Small Scale Collaborative Services: The Role of Design in the Development of the Human Smart City Paradigm*

Francesca Rizzo[1] and Alessandro Deserti[2]

[1] University of Bologna, Department of Architecture, Via Risorgimento 2, 40136 Bologna, Italy
[2] Politecnico di Milano, Design Department, Via Durando 38/a Milano, Italy
f.rizzo@unibo.it, alessandro.deserti@polimi.it

Abstract. Cities are facing disruptive challenges today. All these require smarter solutions and are creating pressure for the public and private sector to deliver innovative services and great expectations are put in the new Smart City paradigm. Most of these solutions keep technologies out of the urban environments, far from being considered components of the urban functioning and, furthermore, even farer from people and their urban spaces. In this framework design is today re-orienting its theories and practices to new kind of design contexts (neighborhoods, streets, squares, cities) where societal challenges are emerging that require different level of changes from everyday life to huge public institutions and complex organizations. This re-orientation is based on a different smart city paradigm that puts people at the center of the cities smartness and recognizes the need for developing micro and contextualized solutions to address larger cities problems in a sociable mode.

Keywords: Service Design, Complex Participatory Design, Human Smart City, Small Experiments, Collaborative Services.

1 Introduction

Complex problems are taking the stage in the current society. Meanwhile from Europe to US, austerity measures have been put in place, "wicked" societal challenges abound, spanning from youth unemployment, healthcare issues for elderly population, energy consumptions, mobility and transportation to mention some of them. All these require smarter solutions and are creating pressure for the public and private sectors to deliver innovative services [2] and great expectations are put in the new Smart City paradigm.

Many solutions, even integrating different perspectives in order to consider the complexity of the urban environments, are today proposed to cities mainly based on hard technological infrastructures: solutions that keep technologies far away from urban environments and, furthermore, even farer from people and their urban everyday life.

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Opposite to this mainstream there are visions of smart cities that are focusing on concepts like citizens needs, bottom-up initiatives, people centered solutions, communities centered solutions, grassroots smart solutions and social innovation. Common to these visions is the idea that smart city is a new paradigm for cities development that relies on the city system capability to boost, encourage, realize and scale up new intangible infrastructures for the cities based on new partnerships typologies for the development of smart services.

Through looking at My Neighborhood European project vision and experiments this paper explores complex participatory design processes [4] [9] [11] [15] as the most suitable design approach to the development of smart solutions for the so-called Human Smart City [6] [21] [17].

Human Smart City (HSC) paradigm as elaborated by the Peripheria European Project (Grant Agreement No.: 271015), moves from recognizing cities smartness in the capability of cities to include citizen driven developments and productions as concurrent city infrastructures together with physical, technical and technological layers. At the core of the HSC vision there is the human perspective, as elaborated by design culture [7] that considers that participatory design approaches to smart services development and production can bring contextual and cultural dimensions in the delivered solutions. Especially the knowledge elaborated in the domain of service design has focused the strength of collaborative services [1] as those collaborative solutions that may match the need for cities to balance the technical "smartness" of sensors, meters, and infrastructures with softer solutions based on public-citizens partnership. With the above trends in mind, the peculiar HSC approach developed in Periphèria project is mainly rooted on the idea that smart is a city where people, citizens, stakeholders are the main actors of ICT driven urban development. In such a human smart city new and innovative market opportunities for ICT and Future Internet based public services can be created, deeply rooted in the real problems of people, in their urban daily lives, in their commitment to respond proactively to their own problems and needs.

To peruse this vision Peripheria considered and applied complex participatory design processes, and the correspondent design culture, as the most suitable approach to create conditions to set up and generate innovation ecosystems where network of stakeholders can co-develop solutions in partnership with their administrations.

In line with Peripheria vision the My Neighborhood | My City Project (January 2013-June 2015, Grant agreement no.: 325227) is trying to further develop the HSC paradigm starting by amplifying and connecting existing grassroots social initiatives in 4 different European neighborhoods (in Lisbon, Milano, Aalborg and Birmingham) to show their potentials behind their connections and collaborations in designing smart cities through collaborative services to be experimented and eventually scaled-up. Here complex partnerships are involving the municipalities together with citizens, NGOs, public schools and private companies to develop micro solutions to be experimented and eventually networked and scaled.

In the rest of the paper the authors discuss the current experimentation in My Neighborhood project (especially the Milano pilot). Then the authors focus on the difficulties and lesson learnt when design takes the responsibility and the leadership

of actively boosting collaborative partnerships as basis for implementing new collaborative services. In the final section the authors propose a preliminary route for micro solutions scalability to affect larger smart city vision.

