

# C3places

Using ICT for Co-creation  
of Inclusive Public Space

**Carlos Smaniotto Costa, Joana Solipa Batista, Inês Almeida,  
Marluci Menezes, Aelita Skaržauskienė, Monika Mačiulienė,  
Dick Botteldooren, Timothy Van Renterghem, Rita Pizzi, Paolo Ceravolo,  
Ina Šuklje Erjavec, Vita Žlender, Barbara Goličnik Marušić**

**ERA-NET COFUND SMART URBAN FUTURES CALL (ENSUF)**



# URBAN EUROPE

JOINT PROGRAMMING INITIATIVE URBAN EUROPEAN



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*C3Places - Using ICT for Co-Creation of Inclusive Public Places*

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## **Authors**

Carlos Smaniotto Costa, Joana Solipa Batista, Inês Almeida  
*Universidade Lusófona, Portugal*

Marluci Menezes  
*National Laboratory of Civil Engineering, Portugal*

Aelita Skaržauskienė, Monika Mačiulienė  
*Mykolas Romeris University, Lithuania*

Dick Botteldooren, Timothy Van Renterghem  
*Ghent University, Belgium*

Rita Pizzi, Paolo Ceravolo  
*University of Milan, Italy*

Ina Šuklje Erjavec, Vita Žlender, Barbara Goličnik Marušić  
*Urban Planning Institute of the Republic of Slovenia, Slovenia*




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## Legend



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# THIS E-BOOK

This e-book and correspondent platform **MyC3Place** present the collection of the outcomes carried out by the partners of the C3Places Project.



Discover the site **MyC3Place**

It explores the new dynamics of open spaces as a trusted service for community and expands our understanding on how mediated public open spaces function, paying attention to stakeholders, local context and different social groups.

The e-book shows how it's possible to increase the quality of public open spaces (squares, parks, green spaces) as a community's service, reflecting through ICT the needs of different social groups. Public spaces are critical for cultural identity, as they offer the place for interactions among generations and ethnicities. Even in the digital era, people still need contact with nature and other people to develop different life skills, values and attitudes, to be healthy, satisfied and environmentally responsible. Using ICT and co-creating with users, this e-book expands our knowledge on meeting emerging citizens' needs about the future public space.

All the contents are classified by means of keywords that are described on the following pages. Then the work of each partner is presented in detail.



# INTRODUCTION

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**C3Places (ERA-NET Cofund Smart Urban Futures Call - ENSUF) aim is to develop strategies and tools to increase the quality of public open spaces through Information and Communication Technologies (ICT) by influencing positively co-creation and social cohesion effects.**

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In the last decades ICT have grown into an important social medium.

People build and maintain the relationships through various social media, and increasingly this affects the way they organise their everyday lives and how they use the city and its spaces.

Yet, diversity of public open spaces remains critical for cultural identity development, as they provide important gathering points in the urban fabric and offer the place for interactions among generations and ethnicities.

People of all ages still need contact with nature and with other people, to develop different life skills, values and attitudes, to be healthy, satisfied with their lives and environmentally responsible.

C3Places generates knowledge and know-how for a co-creation approach to be used to merge the use of ICT with these essential functions of the public spaces.



# C3PLACES POLICY BRIEF

## ON CO-CREATION OF INCLUSIVE PUBLIC OPEN SPACES AND THE USE OF DIGITAL TOOLS

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**The Project C3Places presents the first results and launches a policy brief on co-creation of public spaces. In this policy brief the Project, heeding the sustainability calls for engaging concerned stakeholders in decision making, provides guidance on where to start, how to approach creatively placemaking and how to make use of digital tools. The overarching lesson learnt is that placemaking is an unfinished business and therefore demands a vision to succeed.**

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The Project C3Places ([www.c3places.eu](http://www.c3places.eu)) is concerned with places (parks, squares, streets, etc.) that affect us all on a multitude of levels: physically, socially, psychologically and culturally. The Project, aimed at developing strategies and tools to increase the quality of public open spaces through digital technologies, has learned much about how placemaking can positively influence co-creation and effect social cohesion.

