MiraMap: an e-particpation tool for Smart Peripheries

INPUT 2016

9th International Conference
on Innovation in Urban
and Regional Planning

input TORINO 2016

e-agorà | e-αγορά

for the transition toward resilient communities

edited by G. Colombo | P. Lombardi | G. Mondini

9th International Conference on Innovation in Urban and Regional Planning

e-agorà/e-ἀγορά for the transition toward resilient communities

Conference Proceedings Book

ISBN 978-88-9052-964-1

Istituto Superiore sui Sistemi Territoriali per l'Innovazione

Istituto Superiore Mario Boella

POLITECNICO DI TORINO

UNIVERSITÀ DEGLI STUDI DI TORINO

Dipartimento Interateneo di Scienze, Progetto e Politiche del Territorio

INPUT 2016 "e-agorà/e-άγορά for the transition toward resilient communities"

Conference Proceedings from the INPUT2016 Conference in Turin (14th–15th September 2016)

INPUT2016 CONFERENCE COMMITTEE
Arnaldo Cecchini, University of Sassari
Dino Borri, Polytechnic University of Bari
Valerio Cutini, University of Pisa
Alessandro Plaisant, University of Sassari
Giovanni Rabino, Polytechnic University of Milan
Giuseppe Las Casas, University of Basilicata
Michele Campagna, University of Cagliari
Andrea De Montis, University of Sassari
Corrado Zoppi, University of Cagliari
Romano Fistola, University of Sannio
Rocco Papa, University of Naples "Federico II"
Patrizia Lombardi, Politecnico di Torino
Giovanni Colombo, ISMB Istituto Superiore Mario Boella
Giulio Mondini, SiTI Higher Institute on Territorial Systems for Innovation

INPUT2016 ORGANISING COMMITTEE
Cristiana D'Alberto, ISMB Istituto Superiore Mario Boella
Maria Cristina Longo, SiTI Higher Institute on Territorial Systems for Innovation
Stefania Mauro, SiTI Higher Institute on Territorial Systems for Innovation
Luisa Montobbio, Politecnico di Torino
Cinzia Pagano, Politecnico di Torino

Edited by Giovanni Colombo (ISMB Istituto Superiore Mario Boella), Patrizia Lombardi (DIST - Politecnico di Torino), Giulio Mondini (SiTI Higher Institute on Territorial Systems for Innovation)

Editorial coordination by Stefania Mauro

Graphic design by Sara Oggero (ISMB)

ISBN 978-88-9052-964-1

INPUT2016 SCIENTIFIC COMMITTEE
Ivan Blecic, University of Cagliari
Dino Borri, Polytechnic University of Bari
Grazia Brunetta, Politecnico di Torino
Edoardo Calia, ISMB Istituto Superiore Mario Boella
Domenico Camarda, Polytechnic University of Bari
Michele Campagna, University of Cagliari
Alessandra Casu, University of Sassari
Arnaldo Cecchini, University of Sassari
Giovanni Colombo, ISMB Istituto Superiore Mario Boella
Grazia Concilio, Polytechnic University of Milan
Tanja Congiu, University of Sassari
Valerio Cutini, University of Pisa
Andrea De Montis, University of Sassari
Giovanna Fancello, Paris-Dauphine University
Romano Fistola, University of Sannio
Sabrina Lai, University of Cagliari
Giuseppe Las Casas, University of Basilicata
Federica Leone, University of Cagliari
Sara Levi Sacerdotti, SiTI Higher Institute on Territorial Systems for Innovation
Patrizia Lombardi, Politecnico di Torino
Giampiero Lombardini, Università degli Studi di Genova
Enrico Macii, Politecnico di Torino
Fabio Manfredini, Polytechnic University of Milan
Stefania Mauro, SiTI Higher Institute on Territorial Systems for Innovation
Giulio Mondini, SiTI Higher Institute on Territorial Systems for Innovation
Eugenio Morello, Polytechnic University of Milan
Beniamino Murgante, University of Basilicata
Silvie Occelli, IRES Piemonte
Andrea Pacifici, ISMB Istituto Superiore Mario Boella
Rocco Papa, University of Naples "Federico II"
Paola Pittaluga, University of Sassari
Alessandro Plaisant, University of Sassari
Giovanni Rabino, Polytechnic University of Milan
Bernardino Romano, Università degli Studi dell'Aquila
Marco Santangelo, Politecnico di Torino
Francesco Scorza, University of Basilicata
Matteo Tabasso, SiTI Higher Institute on Territorial Systems for Innovation
Valentina Talu, University of Sassari
Andrea Trunfio, University of Sassari
Andrea Vesco, ISMB Istituto Superiore Mario Boella
Angioletta Voghera, Politecnico di Torino
Corrado Zoppi, University of Cagliari

