Chapter 11
Digital Tools for Capturing User's Needs on Urban Open Spaces: Drawing Lessons from Cyberparks Project

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Abstract The chapter discusses how ICT can be used to enhance the understanding of the relationship between space, users and social practices. As an example of possible use of ICT for capturing and better understanding user's needs, the new digital tool WAY Cyberparks is presented and discussed. A "cyberpark" is defined as a new type of urban landscape where nature and ICTs blend together to generate hybrid experiences and enhance quality of life. The WAY Cyberparks digital tool consists of a smart phone application, server/cloud and web services. Through the experiences from testing it in selected urban open spaces in Barcelona, Lisbon and

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Ljubljana opportunities are presented and lessons are drawn about relevant aspects of the ICT towards building a more participatory and collaborative process in planning of public spaces. A relevant aspect of the ICT lays in their ability to enhance communication with (potential) users, transforming the production of public open spaces into an interactive process, and enabling creative community participation and empowerment. Furthermore, some challenges of the increasing penetration of digital technologies devices (smart phones, smart watches, tablets, etc.) within the broader context of their use in public urban open spaces such as parks, gardens, squares, plazas are discussed, together with the consequences of this interweaving, which is growing at a rapid pace, unfolds research needs in the future.

11.1 Introduction

Urban open spaces are widely recognised as an important aspect of the quality of life and environment as well as sustainable and people friendly development of cities. They enable contact with nature, provide possibilities for variety of every day and occasional activities and experiences, they are places for communication, interaction, connection and encounters for inhabitants and visitors. Throughout this chapter, the shorthand phrase—urban open space—is used to represent the full spectrum of different and diverse open spaces within the public realm in cities, i.e. all urban and green spaces provided for communities to use and enjoy, for mobility, for the merit of their environmental benefits, and to address ecology and biodiversity. Among them are streets, squares, plazas, market places, parks, green spaces, greenways, community gardens, playgrounds, waterfronts, etc., each one playing a vital role in the city. In this chapter, collecting the visions of different discussions in the literature and in different disciplines, we work the definition of a new concept, the Cyberpark. A Cyberpark is a new type of urban landscape where nature and ICTs blend together to generate hybrid experiences and enhance quality of life. The attributes of a Cyberpark (referenced from the Smart Cities initiative) could be defined by the use of sensor technologies in a connectable space, accessible to the public through ubiquitous technologies used in sociable and sharable ways where the virtual is made visible or augments the landscape. ICT can be used in this context to give or gather information, to aid co-creation of space, to allow crowd sourcing of information and opinions, and to allow affective sharing or self-monitoring of activities. Hardware may be embedded in the environment in the form of responsive sound or lighting systems, control systems, kinetic objects or artworks, passive sensor technologies and display systems. We recognize that the use of such affordances will be qualified by such considerations as the time of day, the duration of the visit, the weather and temperature, location, season, individual or group engagement, age, gender, purpose of visit and the topology and size of the space.

Many research works emphasize importance of urban open spaces and highlight their social, ecological, spatial, and economic and health benefits, from a single as well as from a cumulative perspective (GreenKeys 2008; Pallares-Barbera

et al. 2011; Smaniotto Costa 2012, 2014; Šuklje Erjavec 2010). There is a consensus that the creation of healthy, attractive and sustainable urban environment not only depends on the presence, distribution, interconnection and accessibility to open spaces, but also usability in terms of attractiveness for different uses and users, its responsiveness, and inclusiveness are important. Regarding the social function, open spaces are social gathering places, where outdoor interactions between people and people, and people and spaces can occur. They are sites of sociability, as they afford the common ground for communication and information exchange. They are places to express cultural diversity, to see and be seen, or even be anonymous in a crowd (Thompson 2002; Whyte 1980). The social interactions are important for defining a sense of place, for contributing to our physical, cultural, and spiritual well-being, for the personal development and social learning and for the development of tolerance (Šuklje Erjavec 2010).

Studies as well as practical experiences highlight the need for comprehensive understanding and consideration of users' needs for successful and effective planning and design of open spaces that should fulfil a wide range of functions and roles (Šuklje Erjavec 1994, 2001; Šuklje Erjavec and Goličnik 2006). A wide typology of open spaces is needed to provide different possibilities for use, by different users' groups, and to fulfil equivalently the different needs and expectations, to provide good accessibility and welcoming atmosphere for all, not only in physical, but also in psychological and social senses, forming territorial identity and image (Šuklje Erjavec 2010).