2 Complex Participatory Design Processes: The My Neighborhood Project Experience

In the tradition of co-design many researchers [18] [8] [20] have focused on the potentiality of end users collaborations and prototyping to engage stakeholders in the exploration of innovation. In this tradition it is possible to consider two basic modes.

The first one is the dialogue mode, and deals with the processes of collaborative design and tools for engaging users and other stakeholders in collective creative envisioning together and eventually in rethinking the current state. This mode grows from practices that have their roots in close connection with participatory design tradition but also 'beyond usability' research dealing with experience design and empathy. The second one is the prototyping mode that addresses in particular the ways in which designers tend to reflect and make sense of complicated and often yet non-existing things by giving shape, sketching, visualizing and prototyping in various ways. These two modes conceptual are most of the time overlapping in practice and they are today converging to the foundations of those design labs (living labs, urban living labs, ecosystem of innovations) that are blooming in a variety of initiatives [16]. These labs are similar to new urban context where envisioning solutions for territorial end urban transformation by establishing strong connections with the network of stakeholders that belongs to a place; establishing long term engagement with local communities that leads to the emergence of new everyday practices that point to new opportunities for design [3] [5] [13] [14] [10] [11] [12] [19].

Contrary to those living labs that emphasize technology evaluation or adaptation My Neighborhood project applies a situated and human centered approach for local communities to develop innovation. My Neighborhood works directly from the particular conditions and resources of the local communities engaged in each of the project pilot in order to employ relevant service systems that may facilitate social innovation. Scalability in this approach comes about not through the similarity between communities but through the robustness and generic qualities of the service design concepts.

In a world of heterogeneity of use and users and entanglement of infrastructures and practices My Neighborhood provides a platform for engagement that transcends traditional models of research and development. The challenge for My Neighborhood is to provide evidence for what can be accomplished beyond the co-design with a twofold aim: (i) addressing problems of the contexts; (ii) establish a long last strategy of innovation for that context. To achieve these objectives the project is operating within the pilots by:

- Modeling and releasing to the municipalities methodologies of complex participatory process that put together citizens private and public stakeholders in new partnership typologies;

- pushing the need to focus on collaborative services: i.e. those services where citizens have a role in maintaining and delivering them;
- supporting the scaling up of the envisioned solutions.

2.1 The Service Design Phases

My Neighborhood project started in January 2013 with the clear goal in mind of applying service design to help grassroots and community based initiatives in the 4 involved neighborhoods to emerge, network and scale up them. The project is operating in a typical ICT research area bringing with it the idea that advanced participatory design methods could make the difference in the level of innovation of the developed solutions since the development process starts from people and not form the available technological paradigm. The work carried out by the pilots in the first months has been than organized in 4 typical design steps or phases: exploration, sense making, idea generation and service design.

Exploration. Exploration deals with understanding the contexts where design is acting. The context analysis in My Neighborhood started with explorative activities aimed at entering the context trying to identify context resources like: entry points, active people and associations, gatekeepers, infrastructures, projects and initiatives, socio-economic context characteristics and everything that could help designers to set the starting conditions for My Neighborhoods small projects and the already existing points of strength and weaknesses in each of the pilots.

Sense Making. Exploration slowly was transformed into a sense making work where the rich amount of information collected in the exploration phase has been analyzed and interpreted, in order to work out facts that could be usable in the design phase. In this phases pilots formalized all the semi-worked elements that would support the following design phases (maps of the stakeholders, resources maps, personas, video and pictures from the contexts, people and stakeholders WIN (wishes, interests, needs). This is also the work during which a first hierarchy of priorities was pointed out: issues and challenges to be addressed have been extracted and prioritized with respect to the stakeholders' feelings and opinions.

Idea Generation. This phase was the first design activity that was conducted in collaboration between designers, citizens and stakeholders and municipalities. It mainly devoted to working together and sharing provisional ideas – new activities, processes, systems or touch-points – that could be of relevance in terms of find an effective solutions to the challenges listed during the sense making activity. In each of the pilot this phase ended with a set of ideas that were further analyzed and selected applying different criteria. Among the others idea selection has been conducted on the following elements: idea feasibility with respect to the context available resources and to the My Neighborhood larger objectives; first group of stakeholders interested in entering the phase of service design and in experimenting with the envisioned solutions; idea potentially to be scaled and to have a market; a robust digital dimension with which to experiment FI solutions.

Service Design. This phase moved forward in the design process from the concept selected to what they could be really become in reality. This phase than included typical design activity conducted in strong collaboration with non-professional designers from the context and from the municipality. The design team so composed developed for each services the detailed design of the services users experience, the new service blue print for the service front end and back front; the map of stakeholders that would support the service implementation and delivery, the service business models. With these elements in hands the pilots entered the services implementation phase.