Table of Content

INPUT 2016 is the ninth meeting with the name "INPUT"

A biennial appointment that started in 1999 in Venice at the IUAV.

We had two shifts in the conference, one in date: 2005 (Alghero) was followed by 2008 (Lecco), to avoid overlapping with the CUPUM conference (*Computers in Urban Planning and Urban Mangament*); and one in name: the acronym INPUT at the beginning stood for *INformatica e Pianificazione Urbana e Territoriale* and now it's *Innovazione e Pianificazione Urbana e Territoriale*.

I have been one of the organizer of the first meeting and I'm very proud of the results the initial intuition has yielded through the organization of this long series of conferences.

In 9 conferences all across the country (Venezia, Isole Tremiti, Pisa, Alghero, Lecco, Potenza Cagliari, Napoli, and now Torino) hundreds of experts and users had the opportunity to share ideas, experiences, tools and projects; people from academic world (among them: urban planners, architects, engineers, computer scientists, sociologists), public administration, and industry (from small start-ups to big enterprises) have had the opportunity to explore and measure the relevance of the ICT for the new ways to think and practice planning and design.

Now we have to face new challenges and maybe rethink the formula of the conference.

We know we were right because nowadays one of the most common sense and mainstream expression is "smart city" (personally I'm not fond of this expression, but it is a fact that this is an expression widely used); we know we have to change exactly for the same reason: we need to avoid the abuse of that expression that can lead to an overly technocratic approach often imbued with ideology; as usual we need to make use of the best available technologies, but having an idea of the purpose of planning, a shared vision of the future.

For this reason I am wondering if this occasion could be the moment for a step forward: from the birth of an Association, to the organisation of a seminar for young researchers and professionals (one year the biennial conference, the next year the seminar), to the opening of the conference to other disciplines (history, restoration, archaeology, …).

The Torino conference could be the right occasion for this *shift of perspective*: among its organisers, in addition to the *Interuniversity Department of Regional and Urban Studies and Planning of the Politecnico di Torino and Università di Torino* (DIST), there are two research institutes: *Istituto Superiore on Territorial Systems for Innovation* (SiTI) and *Istituto Superiore Mario Boella on the Information and Communication Technologies* (ISBM); so that research, education, applications and projects are all brought together through the experiences of the organizing institutions: a good viaticum for the future course of INPUT.

Arnaldo Cecchini

INPUT 2016 "e-agorà/e-άγορά for the transition toward resilient communities"

It is universally recognised that the *Smart City* perspective raises a wide spectrum of unexplored and interdependent problems and extends the horizon over which the *City* growth strategies are defined. Energy generation and consumption models, urban mobility schemes, service processes, goods production mechanisms, citizens' behaviour and community habits are all aspects radically challenged by this perspective. These are sufficient circumstances to affirm that the *smart and sustainable* perspective of our cities is fully inscribed in the fundamental questions of our age.
And it is exactly the character of these *fundamental questions* that makes *Smart City* an unrepeatable occasion for society to challenge on subjects of *technical*, *economical*, *territorial* and *societal* nature that need to be stimulated jointly if the essential aim of Smart City is really the *good life* for society. In this framework, it is fundamental that the technical discontinuities are *responsive* ahead of the unprecedented needs of a sustainable development and the financial system is *flexible* enough to support the new kinds of infrastructural solutions. The territorial and urban disciplines are singled out to elaborate *innovative* concepts enabling the completely renewed City processes to take place. The public administration systems must guarantee *effective* measures and incentives to facilitate the inevitable transformations. The societal bodies must play an essential role in increasing the level of *consciousness* and *participation* of the citizens in defining and verifying the suitability of the new social processes.