There are different methodologies for capturing users' needs as well as interpreting them. They range from different forms of questionnaires, pools and surveys that directly collect and investigate personal opinions, needs, values and motivations, to different observation and monitoring techniques. They have been developed to provide more objective and comprehensive insight into human needs and behaviour. The main subject of this chapter is a review of new possibilities provided by ICT (as a collective term that encompasses digital technology and its facilities and devices) for capturing users' needs and how the increasing presence of ICT is affecting contemporary lifestyles and through them also values and needs of contemporary and future users of open spaces.

Particularly the global access to Internet by smart devices, such as smartphones, smart watches, tablets, etc., making information available and shareable by almost everyone, everywhere and at any time, at low cost and to an unprecedented degree in history (Wilkins et al. 2014), makes the world increasingly hyper-connected. That has decidedly had strong social impact already and has changed the priorities and lifestyles of many citizens. The development of ICT is related to interacting, innovation, and novelty; and it is opening new forms of action in all spheres, from the level of individuals, to society, and that of the state and governance. In fact, our society is increasingly dependent on ICT at home, for work, education, and recreation. Some authors call this already a digital society, having the main driver the digital telecommunication and the wireless connectivity systems. This gives rise to the question whether ICT can support urban sustainability and civic innovation, and encourage greater community engagement and social participation.

Building a theory and studying the social, political, economic, and cultural impact of the ICT is not an easy task because their use is in a constant and accelerated development, transformation, resulting in turn in new interrelations. Due to this constant change, the analysis of opportunities and impacts of ICT faces the risk of dispersion and missing the point. To prevent this, it calls for a precise description and definition of the subject of study: the interactions of ICT in public open spaces. The consequences of the interaction and innovation, of the increasing penetration of digital devices placed within the broader context of their use in urban open spaces (parks, gardens, squares, plazas, etc.) are not yet fully investigated. These facts accompanied by rapid development and increasing application possibilities, challenges urban designers, social scientists and ICT experts to rethink the possibilities and use them in the new ways.

In this chapter, we present niche information addressing development and research of the applicability of ICT tools in public open spaces, which serve as the interface between the space and the people. Such interface can help public space designers and decision-makers to catch the perception, demand, attention, or complaints of people using a space. Moreover, it can be used to enhance the interaction opportunities with contextual information, games or socializing. An example of interactive research methodology is the digital tool WAY Cyberparks.[1] It enables tracking users and their movements in public spaces, and as an interaction interface, it allows through augmented reality to display the information about the possible changes and improvements of the space and its elements, and as social reporting it enables users to give feedback, to provide information about problems, or warning in case of incidents. The main theoretical and methodological perspectives are outlined in context of studies in Barcelona, Lisbon, and Ljubljana, where the digital tool WAY Cyberparks is being used. Its features and ability as a research tool are discussed, as well as lessons are drawn towards a possibility to use ICT for building a more participatory and collaborative process in the production of open spaces.

11.2 Understanding the Relationship Between Users, Social Practices and Space

Considering that space is one of the most important dimensions in the analysis of social phenomena of the contemporary world, it is a key to acknowledge that the term space embraces plurality, as it conveys ambiguity of meanings (Bettanini 1982). The analysis of the relationship between social and the morphologic organisation of space is challenged with the interaction between individuals, society and


Fig. 11.1 The observation elements of the relation between the social and spatial organisation of the space. *Source* Menezes (2003, 2010)
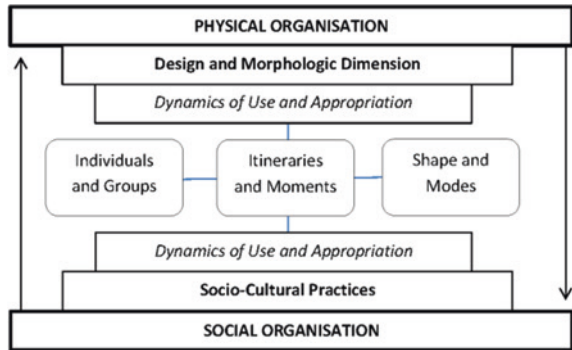
environment, and among individuals and groups, between themselves and with others, as well as behaviours, temporal aspects, and with real and virtual space (Menezes 2010, 2012) (Fig. 11.1).

