

# A Market Analysis of Urban Interaction Design

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**Abstract.** Urban Interaction Design draws upon knowledge and approaches from a range of disciplines involved in the design of urban spaces, connecting them and establishing their interactions as a principle. It is also rooted in the wider field of interaction design, from which it takes much of its emphasis on behaviors at the human scale, putting the citizen at the center of the process of creating solutions in networked urban spaces. The paper presents the results of a preliminary survey that seeks to articulate, through best case examples, the challenges and opportunities for the field of Urban Interaction Design in the context of Smart Cities.

**Keywords:** Smart cities · User-centric approach · Interaction design

## 1 Introduction to Urban Interaction Design

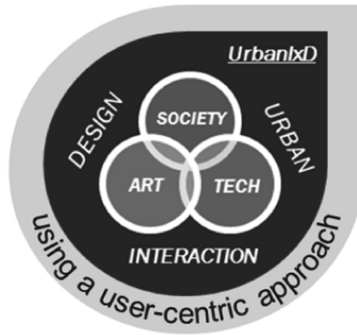
Cities are increasingly characterized by urban environments permeated with data and augmented by technology. In fact ICT can be considered as a new layer of complexity to the city, where everything is digitally interconnected and interdependent. Interactions between city users and these environments are the central question in this context.

What is needed from the user point of view, which technologies can be used, how to “humanize” their impact, and finally how to design an answer to a need, are all questions at the core of Urban Interaction Design.

Urban Interaction Design can be seen as being grounded in the traditions of the Society, Technology and Arts [1], as depicted in Fig. 1.

The ‘Urban’ in urban interaction design signifies the emphasis on spatial aspects that affect human relationships, drawing on approaches from the social sciences.

‘Interaction’ refers to technology, particularly communication and networked technologies that convert the raw material of data into meaning that informs our decisions, at scales that range from citywide solutions to grassroots hacking and tinkering.



**Fig. 1.** Urban interaction design approach

‘Design’, the last part of the trilogy, draws on an interdisciplinary arts tradition, bringing critique and creativity into the mix, with an emphasis on both theory and practice [2].

## 2 Market Analysis

Urban Interaction Design innovates the way we can build Smart Cities, strongly adding the point of view of those for which the Cities are created, the Citizens. In the present study we analyze, by involving a panel of experts via an online survey, what are perceived to be the main challenges to innovate a Smart City, where the opportunities are foreseen, and what cases are already drawing upon this field.

### 2.1 Online Survey

An online survey which explores the perceived impact of Urban Interaction Design was deployed in two phases and run in 1H2014, reaching 122 experts worldwide. Most respondents are based in Europe (70 %) and almost evenly split between Industry (57 %) and University/Research (43 %) affiliations.

The first phase aimed at assessing the general opinions via 9 open-questions in the subjects of interest, such as the emerging issues in the Smart Cities and future opportunities and best practices for Urban Interaction Design.

The second phase was aimed at extending the sample size and converging the main categories of responses identified before. The survey was simplified to 5 multiple-choice questions and 2 open-questions.

### 2.2 Opportunities and Best Cases

Our preliminary analysis [3] shows that opportunities to introduce more solutions for the Smart Citizens lay particularly in areas such as smart governance, smart

environment and smart living. This result is shown in the percentage mapping of the survey output (Fig. 2), where the percentage gap in total declared issues for the Smart Cities (dark grey in the figure) versus total suggested solutions (light grey) is 12 %, 6 % and 4 % respectively for the said areas. The assumption made here is that those areas where few solutions were suggested require more attention and effort in terms of future developments.