All these aspects are covered in our Input Conference, where a wide spectrum of scientific thoughts and sensibilities are brought together with the aim of creating a common and challenging perspective: an intelligent, sustainable and inclusive City as a fundamental contribution to the environmental health and the social wellbeing.

Giovanni Colombo

MiraMap: an e-participation tool for Smart Peripheries

Francesca De Filippia[a], Cristina Coscia[a], Guido Boella[b], Alessio Antonini[b], Alessia Calafiore[b], Anna Cantini[a], Roberta Guido[c], Carlo Salaroglio[b], Luigi Sanasi[b], Claudio Schifanella[b]

[a] Department of Architecture and Design (DAD), Politecnico di Torino, Italy (francesca.defilippi@polito.it)
[b] Department of Computer Science (DI), Università degli Studi di Torino, Italy (guido.boella@di.unito.it)
[c] Department of Architecture Design and Urban Planning (DADU), Università degli Studi di Sassari, Italy.

Key-words: shared responsibilities, mobile crowd-sensing, citizen engagement and smart governance, social innovation, smart peripheries.

Introduction

In the last decades, Information and Communication Technologies (ICT) are increasingly adopted by many Public Administrations (PA) worldwide. Notably, PA are taking advantage of innovative solutions to offer better services and to ease communication with citizens (Liu 2015). Furthermore, the uses of ICT can play a crucial role in increasing accountability and transparency in PA (Avila 2010).
However, as debated in Smart City literature (Aru 2014) there are also possible drawbacks in using new technologies, such as socio-technical misalignment within cities (Warshauer 2004), techno-deterministic conditions (Calzada 2015), enlarging digital divide (Mongomery 2013). Therefore, as Jiménez (Jiménez 2014) suggested, it is crucial to consider that:

- technology is a tool not an end (on the basis of defined targets)
- citizens needs in the city must be identified as the primary target for action (citizens involvement)

At this point some questions emerge:

- How to involve citizens and identify their needs as targets?
- How can we design technologies in order to fit with citizens needs?
- How combining offline and online environments can help creating a smarter balance for inclusiveness?

According to the principles of design for social innovation (Manzini 2015) our work aims to make administration more transparent and accountable and to facilitate participation of citizens. Notably, in the research applied, citizens are enabled to directly report problems and proposals. They are thus transformed in human sensors whose information can be visualized on an interactive map combining crowdsensing with crowdmapping. The ICT solution must be usable from mobile but also via traditional channels (text messages, call phone) to increase accessibility of disadvantaged citizens.
The research process involves an interdisciplinary team from the Academia, composed by urban planners, architects, computer scientists, geographers, legal experts, with the direct participation of local administrators and citizens.

Methodology

The research area is Mirafiori Sud District in the southern urban area of Turin. Since 2013, the Politecnico di Torino established strong connections and institutional relations with the local administration and stakeholders in the Mirafiori Sud neighbourhood. Therefore, that successful collaboration over the years among the Politecnico di Torino and the Mirafiori Sud District in the field of urban regeneration has being ensuring the study significant impact and results. Nowadays, the District represents a paradigmatic picture of a post-industrial city in Europe and North America. In the next future, the southern area of Turin – and particularly Mirafiori Sud - due to its high potential in terms of social and economic development, will be the target of several strategic transformations, with an interesting mix of private top down initiative, public support, facilitation and bottom up social enterprise experiments. Furthermore, Mirafiori Sud is an active neighbourhood in order to overtake the actual situation of crisis. A rich and lively network of local associations support them in this sense (Guiati 2014). Methodology adopted uses an iterative process that consists of two phases in order to assess a very dynamic framework for steady improvement of performance as the case study knowledge increases. The first phase (2013) has set up a pilot project called Crowdmapping Mirafiori Sud to recognize context and specify method. It has involved citizens with different age and technological skills through a participatory approach in mapping informations about their neighbourhood. The second phase (2015) is implementing an innovative solution to perform the study to make citizens interact with public administration. The MiraMap project has a more structured approach in term of IT system in order to directly involve public officers in the reporting process.
The pilot project Crowdmapping Mirafiori Sud (www.polito.it/mapmirafiorisud) was granted with 5x1000 funds from Politecnico di Torino and has involved the academic (including students) and the local community in a participative and inclusive process to identify and categorize on a geographic web-based map the obstacles/barriers which prevent vulnerable categories to access and use public space. In order to allow an easy crowdsourcing of data and the total transparency of their diffusion (Hagen, 2011) the open source platform Ushahidi has been adopted and customized. The adopted research process pointed out the following six levels of inquiry in order to better recognize the context and specify method for the next phase:

