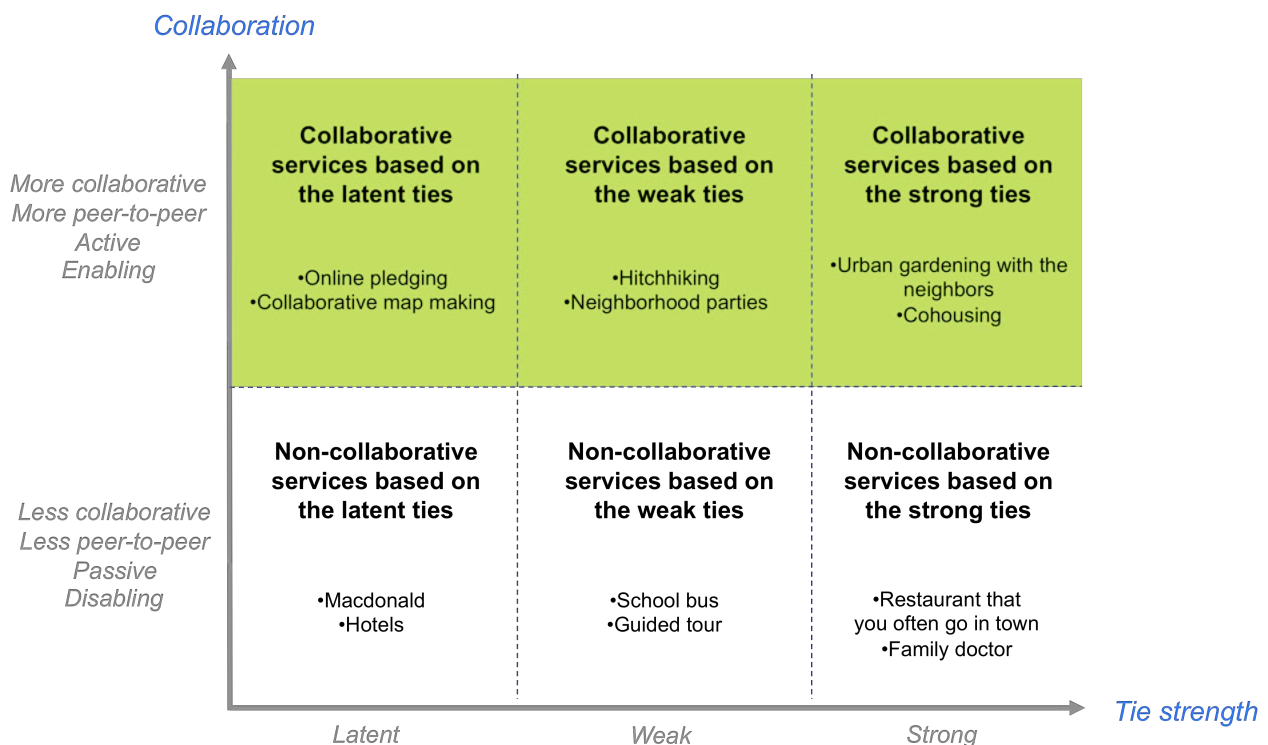

Figure 1. Positioning of collaborative services

1. Collaborative services on the digital platform

In recent years, peer-to-peer and collaborative production has emerged as a powerful trend in the digital, networked industries. Just to mention a few, Wikipedia, an archive of distributed knowledge; Google and Amazon which provide a peer-to-peer platform for sharing information and trading products; various open-source software projects based on Creative Commons licenses. Exhibiting characteristics of anti-rivalry and inclusiveness (Cooper, 2005), collaborative production in digital world is distinguished from traditional ways of production in the market economy in that it is more democratic in political aspect and more efficient in economical aspect (Benkler, 2006). They are examples of socio-technological innovation that are changing our ways of production and living and show possibilities that technologies, especially ICT, can be used an enabling solution to promote social innovation at the grassroots level.