The lessons learned in the Project show that when digital technology is not only used to transform the public realm into more high-tech places it can rather contribute to enrich the experiences of all users and support their involvement in placemaking. This in turn could fuel people's greater attachment to places. Because it is always about people. The overarching lesson learnt is that using digital in co-creation processes is still very demanding, from various aspects. C3Places has not simply added empirical nuance to studies of contemporary urban places, but has offered important critiques of the way that cities are theorised and understood.

This policy brief gives concerned stakeholders arguments for decision taking on where to start, how to approach placemaking and set priorities for co-creation supported by digital tools.

### UNDERSTANDING BENEFITS AND IMPORTANCE OF PUBLIC SPACE

*Which arguments can be used?*

It is paramount for public spaces to be inclusive, responsive, and inviting for all. Public space is a common good and an important resource of urban justice, inclusiveness, social cohesion and quality of life. If planned, designed and implemented responsibly, such places can help transform the way people live, work, learn, spend leisure time, and interact socially.

Studies have shown that people's physical and mental health and well-being is improved by contact with nature, green landscapes and by regular doses of outdoor activities. However, public spaces must be located where people live, work, learn and play and well accessible to all. For example, the empiric evidence provided by C3Places show that for teenagers', the availability and proximity to different public services and facilities, is one of the reasons that makes their neighbourhood a good place to live. That seems to be truth to other age groups as well. For an inclusive urban public space, it is crucial to provide "liveable" public spaces, of different typologies, within an immediate neighbourhood or at a close walking distance. In addition, good environmental quality has to be ensured to make using a public space a pleasant experience. **The more high-tech our lives become, the more nature we need.** The COVID-19 pandemic is making clear that socialising online is not enough for health and well-being of people. They need to go out, be active and in contact with nature and each other on an everyday basis. A well distributed network of public spaces across the urban fabric, especially those rich with natural features are a key factor for quality of life and is in a current situation proven to be an important asset to mitigate the negative effects of lockdown and social distancing. It is necessary to take this into consideration for the future urban development on all levels.

## FOR INCREASED SPATIAL QUALITY, INVEST IN RESEARCH

*What are spatial quality factors and how to achieve and keep them?*

To make public open spaces effective it is important to take into consideration all necessary spatial quality aspects. Among the most important are provision of good accessibility to all, comfort and security, legibility, navigation and convenience for movement. These refer to the level of captivation, cleanness, safety, available attractivities for users, which includes equipment, greenery, level of vitality and variety of possible activities. Besides these aspects, there are also other intangible factors such as image of a place, personalisation and individual appropriation possibilities, adaptability, environmental quality and ecological sustainability. C3Places project examined various stages and types of cocreation and proves that the best way to capture the community needs on public spaces towards specifying quality responses and standards is via implementation of co-creation processes. Quality is a fundamental criterion to achieve responsive and inclusive places. This calls for **direct support and investments in scientific and practical research to provide evidence-based urban environment, local needs, and conditions.** Research evidence must be the basis for urban planning and design and should be produced at different levels and together with different stakeholders – local authorities and experts, academia, civic society organizations, businesses, public institutions, and people that after all enlivens the places. Co-creation can be a strategy to open the opportunities for all those stakeholders to come together and share knowledge, experiences, practices, needs and ideas for high quality public spaces. It must also be assured that funding is appropriate, not only to plan and design public spaces, but for their maintenance and adaptations when necessary.