1. Kick off. A necessary phase of identification, contact and meeting with the local actors and representative of the categories identified as 'vulnerable'.
2. Definition of Criteria. Thanks to an interaction with local actors through a series of transect walks, a reflection on criteria, categories, standard identification of the phenomena to be signaled, have been set up for a coherent achievement of a data base.
3. Set up. Starting from inputs acquisition from the local actors, the Ushahidi platform has been set up, then a website was designed to host all information and news. An email address and a telephone number were also provided, to allow civil society and public administration to promptly access to informations and send their posts. The iXem Labs, Department of Electronics and Telecommunications of the Politecnico di Torino, created a dedicated system based on the open-hardware Arduino plus a GSM/3G shield to send SMS direct to an email address.
4. Training. With the support of the Fondazione della Comunità di Mirafiori Onlus, a group of 30 inhabitants was selected for collecting data on the area, and stimulating the 'crowd-mapping' effect.
5. On field data collection. During June and July 2013 the group formed by the university students and the involved citizens made several data collections in the neighbourhood, sending information direct from mobile phones, app and computers to the Crowdmapping Mirafiori Sud website, email and numbers. Once the information was

received, it was checked for approval and then, if appropriate, was made visible on the map.

6. On line. Once the data collection was completed, outcomes were published, widely presented and made available to all the stakeholders involved and to the local administration.
7. Monitoring and evaluation criteria of *ex-post* impact. The criteria have been set up on the basis of the Community Impact Assessment/ Evaluation (CIA/CIE) methodology that evaluates in a descriptive manner the impacts - monetary and non-monetary - derived from the project in relation to the various actors involved.

Notably, the pilot project made evident citizens'strong expectations for a more active participation of the local institutions. The second phase MiraMap (www.miramap.it) which is currently ongoing, has moved from these insights. It engages both citizens and the local administration in a report process of critical issues as well as positive trends and resources within the administrative area. Thanks to a wider collaboration, which includes the Computer Science Department of the Università degli Studi di Torino, the request of a more sophisticated IT approach have been settled in connecting a new local social network based on a web interactive map (First Life) with an open source Business Process Management system (BPM). Methodology inherited from the first phase have been run to better respond to the project's goals:

1. Preparatory phase. After an official launch of MiraMap, a series of meetings had place with the administrative executives to set up the data management and the features of the digital platform. Result is a collaborative platform which integrates social network features to the administrative workflow.
2. Operational and training phase. Weekly meetings with public officers are ongoing in order to test the platform both in terms of usability and administrative procedures. We are adopting a fragile methodology to be more efficient in providing requested features.
3. Data collection use and validation of the platform. On-going phase to implement the platform both by providing data and by testing new projects and practices undergoing in the neighbourhood.
4. Impact Evaluation. The simulation starts from the assumption that in such processes it is strategic to structure also the phases of monitoring and assessment of the effects on the subjects involved and on territorial and administrative levels.

Integrating technology for MiraMap

To facilitate communication between citizens and public administration, two environments have been designed and integrated: one for citizens using First Life as interface - the Social Network environment (SNenv), and the other based on the BPM system for local administrative staff in public Institutions - the BPM environment (BPMenv). The SNenv is based on First Life: an innovatiove social network based on a map that aims at harnessing the 'network effects' for the achievement of sustainable change in the cities through bottom-up social innovation. Business process management system (BPM) instead, is a set of activities to define, optimize, monitoring and integrating management processes. The two environments have different functionalities to fit with differences in users roles. In the SNenv users are citizens and they can freely sign in: all the registered users visualize, modify or add information in First Life. The second group of users is administrative staff and, thus, sub-roles and tasks are defined apriori and are grounded in the local institution organization; to guarantee efficiency of completing processes, tasks in the BPMenv cannot be delayed and they have temporal constraints for the execution. Therefore, Miramap's architecture is the result of integrating two systems with different functionalities. An