Collaborative service shares several aspects in common with digital collaborative production. Both of them require collaboration rather than competition, inclusiveness rather than exclusiveness and are based on a platform that is decentralized rather than centralized. They also aim to improve the quality of the commons rather than privatized goods. Digital collaborative production aims to expand the repository of digital commons that are mainly information whereas the latter focuses on improving social commons such as relational qualities and social network. In addition, collaborative service and digital collaborative production can supplement each other when they are combined and produce a synergy effect. Firstly, when digital, networked platform is applied to collaborative service, it can increase the accessibility and replicability of the given service, making it available to people of wider social and economical status. Secondly, it can enhance communication between stakeholders within a service and between similar services, thereby strengthening the social fabric and making a service more resilient. Finally, advanced ICT, collective knowledge and innovative business models in open networked platform can reduce the technological, bureaucratic and economical burden of creating and supplying a service respectively.

As the first step to understand how collaborative organizations use ICT to improve their services, case studies of collaborative services on the digital platform were conducted.

2. Research method and the result

Case studies consist of two stages: in the first stage, 30 cases were selected from different parts of the world and analyzed using so-called a 'light format'. The aim of the light analysis is to obtain basic information – both qualitative and quantitative - of the cases in order to understand and affirm the phenomenon. In the second stage, 10 cases were selected from the 30 cases for in-depth analysis in order to understand how ICT facilitate the diffusion of collaborative services.

In order to select the cases that satisfy our definition of collaborative service, over 100 cases were reviewed using the following criteria:

> 1. A service uses ICT to promote itself and enhance communication within community.

> 2. A service involves collaboration in physical and/or digital spaces.

> 3. A service is designed and provided by users with an intention to satisfy their unmet social needs.

In addition to these criteria, factors such as the service area, age of service, organizational size, aim and type of the services were taken into consideration to give diversity to the cases. The result is the 30 cases in table 1.

Case	Form	Service area	Origin	Since	Size
Hitchhikers	Enabling solution	Mainly Europe	The Netherlands	1999	Unknown
Hope institute	Enabling solution	South Korea	South Korea	2006	3365 ideas
Peladeiros	Enabling solution	Brazil	Brazil	2001	32250 users
Vicini vicini	Enabling	Rome, Italy	Italy	1999	Not known

					solution
Green map	Enabling solution	Worldwide	US	1995	400 cities, 51 countries
Open green map	Enabling solution	Worldwide	US	2008	+ 4000 sites
Grofun	Collaborative service	Bristol, UK	UK	2007	10 people
Couch surfing	Enabling solution	Worldwide	US	2004	+ 950000 users
Meetup	Enabling solution	Worldwide	US	2001	4700000 users
Pledgebank	Enabling solution	UK and 12 other countries	UK	2005	91625 users
Katrinalist.net	Enabling solution	US	US	2005	4000 users
Shelfari	Enabling solution	Worldwide	US	2006	Six digits (confidential)
Bookcrossing	Enabling solution	Worldwide	US	2001	740000 users
Mapo dure	Platform	South Korea	South Korea	1997	+ 2500 members
Activmob	Enabling solution	Kent, UK	UK	2008	+ 20 mobs
Aka aki	Enabling solution	Germany	Germany	2008	1494926 encounters
Carrotmob	Enabling solution	US	US	2008	Not yet launched
Economia solidale	Enabling solution	Italy	Italy	1994	4736 users
No 10 Petitions	Enabling solution	UK	UK	2006	+ 5000000 participants
FixMyStreet	Enabling solution	UK	UK	Unknown	31628 problems reported
WiserEarth	Enabling solution	Worldwide		2007	Unknown
Solidarius	Enabling solution	Brazil	Brazil	2008	22319 users
mySociety.org	Platform	Worldwide	UK	2003	1000 users
Sistema FBES	Enabling solution	Brazil	Brazil	Unknown	Unknown
RED Open Health Project	Enabling solution	UK	UK	2004	509 users
Diabetics' meetup	Collaborative service	US	US	2009	55 users
Zero relativo	Enabling solution	Italy	Italy	2006	217 users
Timebanks	Platform	Worldwide	US	1980's	Unknown