The following sub-sections describe the design process applied in Milano.

2.2 The Envisioned Solutions: The Milano Pilot Case

The Milano pilot takes place in the neighborhood of Quarto Oggiaro, located in the north west of Milan, not far away from the area where the 2015 Expo – Universal Exposition – will take place. Here the entire service design process has been conducted thanks to a strong collaboration between the Politecnico di Milano (that hold a long tradition in design research and in urban planning) and the Milano Municipality. This mixed team of designers performed all the activities in the contexts and managed the interactions with the local communities and stakeholders to engage them in the co-design process and in the service experimentation.

First months in quarto Oggiaro have been spent to explore and approach the neighborhood. The design team started to understand the neighborhood physical characteristics, the populations, the main actors in the contexts, the relation between the neighborhood and the rest of the city, the socio-economic dimensions, the characteristics of the services offered in the neighborhood.

After that an intensive period of co-design meeting started. The design teams in this phase established 4 different design tables (with designers, urban planners, people from the municipality of Milano, people and representatives from the neighborhood). Each table started from a complex discussion on the main neighborhood issues that ended with a list of main challenges:

- to regenerate disused and derelict public areas;
- to improve social life and inclusion of elderly people in Quarto Oggiaro;
- to prevent school drop outs and create job opportunities for young people;
- to test new potential business models for start-up and spin off.

Related to these challenges the design tables then worked to elaborate possible service ideas as smart solutions for the framed problems.

Service ideas developed for Quarto Oggiaro were: ICT bread, Quarto gardening, Quarto Food and Integrated communication. Out of these service ideas, My Neighborhood focused on two of them: Quarto Food and Quarto Gardening.

The Quarto Food Service. Quarto Food Club is a service that combines the need to improve social life for a vulnerable group of single elderly citizens that would enjoy a meal prepared with special care and consumed in a sociable and enjoyable condition so that to have an impact on their sense of loneliness (the elderly community in Quarto Oggiaro is large and it is expressing many important needs). At the same time the service seems to respond to a second neighborhood issue: that of the young people unemployment. The opportunity for young people from the Hoteling School of the neighborhood to be recognized in the practical training, having the possibility also to test new business model hypotheses.

Specifically the service involves two high schools in Quarto Oggiaro where students prepare every week some meals as part of their training for catering and food preparation. Starting from this resource the service ideas is to deliver these meals to a group of elders living in the Neighborhood. By preparing for the occasion a kind of social space in the "school" where elderly can come and enjoy the meal together the service idea is that of connecting the school and the students with the elderly from the neighborhood. The students will benefit interaction too, as their work becomes visible and recognized by users. They will also receive academic credits for it.

To be implemented the service required also the development of a formal partnership and it will be really delivered thanks to the agreement between the Professional Schools of Hotel Management (providing food) and some local Associations that will provide the contact with elderly people, and a van for transportation (from private place to the school and vice versa).

Through ordinary activities of food processing, students will prepare -from 1 to 3 days per week- meals for the target group. An IT Platform will support the process of the booking of the meal and the trip, and a personal rechargeable Lunch Card would be provided to the users to partially cover the costs of the meal and the service.

The Quarto Gardening Service. Quarto Gardening is a co-designed service that provides the possibility for the Municipality to access the competences of the students of the Quarto Oggiaro Agricultural School to take care of some the green areas in the neighborhood.

The service is made possible thanks to the agreements between the Property Management of Green Areas (Municipality of Milano and the public institute for Social Housing in Milano) and the technical high school for agriculture. Through practical training activities – formative credits are acknowledged – students will take care of some green spaces in the neighborhood. A focal point could be Piazza Capuana, one of the crucial physical place in Quarto Oggiaro. The square will be one of the first place from which the service will start. This decision was made in order to make visible the impact of the service in the neighborhood and the active action of My Neighborhood project. The service goal is to contribute to reduce expenditure for green space conservation and maintenance, to regenerate public spaces and to discover new job opportunities for young people (by testing a new business model hypothesis). The users would be both public (Municipality) and private (building supervisors, resident citizens).

2.3 Further Steps towards Scaling-Up

In the perspective of up-scaling, the design actions that has been adopted in the development of new solutions in My Neighborhood project (and here presented in details for the Milano pilot) can be seen as a process of building up and enabling infrastructures that would work (from the project beginning) in order to make the service ideas robust to be scaled after their experimentations. To realize these enabling infrastructures a variety of artifacts have been used in the pilots: from co-design methods, to specific toolkits, from digital platforms to dedicated products and services. The process adopted in designing new collaborative services in Milano aimed to support their up-scaling by suggesting the adoption of a methodological frame (processes and tools) in their design phase rather than the replication or adaptation of the solutions.