## PLACES & LEARNING – LEARN ABOUT PUBLIC SPACES, LEARN IN PUBLIC SPACE

### *Why urban learning should be motivated?*

Investing in research advances the knowledge on quality aspects, inclusiveness and co-creation of public spaces on general and local level. The C3Places experiences proved that understanding local context, both from spatial and social aspects are crucial to effectively address real potentials and needs of local places and communities but also revealed two contrasting realities coexisting simultaneously – a valorisation of public spaces that goes side by side with a weak urban literacy and spatial representation. Our pledge is to invest and promote territorial capacity building, connecting education and learning to environment and urban fabric. Urban education can enhance our understanding of the world around us, provide us with more and better opportunities and improve our quality of life. We learn everywhere and at any time. Places of daily use, as public spaces are important for lifelong learning and promotion of civic participation. Territorial education and capacity calls to advance knowledge on how to increase the ability and skills to understand, reflect and reason the urban space and urban environment that help people to orient, feel comfortable, pay attention, care and appropriate the places in a civic and sustainable manner. The experiences of the living labs prove that integrating co-creation into the development process contributes significantly to the exchange and increase of knowledge of different stakeholders and empower them not only for further participation but also for better use of possibilities offered for better quality of life.

## CO-CREATION AS A RESPONSE FOR INCLUSIVE PUBLIC OPEN SPACES

### *Why co-creation approach is important? Which benefits can be expected?*

C3Places uses the terms inclusive and responsible place to describe a far-reaching framework of principles on which communities can build a shared commitment to sustainability in social and urban development. The fundamental principle is to involve communities, from the very beginning in the making and transforming of public spaces, giving people a voice and a forum to set priorities, negotiate their needs and preferences and actively participate into development of suitable solutions. The co-creative approach is intrinsically user-oriented because it helps the people and organizations to promote their own decisions, develop capacities for open-ended social innovations, rather than invites citizens to participate in existing initiatives. Co-creation has enhanced debates concerning the nature of contemporary cities. Co-creation of public spaces offers an excellent opportunity to actively engage different stakeholders in the process of the production and consumption of urban fabric. Participatory strategies and methodologies, as co-creation, imply sharing clear goals and expectations, to assure a common understanding among all stakeholders involved. It may be time consuming on a first sight, seems short term more expensive, and require councils to devote time and resources for placemaking, but it brings long-term all-round benefits that cannot be achieved in any other way. It supports local community interactions that are crucial for quality of everyday life.

Through active co-creation of own environment, a positive attitude, care and the sense of place is developed among people, as well as the possibility of reducing common problems on spatial and social level, as for example safety, lack attractiveness and responsiveness, vandalism, social exclusion and urban alienation. C3Places' pledge is for involving the community in placemaking. The experiences show that people do not ask for flamboyant public spaces, rather they need places where they feel welcome, safe, and inspired to use. Public spaces should demonstrate conviviality, allowing a variety of activities and practices - with diversity of areas, greenery, and equipment (for both individual and group use). Flexibility is a crucial feature to ensure more responsible and user-friendly places. Finding a balance between responding to "everyday life" needs and fostering new (even transitory or ephemeral) ones is a challenge. Taking it, calls for setting public space at the core of the community, it has to be rooted in local needs and negotiated within the community.

## **INTERLINK CO-CREATION PROCESS AND PUBLIC SPACE DEVELOPMENT PROCESS**

### *Where to start?*

Co-creation is an approach but also a tool to be used within spatial planning, design, implementation and management process (open space development). C3Places proved that multi staged co-creation process by well-considered interlinking of different types of engagement activities with adequate expertise support in all phases of spatial development is crucial. In this way, positive outcomes of co-creation in public spaces exceed features of the final product, a spatial solution. There are many different types of collaboration activities, varying in intensities of citizen engagement depending on the issue addressed from sharing and interpreting information, co-learning, expressing opinions, defining priorities, refining ideas, making decisions, creating common values, implementing solutions, monitoring, etc.

## **USING DIGITAL TOOLS FOR CO-CREATION**

### *What are the potentials of digital tools to enhance public spaces, the bottlenecks and how to deal with them?*

ICT offer interactive and innovative tools which can better connect people and places. Mobile technology and digital media are creating new social spaces, transforming the physical public space in a hybrid space. In this context, digital technology becomes an important resource to enrich the use of public spaces, turn placemaking more dynamic and to foster the democratic process of placemaking and co-creation. On the other side, the use of digital tools can be quite demanding in relation to the necessary knowledge and skills and well as technical equipment. C3Places' pledge when technological decisions are implemented, they have to be bolstered by scientific reasoning. In an immature environments these technological solutions can accelerate negative aspects of exclusion and distance even more from the desirable goal of an inclusive community.