Table 1 Case list (data accessed February 26, 2009)

3. Discussion

Despite the diversity in nature and context of the cases, several patterns were identified. Firstly, the cases could be categorized into 7 types according to their meta-function. Secondly, all the collaborative services have a commons structural model and thridly, they produce two essential elements. Finally, ICT contributes to facilitating the production of the two elements.

3.1. A typology of collaborative service on the digital platform.

Each case has a specific function that is performed in a form of a service (e.g. to purchase high-quality agricultural produces directly from the local producers, to exchange used books). These functions can be grouped into what we call meta-goals. Based on these meta-goals, the 30 cases were categorized into 7 types:

Producer/consumer network. In this typology, producers and consumers pursue mutual benefits by establishing a direct network. It is often found in the food industry where producers and consumers create networks to solve problems caused by long supply chains such carbon emission and degeneration of local food industries and to promote critical and responsible consumption.

e.g.) Mapo Dure, a food cooperative in Mapo district of Seoul, South Korea; GAS (Gruppi di Aquisto Solidale), a food purchasing group in Italy; Solidarius and Sistema FBES (Fórum Brasileiro de Economia Solidária) both of which are digital platforms to promote solidarity economy in Brazil.

Figure 2. GAS, the solidarity purchasing groups and the GAS website (http://www.economia-solidale.org/)

Mapping diffused information. In this typology, users collaborate to map diffused locational information.

e.g.) Green Map and Open Green Map which aim to create a global map of sustainable sites and events through grassroots collaboration; FixMyStreet, an open-source project that reports, views, or discusses local problems like graffiti, fly tipping, broken paving slabs, or street lighting which can then be solved by the local councils.

Figure 3. Green Map makers and the Green Map website (http://www.greenmap.org)

Aggregate social action. In this typology, people act together and use their collective power to achieve certain social goals.

e.g.) Pledgebank, a website that enables people to achieve their goals by asking other people to do the same; No 10 petition, an e-petition solution in UK that delivers people's petitions to the Prime Minister; Carrot mob, a network of consumers who buy products in a form of a mob in order to reward businesses who are making the most socially responsible decisions. Its goal is to

leverages consumer power to make the most socially-responsible business practices also the most profitable choices.
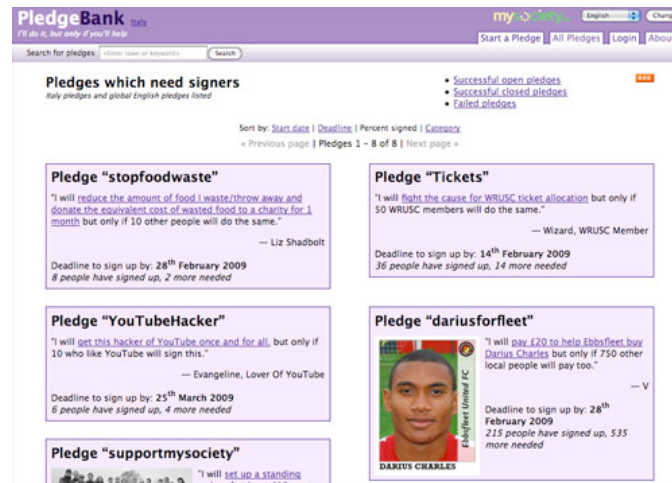

Figure 4. The Pledgebank website (http://www.pledgebank.com)

Creating a network for social conviviality. In this typology, the primary goal is to improve social conviviality by forming and reinforcing a social network. Users are often from the same locality and interact face-to-face and virtually on a regular basis.

e.g.) Meetup, an enabling solution that allows people to form a network of local groups hosts numerous collaborative services, i.e., individual meetups. Among them ones that are organized by users in a specific region for socialization such as Milano meetup; Peladeiros is a solution in Brazil that helps people organize soccer matches; Vicini Vicini is a service initiated by the Municipality of Rome to promote social conviviality of the community. It provides people with tools to organize neighboring parties.