architecture overview can be seen in Figure 1. First Life's architecture is composed by an interactive geographical map interface as frontend and a backend for managing and searching geographical data. The interactive map is created with AngularJS, Ionic, Leaflet and OpenStreetMap. Depending on the category of Point of Interest (POI) chosen, the frontend offers different kinds of interfaces for visualizing or inserting/modifying the data. Moreover, the classification uses two dimensions in line with those used by the local administration: categories (green areas, safety, animals, mobility, etc.) and typologies, inherited from the pilot project (problems, positive realities and proposals). In order to set up an instance of First Life for MiraMap, a new kind of entities has been implemented: reports. Differently than standard entities of First Life, such as places or events, reports do not appear immediately on the map but they are first moderated by the administration. The information added by the citizen is forwarded to the BPM creating a new case to be processed. The user is informed via mail. Differently than in the standard First Life, POIs are associated with a status: reported, verified, closed, that depend on the evolution of the report in the workflow. The BPMenv information relies on BonitaSoft which is a design tool to model workflow and an engine which creates instances of workflow (cases) executing the steps of workflow (activities), using HTML forms where it is necessary to get information from users. It is managed by administrative staff to handle problems reported by citizens and, to make public the procedures that have being carried on. The administrative staff has been structured in three working groups on creating the workflow: the Public Relation office (PRo); the Technical office (To) and the Operational office (Oo). Furthermore two macro-types of reports have been defined: report managed by the PRo and report managed by the To. At each step of the workflow (approval, verification, conclusion) the staff can reply to the citizen, so the report on the map is not only changed in status, but its reply is shared on the map.

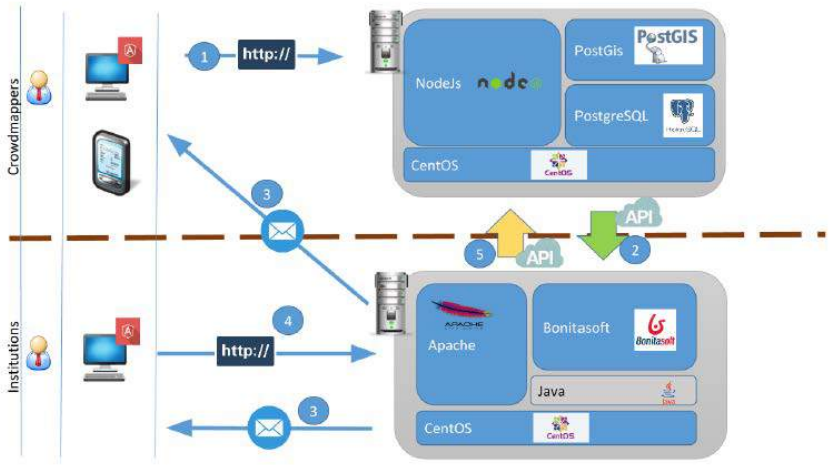

Fig. 1. Architecture of the two environments and their connections.

The possible operations in Miramap can be summarize as follow (see Figure 1):

1. Citizens are the crowdmappers wich fulfill a report form and submit it to the FirstLife server;
2. the backend calls the BPM, through API, creating a process instance which enables the administrative staff at handling the report;
3. when the instance is created it is notified by email to the group responsible of the duty and to the citizen who submitted the report (at each step of the process the citizen will be notified by email);
4. the person in charge can access the report details and start the workflow;

5. by API each step of the process is communicated to the FirstLife backend and it is visualized in the interface as a change of status of the POI.