## DECIDING FOR DIGITAL CO-CREATION OF PUBLIC SPACES

*Is your situation/context suitable for co-creation of inclusive public spaces by digital tools?*

Although we can reasonably expect that in the near future both the availability and usability of digital tools and the knowledge to use them effectively will greatly improve, it is important to understand and take into account that not every situation is equally suitable for this approach. To support decisions on the appropriateness of the particular situation C3Places has developed a tool, a Digital Co-Creation Index, which provides guidance to assess conditions as well as to evaluate, measure and compare different digital co-creation initiatives. The index is compiled in three sub-indexes: Public space quality Index, to evaluate physical and social aspects of the place; Digital Inclusiveness Index, which explains the extent to which affordable technology enables co-creation; and Social Responsiveness Index, which is linked to stakeholders and community members and addresses their maturity to respond to social challenges and generate public value.

**C3Places Project** | [www.c3places.eu](http://www.c3places.eu)

# PARTNERS



UNIVERSIDADE  
LUSÓFONA

**Universidade Lusófona, Interdisciplinary  
Research Centre for Education and  
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Lisbon, Portugal



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Engineering**

Lisbon, Portugal



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Social Technologies**

Vilnius, Lithuania



GHENT  
UNIVERSITY

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Information Technology**

Ghent, Belgium



**University of Milan - Department of  
Computer Science**

Milan, Italy



**UIRS - Urban Planning Institute of the  
Republic of Slovenia**

Ljubljana, Slovenia



# KEYWORDS

C3Places has as primary objective to develop knowledge and know-how to design attractive, responsive and inclusive public spaces by integrating efficiently social value and ICT solutions. The Project is driven by **five keywords** which gives it credibility and expertise to explore the new dynamics of public spaces as a service for community, with the involvement of stakeholders.



**Inclusive & Digital Communities**

**Co-creation of public open spaces**



**Community Involvement**

**Public space users and their social practises**



**Web-mobile technologies**



# INCLUSIVE & DIGITAL COMMUNITIES

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Inclusion means to appreciate and value human differences and variety of lifestyles in a rich and diversified environment that promotes a sense of belonging and where everyone feels respected and valued. In an inclusive community every member should feel safe, respected, and comfortable in being her/himself and express their identity. Inclusive communities create a welcoming environment, so that everyone's skills, creativity and innovation potential are recognized, cultivated and routinely utilized.

An inclusive community brings different cultural perspectives together in many contexts. For C3Places public spaces are the place where each person shares a sense of belonging with other members of the community. Therefore, appropriate spaces should be provided in order to generate mutual enjoyment and enhance citizens' cooperation and also to redress policies and practices that perpetuate the harmful effects of discrimination and segregation.

In the digital era technologies are ever-present, so that we dare to speak about digital communities, inspired in Kenna & Maksymiuk (2019) who discuss some contrasting analyzes of the socio-spatial practices and impacts that are resulting from the uptake of new technologies in urban public spaces. Even a declining significance of public spaces in the digital era was predicted, a fact that the different examples addressed in Smaniotto et al. (2019) have been proven wrong. ICT have potential to generate and increase social inequalities, as well as to offer new opportunities for encountering 'others' in the city. The design and structure of technological solutions can give impetus to the purposeful development towards community common good.

However, social values of the citizens acting in a collective environment have to be aligned or coordinated. As Skarzauskiene et al. (2015) warns, if technological decisions are implemented without scientific reasoning in an immature environment, these technological solutions can accelerate negative aspects of ICT and distance even more from the desirable goal of an inclusive community.



# CO-CREATION OF PUBLIC OPEN SPACES

Related contents: [25](#) [27](#) [37](#) [39](#) [40](#) [42](#) [44](#) [46](#) [56](#) [61](#) [64](#) [68](#) [71](#) [76](#) [77](#) [78](#)

Co-creation - as an active process of engaging different stakeholders, is opening up new opportunities to bring in particular citizens into the design, implementation, monitoring and maintenance of public spaces - to a process that is also understood as the production of public spaces.