Figure 5. Peladeiros users and the Peladeiros website (http://www.peladeiro.com.br)

Mutual support circle. In this typology, users provide mutual support to one another in order to solve problems that they have in common.

e.g.) Open Health project by the Design Council of UK intends to empower patients of chronic disease and their family members to support themselves and those who have the same problem. One result of this project is Activmob, a service organized by people in Kent to do physical activities together.
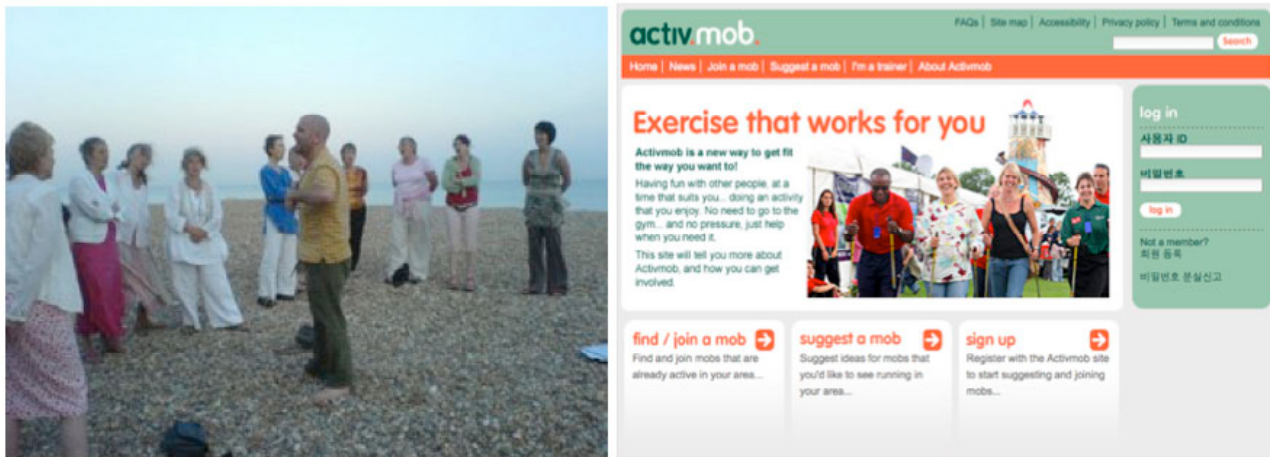
Figure 6. A Local Vocals Singing Group mob and the activmob website (http://www.activmob.com/)

Competences, time and products exchange. In this typology, people collaborate through the exchange of competences, time and products.

e.g.) Time bank, a reciprocal service exchange based on a time-based currency in which community members exchange their time to satisfy their needs. Zero Relativo, an online bartering system in Italy which allows people to exchange secondhand products.

Figure 7. The Zerorelativo website (http://www.zerorelativo.it)

Products, places and knowledge sharing. In this typology, people collaborate through sharing products, places and knowledge.

e.g.) Hitchhikers, an online service that connects people in need of rides and people who have empty seats in their cars; Couch surfing, a global initiative of sharing couches between travelers while exchanging different cultures and creating social network; Bookcrossing, a global book sharing scheme in which one leaves a book in a public place to be picked up and read by others, who then do likewise.