Such analysis advances deepen knowledge of aspects as characteristics of users—individuals and groups—(e.g. sex, age, style, activities, etc.), their behaviour patterns, and associated images. It can outline socio-cultural assets that are activated in the appropriation of the space and the concerned temporalities (rhythms and time of activities, frequently changing on a daily or seasonal basis, durability and stability, and changes with time). Hence, the analysis allows detecting insights in the relationship between these aspects and morphology and physical organisation of open space (street, plaza, green space, coastline, among others). It can reveal, on the one hand the signals or risks of certain users or user groups of being segregated or excluded, and on the other, certain spaces of being vandalized and neglected (Menezes 2010; Fyfe 1998).

The observation of space identifies a social reality because the morphology and layout embodies a representation (Lévy and Segaud 1983), and how that space is experienced by users (perception) and both are reflexive. The represented space reflects a capacity of users to perceive the space, and this in turn, enables them to construct a mental figure—an image, which is used for information, psychic-spatial reformulation and reflection (Menezes 2010). Hence, it is relevant to identify variables, which in the course of use, experience, and appropriation of the space are used as socio-spatial reference by individuals and/or groups (Ferrara 1993; Menezes 2003). The analysis of images and representations of space enables the creation of a set of associations that enhance the knowledge of the relationship between space and society (Fig. 11.2). A more complex issue arises when the connection between physical (as tangible) and virtual (as intangible) spaces realities is introduced, but it can also enrich the spatial perception, thus contributing to the set of urban images and imaginary, eventually creating hybrid spaces The physical and virtual spaces not necessarily concur with each other, quite possibly articulate or juxtapose themselves. That is, the relationship between physical and virtual spaces complicates and enriches the processes and dynamics of use, ownership,
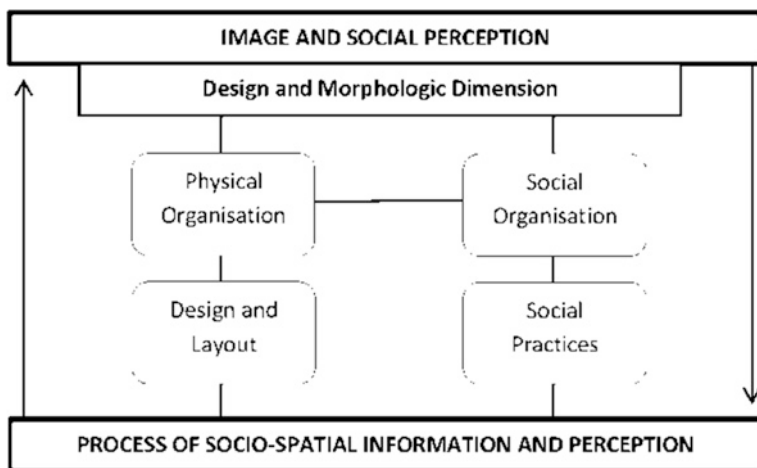
Fig. 11.2 The process of socio-spatial information and perception. *Source* Menezes (2003, 2010)

perception and socio-spatial representation. The differences of tangible and intangible order create combined and articulated realities that, in some cases, can also be juxtaposed. However, in general, the relationship between physical space—as example for the material order—and virtual—as example for immaterial order—could be exemplified by the idea of hybrid spaces.

Therefore, it is important to understand an open space from the social practices, as they through a set of reciprocal relationships create and transform the meanings of space. These can be different between male and female, young and old, we and others, indoor and outdoor, private and public, local and global, time and space, daily life and extraordinary situations, real and virtual, leisure and work. All these aspects are equally important to understand the different expectations of the people and define their needs. Then, the challenge is to identify the contribution of ICT to give expression to aspects that come out of the relationship between users, social practices and spaces.