Co-creation seeks therefore to make the production of public space, on the one side more effective and efficient, and on the other more inclusive and responsive. By creating opportunities for dialogue and participation and making the production process more trusted it enables the government to deliver better places for the people.

It is more important than ever that citizen engagement and public participation are enacted properly to provide the necessary push and oversight for tailored policies. Co-creation initiatives and social cohesion should be based on the broad and active citizen engagement and community participation.

It is also a multi-stakeholder process that provides guidance and tools for all stakeholders, for government decision-makers and officials, for civil society organizations and activists to translate the outcomes into community-tailored solutions. A vibrant society must rely on initiatives and cooperation of the citizens to be able to attain a better quality of life.



# COMMUNITY INVOLVEMENT

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For inclusive communities the involvement of all relevant stakeholders is essential. Involving the community means building relationships.

The community is at the core of placemaking, the process of involving people to “collectively reimagine and reinvent public spaces” (**PPS**) and its engagement should result in integrated knowledge and be translated in actions towards more inclusive and responsive public spaces.

For practice this also means advancing the co-creation of knowledge, collaborative agenda-setting and joint decision on commitments. Community involvement combines therefore elements of interactive engagement and intervention, provided that an active promotion of opportunities for participation is in place. There are different ways of involving the community and for refining commitment, these goes from in-kind and financial support, volunteering, engaging in different tasks, contributing with opinion and local knowledge. Enduring after all partnerships and through establishing and strengthening collaboration community involvement creates capacity to address changes in public policies.





# PUBLIC SPACE USERS AND THEIR SOCIO-SPATIAL PRACTICES

Related contents: [20](#) [21](#) [22](#) [23](#) [25](#) [27](#) [30](#) [32](#) [35](#) [39](#) [40](#) [42](#) [44](#) [46](#) [48](#) [53](#) [56](#) [58](#)  
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It is also the aim of C3Places to bring together knowledge about the way the community uses and appropriates the public space, in light of the new technologies towards creating new understandings of the relationships between spaces and social behaviour.

Users of public space may differ in a multitude of factors, such as predominant age, gender, religion, nationality and language, physical and mental abilities, standard of living, level of education, 'majority' or to a marginalised segment of the population.

This diversity must be considered when improving the quality of public open spaces and defining participatory dynamics. C3Places is concerned with theoretical and methodological approaches, as well as novel research findings to deliver answers to relevant questions such: What do people want from public space? Does this differ by socioeconomic status, gender, age? Menezes & Smariotto (2017) addresses the questions research should pose in order to get a comprehensive picture of who uses public space, what for, when and with which artefacts.

These aspects are also relevant to better understand the way people use a public space and the resulting spatial practices. These combine therefore elements of sociology (people) and (urban) planning sciences (spaces) to examine the social and material constitution of spaces and the interactions between people and people, and people with their environment. C3Places is interested in the material and conceptual opportunities that socio-spatial practice affords, in order to be able to obtain more knowledge to guide the design of policies. The Project is therefore not interested in individual data but grouped phenomena on the basis of similarities.

The socio-spatial practices that build the C3Places knowledge base in **Ghent, Lisbon, Milan** and **Vilnius** are addressed at **description of cases**.



# WEB - MOBILE TECHNOLOGIES

Related contents: [22](#) [27](#) [39](#) [42](#) [44](#) [46](#) [48](#) [50](#) [53](#) [58](#) [66](#) [68](#) [71](#) [76](#)

Undoubtedly, digital and mobile technologies are penetrating in all spheres of our lives. The increasing ubiquity and pervasiveness are also transforming our physical living space into a mediated and hybrid place.

The Project C3Places developed a framework for better understanding how digital tools can support the co-creation processes.

The types of ICT tools and their supporting devices were systemised in main category groups describing where the tool is installed in relation to the public space and how an ICT tool interacts with the user.