Figure 8. Couch surfers and the Couch Surfing website (http://www.couchsurfing.org)

3.2. The structural system of collaborative service on the digital platform.

In defining collaborative services on the digital platform, there was a hypothetic idea of what it requires to be formed (3 criteria for selecting the cases). The result of case studies clarified this hypothesis and confirmed that all the cases exhibit a common characteristic regarding the environment in which it is formed and develops. The structural system of collaborative service on the digital platform consists of 3 elements: an event, a collaborative service and an enabling solution (Figure 9).
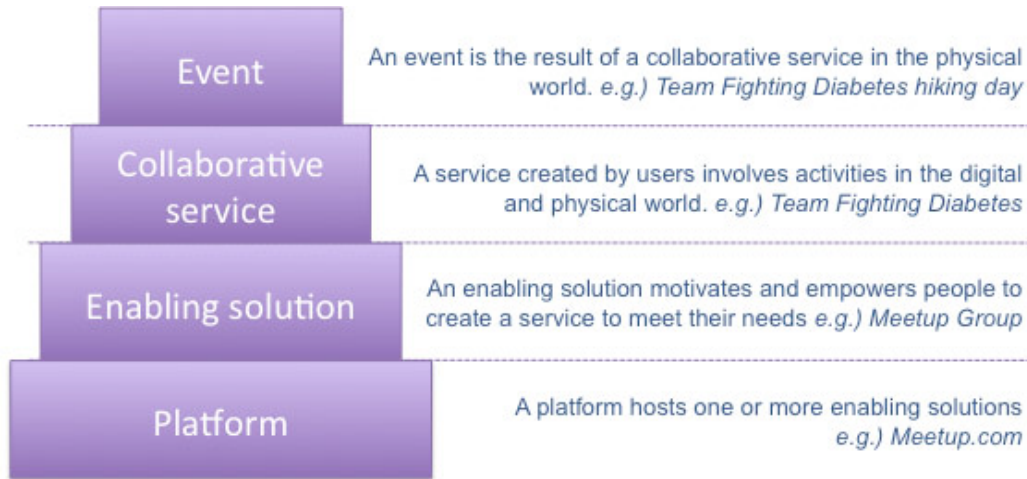

Figure 9. The structural system of collaborative service on the digital platform

1. *A platform.* A platform is a base of the structure that hosts one or more enabling solutions. It may not exists in some cases where there is only one collaborative service. An example is a social networking service called Meetup.com that supports organization of local groups across the world (figure 10).
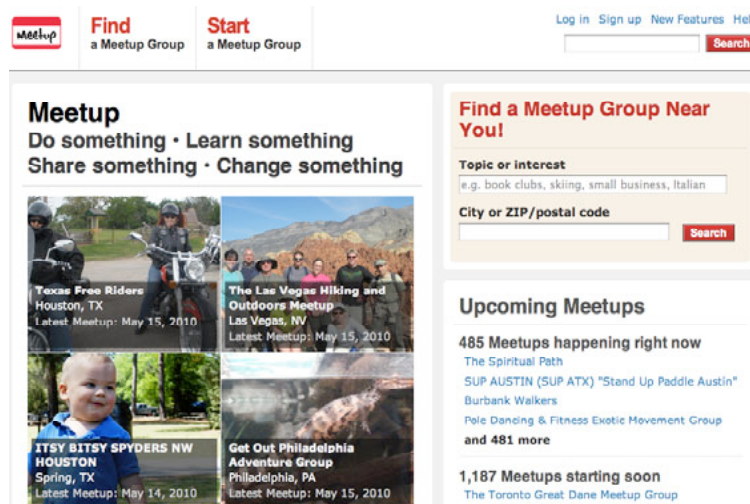

Figure 10. Meetup.com is a digital platform that hosts diverse Meetup Groups (http://www.meetup.com)