11.3 The Cyberparks Social Engagement and Location Technologies

In the era of big data, cities and communities create data that can serve different needs of their citizenry. The production and user-friendliness of open spaces in the public realm is a matter of increasing concern to councils and citizens alike. The concern is driven by a greater understanding on environmental issues and a growing concern about quality of life. There is a strong relation between people and places. As Silberberg et al. (2013) state, the relationship between both is not linear,

but iterative, and mutually influential. This raises the question if city governments will do more for those people/communities who raise their voices. What happens with such passive citizens/communities, will they still be heard? No doubt, the more involved people are in their environment the more they feel collectively responsible for it. The engagement of people, achieving their needs, the quality of places and the public investment in these places, etc., are part of a virtuous circle (GreenKeys 2008). In this process, technology can be the fuel that keeps the process in motion, as ICT enables the creation of platforms with digital engagement at their core. For this work the question is centred on how open spaces can be not only designed for people but also with people. Considering that technology is shaping, and will continue to shape people's perceptions and social interactions, and probably the emergence of social and political thoughts, which will reflect not only in the way people use urban spaces but also on their needs and requirements regarding the design and quality of these spaces.

There is a wealth of evidence that the involvement of people can provoke a real change in the quality of the urban environment (Šuklje Erjavec 2010; GreenKeys 2008), thus improving the quality of life. The emergence and penetration of ICT has led to various forms the appropriation of the open spaces where the ICT facilities and devices play more and more a significant role. In this context, the COST action TU1306 coins the term *Cyberparks*, as a new type of urban landscape where nature, society, and ICTs interact to generate hybrid experiences and enhance quality of urban life. This hybrid space plays a prominence role to advance knowledge on the relationship between people, social practices and places, and the resulting social and spatial interactions. Urban ethnography will bring together knowledge about the use of new media technologies in public spaces from an ethnographic point of view and set up the understanding of the public spaces and human behaviour in the context of new media. In order to understand how best to connect technology and public spaces, we will observe both uses of technology within space, but also user-behaviour in that space not linked to technology. The constant and increasing presence of ICT makes the world increasingly hyper-connected, what decidedly have strong social impact. Considering only a small part of these impacts, on a micro scale, this work focus on the intertwining of ICT with open spaces. The diffusion of ICT is increasingly changing our relationship with our physical and social environment for work and recreation. Understandably the blurring of boundaries between physical and virtual life gives rise to concerns however it opens new opportunities to social interaction, communication, and media services.

Another systematic for ICT in relationship with open spaces is proposed by Ioannidis et al. (2015) with an approach based on a cognitive-based strategy. It classifies the interrelation into three frameworks: (1) Position informatics, (2) Sensory informatics, and (3) Synergistic interface. In their view the interactions is a two-way system that learns people how and what to decide/choose/prefer while they move in an open and mediated space. Further, the authors consider that it should enable people to reconsider their own roles in the action-sensitive environments of a Cyberpark. This approach can be a possible tool to understand

the role of the digital information in a digitally mediated open space. From these three frameworks, the synergistic interface is in the core of this work. To evolve, the mediated space has to be understood more than configuring wireless sensor network spots or about designing green landscapes accessorised with wireless Internet access spots (Ioannidis et al. 2015). Instead, it requires a creative re-imagination of urban open spaces. Technology support, like recording, filtering, grouping, or sharing different opinions and preferences, can provide new pathways for generating and advancing knowledge on places and people interaction.

These days the experiences are moving beyond initial artistic, political, marketing, towards a more academic outlook by aiming for a more sustainable and a people's more friendly urban development. The metaphor of digitally mediated open spaces, where different physical access and paths are provided to enable things to happen, seems to be a promising line of thought. In this context, the cooperative design and decision-making processes can be enhanced with new views and approaches. However, more important than rather limiting people to mere users, digital platforms enables people to take part in an urban process. ICT and the social interactions enable therefore an evolving of a more people-centred framework not only for urban, but also for cultural, economic, and political development. In general, the use of ICT for the provision of a framework based on cooperation can lead to an enhancement of democracy and people's empowerment. In another words, cities must be considered as platforms, with citizens involved to utilize technology to creatively built and redefine core functionalities (Grech 2015). The possibility of ICTs' use in a connectable space, accessible to the public through ubiquitous technologies used in sociable and sharable ways, is opening many new opportunities for interrelation of ICT and urban open spaces. In the case of the COST action Cyberparks three different mode of communication were defined:

1. Communication among users (phoning, messaging, web surfing, gaming, etc.);
2. Transmission of useful information for users (digital advertising, assisted navigation);
3. Interaction on urban issues via mediated, through social software for enhancing communication and connecting people on urban issues. These encompass networking and social reporting, improving participatory and/or consultation processes, in decision-making processes, e-planning, or new ways for governments and citizens to interact.