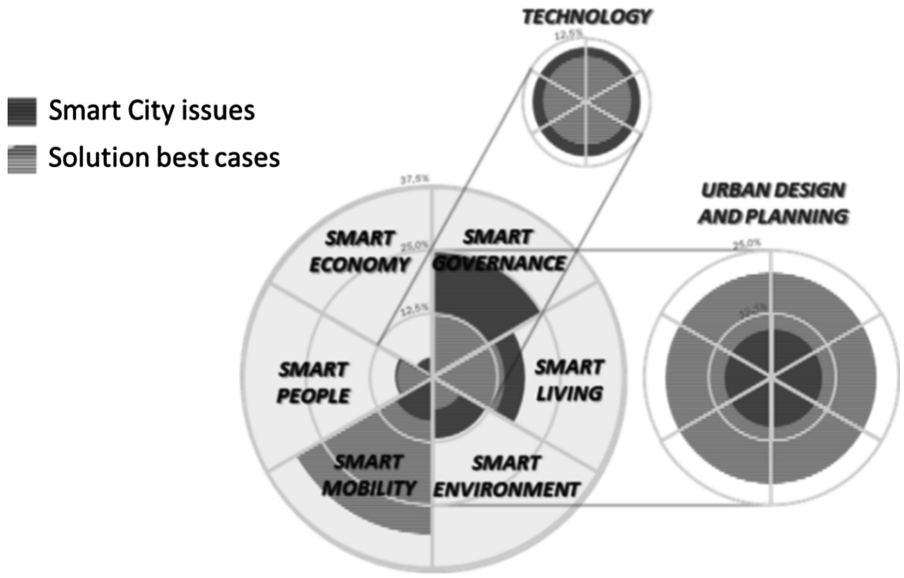


Fig. 2. Urban interaction design survey results

The respondents provided 104 examples of Smart City products or services that in their opinion were related to Urban Interaction Design. Among these we identified a 30 % as best cases according to the characteristics described in Sect. 1 of this paper, which are listed in Table 1.

The most representative of these is the Smart Citizens project [3], a platform to generate participatory processes of people in the cities. The objective of the platform is to serve as a node for building productive and open indicators by connecting data, people and knowledge. The idea is leveraging on several elements: involvement of the citizens in both the development and product deployment, integration of the solution in the smart city tissue, use of the most innovative open hardware and open software approaches.

**Table 1.** Urban interaction design best cases in the smart city context

Area	Best case	Description
Civic enlightenment	Bottle Bank Arcade Machine	Gamification for promoting plastic recycling <sup>(*)</sup>
Road security	Speed Camera Lottery	To get more people to obey the speed limit by entering a lottery for those who kept the limits <sup>(*)</sup>
Participated IoT	Smart Citizen Project	Citizen participation platform with low-cost sensors for creating open indicators in the cities
Interactive maps	Google Maps	Web mapping service
Green transport	Copenhagen Wheel	Wireless pedal assisted system with an App to monitor your ride and socially connect
Public transport	Flexible bus stop	Dynamic and flexible bus-service system by Philips
Car sharing	Car2Go	Accessible and flexible car rental system
Intelligent building	Xeromax Envelope	Interactive second-skin for building that records, presents and forecasts weather conditions <sup>(**)</sup>
Interactive display	Pointssign	Interactive advanced directional signs
Urban furniture	Light Lines	Modular & controllable lighted outdoor furniture <sup>(**)</sup>
Interactive exhibits	Danmarks Borgcenter	User-generated content & interactive exhibit on the castle ruins of Vordingborg, Denmark
Smart governance	Hackity App	Citizens App for public space participated design
Smart economy	Matching Markets	MIT mobile network of vendors w. real-time communication

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### 3 Conclusions

In this work we presented Urban Interaction Design as a new field with a user-centric approach based on the creative contamination of the Art, Society and Technology domains. We believe it can powerfully innovate the way we develop services in a networked urban environment, offering an effective tool to understand and tackle all challenges holistically.

In order to better understand this field and assess its potential and maturity level we conducted an online survey that prompted smart governance, smart environment and smart living as areas yet under-addressed in terms of available solutions at least with reference to the described approach.

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