2. *An enabling solution*. An enabling solution is a system of products, services and communications that empower people to collaborate to meet their needs and to diffuse their solutions. Democratization of ICT provides people with a variety of effective tools to organize, manage and participate in collaborative services more efficiently than ever. Figure 11 is the homepage of Team Fighting Diabetes Meetup Group. Meetup.com provides groups with a set of tools that support group activities.
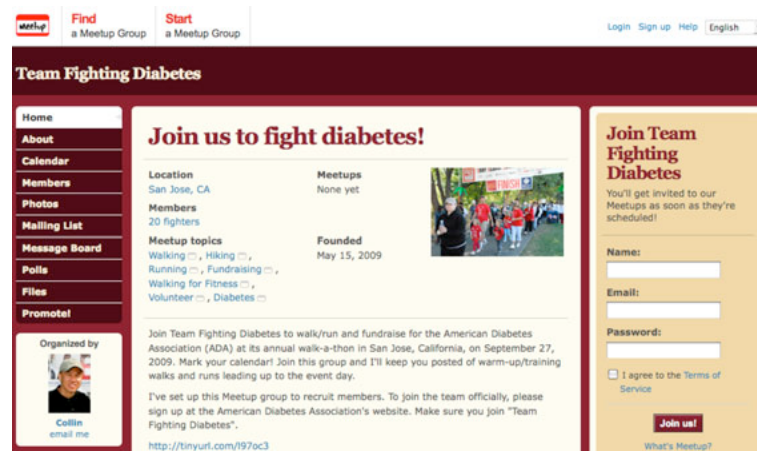

Figure 11. Team Fighting Diabetes Meetup Group homepage (http://www.fightingdiabetes.org/)

3. *A collaborative service*. On top of the enabling solution lies a collaborative service created and accessed by users. In Meetup.com, there are tens of thousands of collaborative organizations in places around the world (figure 12).
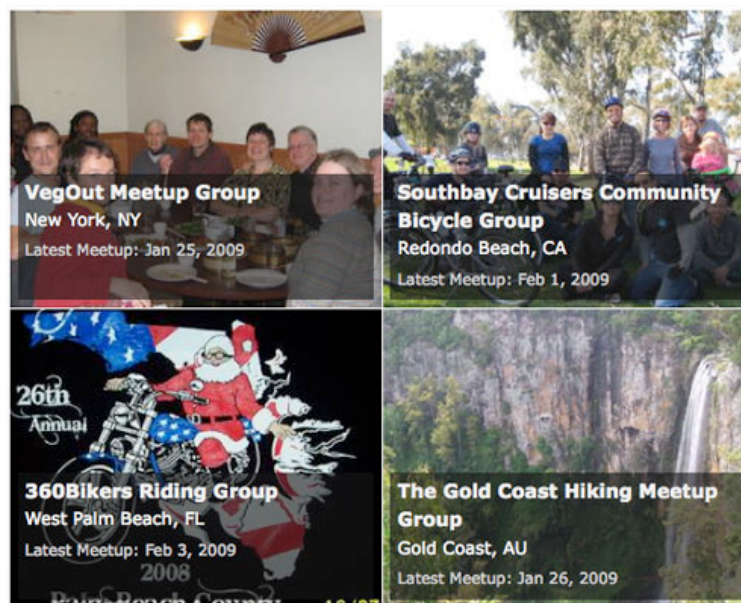

Figure 12. Collaborative services in Meetup.com (http://www.meetup.com)

4. *An event.* An event is the result of a collaborative service in the physical and digital world. An event may vary in the size of participants, the degree of interaction and the knowledge or physical assets required by the participants (e.g. a large smart mob vs. two people sharing couches). These variables need to be considered when designing a collaborative service and an enabling solution. Figure 13 illustrates a scene from a hiking day organized by Team Fighting Diabetes Group where the members – diabetics and their families – exercise together and promote a healthy lifestyle.