As argued above, ICT is deeply redefining relationship between individuals, community, and governments; it is introducing new opportunities but also new challenges and risks. Digital divide and literacy is an apparent manifestation of this, and must be considered not only in relation to ICT appropriation within the various age, cultural and economic groups, and relational circles, but on technologies than the results can be influenced. Before further examining the issues in more detail, we should reflect on some fundamental questions about the influence of technology providers and associated hardware and software. The question inevitably arises as more societal, political and cultural processes become digitised, and

what is the role of ICT to shaping these processes. Our goal is to create a social infrastructure around open space, where ICT can be a fuel that could support the creation of a more inclusive urban environment.

11.4 ICT for Capturing User's Needs

ICT opens different ways to increase the knowledge available in the interaction between people and spaces. Ubiquitous computing, i.e., computing capacity anywhere and anytime is becoming a reality these days thanks to the appearance of smartphones, tablet computers, and embedded processors seamlessly controlling more and more of the objects that are part of our everyday lives. This enormous computing capacity, combined with the continuous development of more efficient digital sensors capable to extract richer information from the environment, and supported by a global communication network like the Internet, constitute a powerful tool to establish a broadband communication channel between people and their surrounding spaces. Furthermore, social networking services (Twitter, Facebook, Instagram, etc.) are revealing themselves as a very adequate vehicle to activate this channel due to their growing popularity and generic end-user design.

However, many of these opportunities are not yet fully investigated, i.e. only recent studies are available to understand the behaviour and opinions through social networks and corporate mapping tools. Nevertheless, to gain knowledge is difficult as long as ICT is not targeted to the respective context. This questions the credibility of data and results. The blind and des-contextualised communication can be overcome if ICT and open space issues are balanced, and seem as a common product. New digital media is especially effective for gathering different data and information about users' preferences and concerns. With appropriate adjustments, ICT can be used also for research purposes for gathering relevant information about behaviour, needs, preferences, motivations as well as opinions and suggestions of users. This information can help professionals to design places that meet users' needs, to manage them more effectively, as well as to present better their importance to decision makers and society in general.

11.5 A Tool for Monitoring the Use of Open Spaces

A method to extract synergies is proposed by the COST action Cyberparks, which is synthesized in a digital tool called WAY Cyberparks (Bahillo et al. 2015). It consists of three main elements: a smartphone application (app), a set of web services and the cloud. The Fig. 11.3 shows the logical architecture of the monitoring tool. The smartphone uses its sensors to collect the so-called "signals of opportunity" (SoOP), which transmitted for localisation or non-localisation purposes may be exploited to this end. The smartphone app is in charge of computing its own
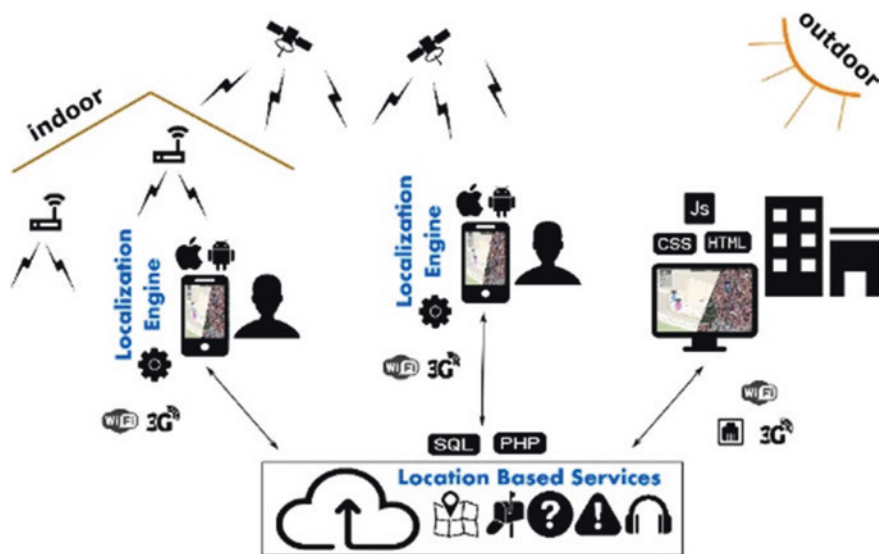
Fig. 11.3 The logical architecture of the monitoring tool. *Source* University of Deusto (2015)
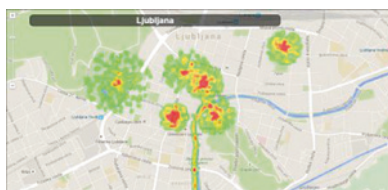