# RESULTS OF C3PLACES LIVING LABS



**Ghent**  
*Belgium*



**Lisbon**  
*Portugal*



**Milan**  
*Italy*



**Vilnius**  
*Lithuania*



# GHENT LIVING LAB

The Ghent Public Open Space living lab will be centred on **urban green users** as there is a particular interest for people using such spaces, which often struggle to survive in the urban realm because they are exposed to a broad range of environmental pollutants (e.g., particulate, noise, etc.).

The Ghent living lab is different from the other case studies of the C3Places network, because it does not necessarily look at a single “physical” place, but rather at a system of places and their virtual (and social) counterparts. One of such (meta)spaces is located in Ghent in a public park and square that connect to the newly build library of the future “De Krook” that also houses experience labs of Ghent University and IMEC. It is supported by the broader Ghent Living Lab initiative.

## Local Partners

- Ghent University
- IMEC
- Ghent Living Lab Initiative
- City of Ghent
- City of Antwerp
- Ringland

## Living Lab







# CAN ATTITUDE TOWARDS GREENERY IMPROVE ROAD TRAFFIC NOISE PERCEPTION?

A case study of a highly-noise exposed cycling path



**Francesco Aletta, Timothy Van Renterghem, Dick Botteldooren**

This study was based on an on-site survey along a highly noise exposed cycling path immersed in the green, in close proximity of Antwerp Ring Road in Belgium.

The survey was held at 181 passers-by during a working week in September 2017. The survey included questions about overall cycling/walking experience, perceived loudness of road traffic noise, soundscape appreciation, perceived dominance of sound sources, and overall attitude towards greenery's potential to reduce noise and improve air quality.

A k-means cluster analysis was performed on the scores of the attitude towards greenery (ATG) questions to create an ATG variable reflecting two profiles of users: "positive" and "sceptical" towards greenery's potential.

The effect of ATG on overall cycling/walking experience, perceived loudness of road traffic noise, soundscape appreciation and perceived dominance of sound sources was tested through a set of independent samples t-tests. Results show statistically significant differences between the positive and the sceptical group for the dimensions of annoyance and calmness, perceived loudness of road traffic noise and perceived dominance of road traffic sounds and natural sounds.

However, no difference was observed for the two groups in terms of overall cycling/walking experience, suggesting that, for the investigated case, other factors might be playing a role.

[Read the full article](#)



Aletta, F., Van Renterghem, T., & Botteldooren, D. (2018). *Can attitude towards greenery improve road traffic noise perception? A case study of a highly-noise exposed cycling path*. In Proceedings of the 11th European Congress and Exposition on Noise Control Engineering (pp. 2377–2382). Hersonissos, Crete, Greece.



# INFLUENCE OF PERSONAL FACTORS ON SOUND PERCEPTION AND OVERALL EXPERIENCE IN URBAN GREEN AREAS

A Case Study of a Cycling Path Highly Exposed to Road Traffic Noise



**Francesco Aletta, Timothy Van Renterghem, Dick Botteldooren**

In contemporary urban design, green public areas play a vital role. They have great societal value, but if exposed to undue environmental noise their restorative potential might be compromised. On the other hand, research has shown that the presence of greenery can moderate noise annoyance in areas with high sound levels, while personal factors are expected to play an important role too.

A cycling path bordered by vegetation, but highly exposed to road traffic noise, was here considered as a case study. A sound perception survey was submitted to participants on site and they were subsequently sorted into groups according to their noise sensitivity, visual attention and attitude towards greenery.

The aim of this study was testing whether these three personal factors could affect their noise perception and overall experience of the place. Results showed that people highly sensitive to noise and more sceptical towards greenery's potential as an environmental moderator reported worse soundscape quality, while visually attentive people reported better quality. These three personal factors were found to be statistically independent. This study shows that several person-related factors impact the assessment of the sound environment in green areas. Although the majority of the respondents benefit from the presence of visual green, policy-makers and planners should be aware that for a significant subset of the population, it should be accompanied by a tranquil soundscape to be fully appreciated.