Figure 13. Team Fighting Diabetes' hiking day (http://www.fightingdiabetes.org/)

3.3. ICT and the dual dimension of collaborative service

Collaborative service by definition has a dual dimension of production: the first dimension is the production of a solution, i.e., a service that meets the social needs of users. Because this is the main goal of a collaborative service and the outcome is visible and measurable, current service design tools are dedicated to this dimension, i.e., how to design a solution that effectively solves the existing social problems.

However, we also look at the other dimension, the production of social network. Social network is crucial to the existence of a collaborative service. As Cipolla (2007) claimed, a collaborative service requires relational qualities as a prerequisite and if this service manages to be scaled up or replicated, the existing relations among users are reinforced and new relations are formed in the process of collaboration. These relations in turn become a ground for new collaborations and, as it will be discussed, contribute to the diffusion of social innovations (or solutions). In short, the production of a service and a social network is mutually beneficial and creates a virtuous cycle. Furthermore, we argue that the production of the two elements can be amplified by ICT (figure 14).
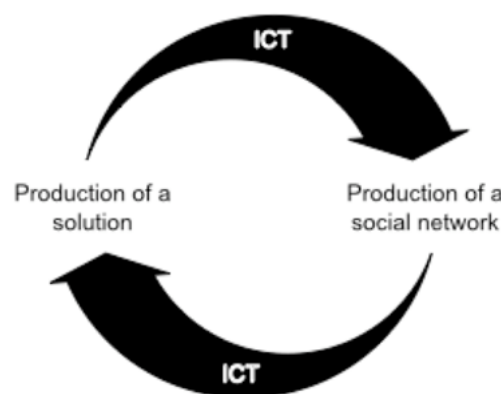

Figure 14. Production of a solution and a social network in a virtuous circle and its amplification through ICT

ICT and the production of a solution. The degree to which each case of collaborative service makes use of ICT varies from a simple mailing list to a highly customized database. However, in all of them, ICT plays a role of "democratizing innovation" (Hippel, 2005). It has introduced novel ways of production based on peer-to-peer relation that are more democratic in political aspect and more efficient in economical aspect than the traditional mode of production (Benkler, 2006). The case studies revealed that collaborative services on the digital platform benefit from ICT mainly by:

   • Sharing and creating the Creative Commons. Many examples in our case studies have been developed using open source code or solutions that are free for non-commercial uses, thereby reducing the cost and more importantly allowing others to replicate their initiatives. These cases include No 10 Petitions, FixMyStreet, Pledgebank and Open Green Map.

• Improving productivity and efficiency of communication. In the cases of Meetup and WiserEarth, organizing a face-to-face meeting has become easier than ever thanks to a set of digital tools such as social networking service, calendar, blog and RSS. Carrotmob, a so-called flash mob[2], uses ICT to organize collective social actions. In Green Map Service, users have collaborated to create maps of over 400 cities from 55 countries since 1995 and with the launch of Open Green Map in 2008, a mashup version of Green Map, more than 4000 sites have been created in less than one year (counted in December 2008).

• Lowering the threshold of participation. As much as the creation of a collaborative service has become easy, so has been the participation and withdrawal. This contributed to lowering the psychological pressure put upon users and gave users more freedom. This consequently eliminated barriers that kept people from participating in collaborative services such as economic burden, dedication of time and effort to the service.

• Motivating people to collaborate. Some cases employ incentive mechanisms used in a crowd-sourced system in order to motivate people to participate and collaborate. Pledgebank, a website where people publicize their pledges and ask others to join, shows the number of people who have joined the registered pledges, thus creating a bandwagon effect to attract people to participate.

ICT and the production of a social network. As ICT facilitates the production of solutions, at the same time it reinforces the social network of engaged communities and creates new ones, mainly what is known as weak personal ties. The importance of weak ties was first recognized by sociologist Granovetter in his work 'The strength of weak ties' (1973). In this work, he claimed that personal ties can be categorized into strong, weak and absent. The tie strength can be measured in terms of a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie. Strong ties arguably takes decades to be formed and are observed in intimate relations such as families and cliques. On the other hand, weak ties take relatively shorter time to be formed and are observed among friends, colleagues and acquaintances.