Fig. 11.4 The monitoring tool allows creating behavioural maps. The aim of this functionality is to help urban planners, designers or decision-makers to view how participants use the space (place vs. time vs. user profile). University of Deusto

position by fusing those SoOP according to a localisation engine. It also allows the user to define an own profile, get contextual information, answer contextual questions, as well as choose and send augmented reality suggestions.

All this information, participant profile, position, answers, and suggestions, is sent and stored into the cloud, from where the web services get the information, allowing visualising participants' suggestions, answers, weather conditions, real time positions, or the paths filtered, inter alia, by the user's profile. It operates in two modes: online and offline. In the first mode, the app continuously sends user data (profile and position) through the active communication service (GPRS, 3/4G or Wi-Fi) to the cloud. In offline mode, the app saves the data in the smartphone memory and sends them to the cloud whenever the user wants, for example when arriving to a place with Internet connection. Some examples are depicted in Figs. 11.4, 11.5, 11.6, 11.7, 11.8 and 11.9. They show some of the mentioned functionalities. The tool WAY Cyberparks it is based on the combination of users'

Fig. 11.5 The monitoring tool allows creating context based audio tracks. Every time the user enters the operational range of each audio track the tool notifies the user with the corresponding audio track. University of Deusto

Fig. 11.6 The monitoring tool automatically sets not only the place but also the actual weather conditions where the suggestions were taken. University of Deusto

Fig. 11.7 The monitoring tool allows tracking the users' path, and it uses different symbols for different genders and ages. University of Deusto

Fig. 11.8 The monitoring tool allows creating several context-based questions. Every time the user enters the operational range of each question the tool notifies the user and stores the answer. University of Deusto

Fig. 11.9 The monitoring
tool allows the user to send
suggestions regarding the
public space that has been
visited. The user can attach
text, audio and/or video
data to better describe the
suggestion. University of
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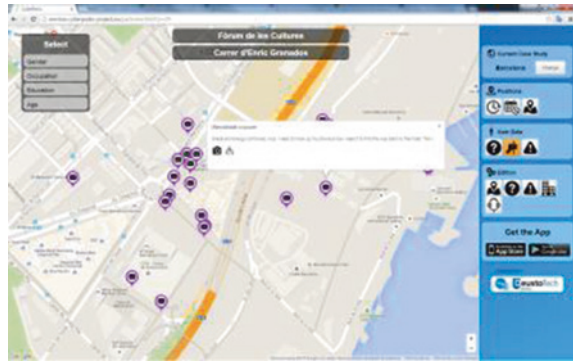
analogue and digital responses to external stimuli in order to enhance the knowl-
edge on the use of hybrid spaces and spatial experience. It takes account on the
one hand, that the use of open spaces is influenced by personal decisions and pref-
erences, as well as also by weather conditions and the availability of suitable and
accessible places and on the other by significances, images, and representations
people attach to open spaces. The reflection presents a significant added value than
by assembling digitised sensory experiences based on the habitual seeing, and then
filtering them in terms of their relation to space in order to interface users, places
and facilitators, a second approach emerges, this of the sensory informatics frame-
work, as described by Ioannidis et al. (2015: 280).

With the tool WAY Cyberparks, users become themselves nodes of the network
and are more than simple sample. Besides uploading their personal profile they
can also share media material (images, videos, audios and text notes, etc.) depict-
ing the content of their individual space-related experiences. The methodological
comparison discloses that the understanding of the relation *people and place* is
more complete when quantitative data is combined with qualitative (images and
maps). The analysis of local knowledge reveals meanings and identities attached
to places, and situational uses of the spaces. With their opinions and proposals
users are also able to directly influence and co-create the future development of
the place.