On the first point, we observe that – even if we cannot recognize specific elements of the Quarto Gardening and Quarto Food that can guarantee their success – deepening some aspects helps to build a sound base for the implantation and the future development of both services. In particular, the issues related to the business modeling, the main network of actors that contribute to the service and to the economic underpinning of the envisioned solutions are quite relevant in facilitating or in braking their up-scaling process and they will be explored in deep for both services during their experimentations.

On the second point, we observe that some features of Quarto Gardening and Quarto Food are intrinsically connected to the development process (as results of the process), and that the issues raised and the problems faced within the development process might be more relevant than its sheer results. E.g., the configuration of a network of actors and stakeholders and the management of their relationships can be a fundamental step in their development.

In the following, the authors describe the development process of the solutions, introducing a larger set of phases and actions (with respect to the 4 phases of the service design process described above) representing a methodological reference that can be adopted in the perspective of up-scaling and that has been applied in My Neighborhood project and specifically in the Milano pilot.

The adoption of this strategic conceptual frame in the development of a solution cannot automatically guarantee its scalability, but it may ensure the quality of the solution itself, and can facilitate its adoption and its adaptation to the specific conditions and necessities of different sites.

The frame, already adopted in previous research projects (PERL: *The Partnership for Education and Research about Responsible Living*, November 2009- November 2012, Project no.: 155927-LLP-1- 2009-1-NO-ERASMUS-ENWA), is based on 7 phases/areas of work:

1. **ANALYSING.** The exploration and mapping of existing solutions and initiatives oriented toward the inspiration of new solutions or systems of solutions. It includes the identification of a consistent design opportunity for a competitive and innovative solution.

2. **ENVISIONING.** The development of scenarios, visions and proposals, used both to define the overall directions to take and to stimulate and align the actors and stakeholders in the development process.
3. **DESIGNING**. The development of the solution through the adoption of participatory design tools supporting interaction and convergence among the involved parties.
4. **ENABLING.** The development of digital platforms, toolkits and other supporting tools and actions (such as knowledge-transfer initiatives), to enable the new network of actors in carrying on the development process by themselves.
5. **PROTOTYPING**. The solution experimentation in a local and small scale; including the assessment and the testing of the network of the involved actors, to give feedbacks for the assessment of the new idea.
6. **COMMUNICATING.** The development of presentations, visualisations, and communication tools and actions to inform about the solution before, during and after its development, with different aims such as convincing potential actors to join or sponsor the initiative, create consensus, foster the adoption of the solution etc.
7. **SYSTEMATISING.** The activities oriented towards organising synergies and multiplication effects among different single projects and different elements of the same project.

3 Conclusions

The co-design processes implemented in My Neighborhood have been a good laboratory to experiment some key issues related to co-design of public services and to the development of co-design approach in complex neighborhood communities. In the following the most important lessons learnt are reported:

- transferring the new service design approach to the public sector can change the way in which municipalities design services. There are many experiments that are going on in Europe and that are demonstrating that larger governmental programs are looking at service design with interest. Here it is important to underline as My Neighborhood is experimenting with service design not as a method to redesign users experience but as set of competence that may trigger profound and unexpected change in public organizations, if transferred and interiorized by the employees from the municipality;
- Small experiments and initiatives are crucial for gluing citizens around “the same story” and to make them active with respect to larger urban transformation;
- Volunteers and associations can work as good entry points but also there is the risk that they introduce element of resistance due to their roles as leaders in the contexts where they operate that may negatively impact on new ideas, processes and solutions;
- My Neighborhood started from people wishes, interests and needs and tried to transform them in new collaborative services also against a larger context. As example, in Milano the design tables had also the role of being the place where the

Municipality discusses its vision for the neighborhood together with the people from Quarto Oggiaro (the vision for urban transformation should govern and drive the flourishing of small initiatives to synergize them towards the larger change);
- Services can be interpreted as tools for triggering the development of the cities intangible infrastructures. New partnerships involving service design, ICT application, services management and governance, are needed for re-thinking the smartness of cities;
- current national regulation and policies can be constraints for the design of new services (My Neighborhood is suggesting new practices for developing policies and regulation much more opened to experimentations from the cities bottom side);
- opposite interests may lead different stakeholders. Complex participatory processes can be applied to find short terms convergence among stakeholders that can both peruse their larger objective but find convenient to be partners in some small experiment. For example, in Milano the Schools involved in QuartoFood and Quarto Gardening have no interest in developing new businesses but My Neighborhood can give them the possibility to involve their students in real meal and gardening services experiences;
- collaborative services developed in My Neighborhood need to find an owner that will maintain them after the end of the project. For this purpose My Neighborhood is developing strategies for service scaling-up.

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