According to Granovetter (1973), information tends to remain isolated in a group formed by strong ties whereas it tends to diffuse through weak ties. It is because people connected through strong ties share a large part of their social network and therefore tend to form an isolated group. In such a group, information is likely to be self-contained and inaccessible by those outside the group. On the other hand, people with many weak ties often play a role of bridges that connect groups and it is through these bridges that information, including difficult innovations, diffuses. As a result, the social network of an organization whose members are connected mainly through weak ties forms an open network where information is widely shared among the members while an organization whose dominant ties are strong turns into fragmented cliques (Granovetter 1983).

The case studies show that both weak ties and strong ties are essential to collaborative services and that they play different roles (Baek 2009): The strong ties exist mainly in a community where collaboration initiated and was incubated. A collaborative service is initiated by a group of people who share the same value and are often tied in strong ties. They are usually friends, families or long-time neighbors. They are the ones who maintain the core values of a service and incubate the service until it becomes ready to diffuse. On the other hand, the weak ties maintain a collaborative organization open and allow its innovation to diffuse and replicate. As the innovation diffuses through the weak ties, the collaborative organization develops from a closed group into a network and the impact of innovation is amplified. Once the innovation is adopted to a new context (through weak ties), it requires strong ties between the adopters and the whole process repeats. In short, the diffusion of collaborative services is an iterative process where the generation and incubation of an innovation are mainly achieved through strong ties and the development and the diffusion are achieved through weak ties.

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[2] A flash mob is a large group of people who assemble suddenly in a public place, perform an unusual and pointless act for a brief time, then quickly disperse. (The Concise Oxford Dictionary, 2004)

3.4. The role of ICT in design process

In design for social innovation and sustainability, the aim of design activities is to foster grassroots social innovations and facilitate their diffusion so as to increase the impact on society and ultimately to trigger a systemic transformation towards sustainability. One approach to do this is by designing enabling solutions, a system of products, services and communications that empowers people to collaborate and innovate to meet their own social needs. The role of ICT in this context is to be a building block of this system. In other words, ICT can be a tool to design a favorable environment for individuals and communities to collaborate and innovate. Then it is absolutely necessary to understand how the technologies can be used most effectively under which circumstances. The role of ICT in designing collaborative services can be threefold: to diffuse information such as innovative ideas, to connect people and to improve the functionality of services. Identification of these roles leads to providing designers with guidance to use ICT to design a product service system that reinforces a sense of community among users, allows people to get connected to those who share the same values and interests and thus to diffuse their innovative ideas to outside their community.

4. Conclusion and future work

In this paper, we introduce the notion of collaborative services, an example of grassroots social innovations, and show how ICT can support their implementation and diffusion using case studies and literature studies. Despite an effort to cover the cases from diverse contexts, this research does not comprehensively explore the ubiquitous phenomenon. Neither does it contain an application of the findings to a design project. Instead, this research identifies the characteristics of collaborative services on the digital platform and the role of ICT in design process. It is a preliminary step to design a digital platform that supports grassroots collaborations for sustainability and improve the social network of engaged communities.

The future works will include an investigation of the roles of ICT in a more specific context, sustainable food production and consumption and applying the findings to a design project, more specifically, to develope a digital platform that supports various initiatives related to this topic. The project is called 'Feed Milan (in Italian, Nutrire Milano)' project[3] and it aims to build a sustainable food network in Milan and its peripheral rural area called the Agricultural Park South of Milan in collaboration with Slow Food and the University of Gastronomy.

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[3] http://www.nutriremilano.it/

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Figure 12. Meetup.com website. From http://www.meetup.com (assessed May 5, 2010)

Figure 13. Team Fighting Diabetes' hiking day. From http://www.fightingdiabetes.org/ (assessed May 5, 2010)

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