11.6 Experiences and Lessons Learnt from Using
the Way Cyberparks Digital Tool in Barcelona,
Lisbon and Ljubljana

The *WAY Cyberparks—a Tool for Monitoring the Use of Open Spaces* has been
tested within different open spaces in the three cities, Lisbon, Barcelona and
Ljubljana. These cities are very different regarding their open space structures. For
better understanding the general situation in the cities, information about planning,

design and management of open spaces and their experiences and policies of the use of new technologies, especially ICT, have been collected. Testing the digital tool was linked with fieldtrip observations and perception analysis. In Lisbon for example, the tool was used to monitor the movement and collect preferences within the big multifunctional urban park *Quinta das Conchas.* This park, one of the highest biodiversity spots in the city, is inserted in an area with high urban growth and surrounded by a densely built fabric, which concentrates a considerable part of the city's population. In Barcelona, on the other hand, two charismatic but completely different types of open spaces were analysed, the Enric Granados Street (*Carrer Enric Granados*) and Forum of Cultures (*Fòrum de les Cultures.* The former is a residential lively, dense street with services and amenities located centrally in the Cerdà Enlargement (Example) (Pallares-Barbera et al. 2011); the latter is mainly a reunion of buildings and cement plazas built for the 2004 Forum of Cultures exhibition. For the most part, locals and neighbours use Enric Granados Street, while Forum's facilities are used for large meetings, conventions and festivals, while other times it is an empty space. In Ljubljana, the tool was used for creating behaviour map of urban open spaces' visitors in the city centre. It included a wide range of different types of spaces from small and old to big modern squares to urban parks. Experiences gathered were used for further development of the idea of monitoring the preferences and behaviour of the people when using an open space, and of capturing their needs and ideas for improvement and development of the place, as well as to improve the tool further.

The results and information collected pointed out some important benefits and added value of the use for such a digital tool for capturing the user's needs. Very strong advantage of such methodology is the combination of more objective behaviour monitoring with the interactive questionnaire that enables gaining wider range of data from the same source, frame of time and environment. The flexibility of the tool, which can be easily updated and adapted to a particular spatial and social context, along with changes in the interactive questions enables a researcher to decide about the research focus and range of aspects. At the same time, the digital tool can be used as an interactive, participative or monitoring tool for planning, design management and development of urban open spaces, giving feedback in real-time and directly from the users of space. Weaknesses in the system are mostly due to the need for users to own smartphones, download and use the app, what limits the users' group now, but this will be very probably of minor importance in the close future.

The combination of ICT, GPS and GIS devices allows new and far-reaching types of analysis of open spaces, and this can result in improvement of surveys, what can lead to measures for participative planning and production of open spaces, and urban policies. Such use of ICT can enhance the understanding of the relationship between spaces and the users and their practices, aiming towards the production of inclusive and cohesive urban spaces. An integrated GPS-tracking, web services (as in the tool WAY Cyberparks) create a promising technology and research field for data collection and spatial analysis of people's behaviour in urban spaces.

Digital technologies have much to offer regarding the management and planning of urban spaces. One of the main challenges is how to address technology to integrate open space and public life. ICT allows feedback, enables a two-way communication and can be used for social reporting. It can help to enhance the attractiveness and responsiveness of the public spaces, as users can share information, expose their opinions, needs and desires. ICT can be a tool for scenario simulations and challenges city councils to rethink the communication among the cities and communities and build development strategies in entirely new ways. But city councils have a part to play, they must create the appropriate and stimulating environment in which citizens can propose and prioritise new ideas as well as react to them in proper time frame, avoiding loosing information in the cyberspace. For effective use of ICT possibilities is important to introduce interactive approaches into the official processes of planning and decision-making. In Lisbon and Barcelona, for example, the aspect of use of new technologies is already a topic and partly incorporated into city development but more in terms of the Smart Cities as of more people friendly and interactive urban environment. Also in the city of Ljubljana the use of ICT for different administrative and urban development needs is already recognized as an useful approach within the urban planning processes. An interactive platform for public has been open by city municipality as a part of the spatial strategy and urban plan development process. These few examples show that there is a wide range of possibilities to create different pools linked to information sharing and gathering, collection of resources and expertise or connecting different groups of interested citizens.