Conclusions

The pilot project Crowdmapping Mirafiori Sud had experimented a possible application of participative methods and techniques, via:

- the set up of a low-cost smart system accessible to everyone;
- the set up of a partnership constituted by Civil Society, Public Administration and representatives of Non-Profit Sector right from the early stages, to guarantee administrative social and technological transformation;
- the training and capacity building process referred to the use of the technology to identify, map and report existing or potential problems;
- the capacity of all the players involved to promptly access data and to offer an immediate and transparent response to reports received;
- the availability of a decision making support tool, not only in response to single/specific problems, but also for planning district scale interventions;
- the CIA method shows that the platform and the connected strategies/actions have no negative physical territorial and social impact: no stakeholder is penalized by the use of the platform, aimed at supporting administrators in the government of the territory.

MiraMap moves from these achievements and intends to provide a technologically advanced solution whose implementations concern: a more complex administrative process and a social network customization to support bottom-up co-design, opening up new opportunities for citizen-to-citizen co- production of services [Ostrom 1990].

References

Renata Avila, Sopheap Chak, Jakub Gornicki, Heacock Victor, Kaonga S. Presley and Manuella M. Fibeiro and Singh C. Yang, *Technology for transparency: The role of technology and citizen media in promoting transparency, accountability and civic participation*, 2010. Accessed: April 20, 2016. http://globalvoiceonline.org/wpcontent/uploads/2010/05/TechnologyforTransparency.pdf

Silvia Aru, Matteo Puttilli and Marco Santangelo, "Città intelligente, città giusta? Tecnologia e giustizia socio-spaziale, *Rivista GeograSica Italiana*, vol. 121 (2014): 385-398

Igor Calzada and Cristobal Cobo, "Unplugging: Deconstructing the smart city", *Journal of Urban Technology,* vol. 22 (2015): 23-43

Shuhua M. Liu and Qianli Yuan, "The evolution of information and communication technology in public adminidtration", *Public Administration and Development,* 35.2 (2015): 140-151

Ezio Manzini and Rachel Coad, *Design, when everybody designs: An introduction to design for social innovation* (MIT Press), 2015

Martin Montgomery, *An introduction to language and society* (Routledge), 2013 Elinor Ostrom, Governing the commons: The evolution of institutions for collective actions (Cambridge University Press), 1990

Christopher Williams, *Leadership accountability in a globalizing world* (Palgrave Macmillan), 2006

Mark Warschauer, *Technology and social inclusion: Rethinking the digital divide* (MIT Press), 2004

INPUT, the International Conference on Innovation in Urban and Regional Planning is managed by an informal group of Italian academic researchers working in many fields related to the exploitation of informatics in planning. Since the first conference, held in 1999, INPUT has represented an opportunity to provide innovative and original contribution to the ongoing debate on the Innovation and the use of ICT in planning, management and evaluation issues and to improve the process of knowledge acquisition, by means of the development of new techniques and methods

INPUT 2016 "e-agorà | e-αγορά for the transition toward resilient communities", the 9thInternational Conference on Innovation in Urban and Regional Planning has been held the 14th and 15th of September 2016 in Turin at the Castello del Valentino.

Jointly organized by SiTI - Higher Institute on Territorial Systems for Innovation, DIST - Interuniversity Department of Regional and Urban Studies and Planning of the Politecnico di Torino and Università di Torino, and ISMB - Istituto Superiore Mario Boella on the Information and Communication Technologies, the Ninth Edition, starting from an open and critical view of the Smart City paradigm, aimed at raising a comprehensive spectrum of new and interdependent problems showing a multidisciplinary character and extends the horizon over which the urban growth strategies and, more generally, the regional development strategies are defined. This view not only calls into question technical or systemic issues, but heavily challenges societal and ethical aspects, assigning a new kind of responsibility to the needed research and innovation efforts.

Almost 90 contributions, more than 200 national and international authors have presented their research during 8 thematic sessions:

- STeHeC - Smart Territories and Healthy Cities
- ESSP - Ecosystem services and spatial planning
- TSC - Towards the Smart City: procedures, parameters, methods and tools
- SMGI - Social Media Geographic Information and collaborative mapping: exploring new trends in spatial analysis
- UFePC - Urban Form and Perception of the City
- IMPC - ICT Models: Planning for inclusive Communities
- URTL - Urban-Rural Transitional Landscapes
- MMSD - Methods and Models for Sustainable Development

ISBN 978-88-9052-964-1