Different aspects of new technologies have been also used in different contemporary open space designs and elements. Different ICT devices, sensors, apps and games are already used as a part of the open space programme, incorporating urban furniture, screens and other elements. The free Wi-Fi in the open space also enables new ways of its use, which are also attractive to people with more "wired and indoor lifestyles".

11.7 Conclusions

Both, the significance and relevance of the subject—sustainable and mediated open space—are directly related to the overarching goals of the UN Agenda 2030 for Sustainable Development, which was adopted at the last Summit held in New York in September 29, 2015. The agenda aims to wipe out poverty, fight inequality, and tackle climate change over the next 15 years. In line with its 11th and 17th objectives towards achieving better value for communities by ensuring universal access to safe, inclusive and accessible, *green and public* spaces, in particular for women and children, older persons and persons with disabilities. The WAY Cyberparks digital tool addresses these UN goals by collecting data directly from the users, enabling their direct involvement and thus supports the creation of a universal and inclusive design of public spaces. In general, we all can benefit from

freely accessible technology and knowledge resources and from an interactive tool more than a one-way communication model. The grade of penetration of ICT into open spaces varies not only among the cities, but also among their spaces—this makes drawing general conclusions depending from case to case.

For sustainable and people friendly cities it is necessary to set issues of open space and urban landscape in the forefront of the urban development agenda along with a broad understanding that they are not an optional add-on, an aesthetic consideration or a desirable enhancement for future, but a fundamental part of the solution. The creation of digitally mediated spaces that allow incorporation of user's concerns and preferences, can help to create healthier, safer, and more prosperous cities and encourage a process for achieving sustainability in urban development.

The introduction of the ICT into urban open space design and functions can attract more people to engage into outdoor activities, especially the groups of citizens that are more attached to the wired lifestyle and are now staying mostly indoors.

When discussing about inter-relation between ICT, places and users it is also important to take into consideration that the penetration of ICT into urban spaces is creating a new typology of urban landscapes. The physical dimension receives a more dynamic form and this involves understanding such spaces as more than a simple spatial unit. A digitally mediated space employs different characteristics to carry out different functions and provide potential diverse benefits—from attracting new types of users to allow space process and transmit a large amount of information not previously encountered. For instance, functions such as crowdsourcing processes on particular open spaces; and group of users gathering to use particular ICT for practicing sports, dancing, conducting crowd meetings with other groups placed in other far away Cyberparks.

The efforts of this work are centred on the analysis of how ICT can be used to enhance the understanding of the relationship between spaces and the users and, their practices, aiming towards the production of inclusive and cohesive urban spaces. A relevant aspect of the ICT lays in their ability to enhance communication with (potential) users; this enables creative participation and community empowerment. ICT can be a tool for scenario simulations, and used for social reporting it can help to enhance the attractiveness and responsiveness of the public spaces, as users can share information, expose their opinions, needs and desires. To this end, a digital tool, called WAY Cyberparks, has been developed and initially tested in three cities.

The blurring boundaries between real and virtual life gives rise to concerns but also open new challenges, regarding the concept of social interaction, communication, and media services. The relationship between individuals and their local contexts are as old as the scientific knowledge in general. The emergence and penetration of ICT has led to various forms the appropriation of the open spaces where the ICT facilities and devices play more and more a significant role. The experiences are moving from those with an initial artistic, political, marketing, or experimental goal, into a more academic aiming to a more sustainable and a

people's more friendly urban development. Though technology inherits huge benefits, as the potential mentioned in this work, particular attention has to be given to the use of ICT and their devices. ICT can be another means of excluding, segregating, rather than integrating people, provoked not only by the access to technology, but also by the speed of technology advances. There are risks to be aware of, not only in terms of mediated open spaces, but also in terms of socio-political challenges. Another important challenge lays in managing risks and potentials of the relationship ICT, open spaces, and social practices. In this context, particular importance are given to ICT as an active mediator in the relationship between the production of knowledge of urban open space—for research purposes aiming at advancing knowledge, and to frame a strategy for interventions—for planning purposes aiming at comprehensive urban spaces—for social purposes aiming at increasing people empowerment. Hence, the contribution of ICT to transform our cities into more social environments, rather than just more high-tech, is not conclusive yet. The question how to make cities more digitally responsive at the same time more inclusive and people friendly remains a challenge.

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