[!\[\]\(3211b5d1d968fc1665909b34f9f16010\_img.jpg\) Read the full article](#)



Aletta, F., Van Renterghem, T., & Botteldooren, D. (2018). Influence of Personal Factors on Sound Perception and Overall Experience in Urban Green Areas. A Case Study of a Cycling Path Highly Exposed to Road Traffic Noise. *International Journal of Environmental Research and Public Health*, 15(6), 1118. doi:10.3390/ijerph15061118



# INTERACTIVE SOUNDSCAPE AUGMENTATION OF AN URBAN PARK IN A REAL AND VIRTUAL SETTING



**Timothy Van Renterghem, Kang Sun, Karlo Filipan, Kris Vanhecke,  
Toon De Pessemier, Bert De Consel, Wout Joseph, Dick Botteldooren**

Inappropriate soundscapes are able to strongly deteriorate the user experience in parks. A possible remediation is adding positively perceived sounds.

The case of an urban park, fully surrounded by road traffic noise sources, was studied to explore the potential of adding natural sounds in an interactive way. A preliminary test was conducted in the lab with Virtual Reality (VR) glasses and headphones.

The audio-visual representation of the real environment was obtained by combining binaural recordings with first-order ambisonics and 360-degree video camera footage.

The users were allowed to mix in eight types of natural sounds until their personal optimized soundscape was composed. This was done in a very similar setup as in the (real) park. The loudspeaker augmenting the sound environment in the park was steered with a smartphone application.

This app ensured the user's presence near the loudspeaker and allowed to gather more detailed assessments of the perceived sound environment through questionnaires. This combination of experiments allowed checking the validity of VR that is becoming increasingly popular in audio-visual interaction studies. In addition, the most preferred natural sounds and the way they influenced environmental noise perception were analyzed.

[Read the full article](#)



Van Renterghem, T., Sun, K., Filipan, K., Vanhecke, K., De Pessemier, T., De Coensel, B., ... Botteldooren, D. (2019). *Interactive soundscape augmentation of an urban park in a real and virtual setting*. In M. Ochmann, M. Vorländer, & J. Fels (Eds.), *Proceedings of the 23rd International Congress on Acoustics: integrating 4th EAA Euroregio 2019*: 9-13 September 2019 in Aachen, Germany (pp. 899–903). Aachen, Germany: Deutsche Gesellschaft für Akustik.



# CLASSIFYING URBAN PUBLIC SPACES ACCORDING TO THEIR SOUNDSCAPE



**Kang Sun, Karlo Filipan, Francesco Aletta, Timothy Van Renterghem, Toon De Pessemier, Wout Joseph, Dick Botteldooren, Bert De Consel**

Cities are composed of many types of outdoor spaces, each with their distinct soundscape. Some of these soundscapes can be extraordinary, others are often less memorable. However, most locations in a city are not visited with the purpose of experiencing the soundscape. Consequently, the soundscape will not necessarily attract attention. Existing methods based on the circumplex model of affect classify soundscapes according to the pleasure and arousal they evoke, but do not fully take into account the goals and expectations of the listener. Therefore, in earlier work, a top-level hierarchical classification method was developed, which distinguishes between spaces based on the degree to which the soundscape creates awareness of the acoustical environment, matches expectations and arouses the listener.

This paper presents the results of an immersive laboratory experiment, designed to validate this classification method. The experiment involved 40 participants and 50 audiovisual recordings drawn from the Urban Soundscapes of the World database. It is shown that the proposed classification method results in clearly distinct classes, and that membership to these classes can be explained well by physical parameters, extracted from the acoustical environment as well as the visual scene.

 [Read the full article](#)



Sun, K., Filipan, K., Aletta, F., Van Renterghem, T., De Pessemier, T., Joseph, W., ... De Consel, B. (2019). *Classifying urban public spaces according to their soundscape*. In M. Ochmann, M. Vorländer, & J. Fels (Eds.), *Proceedings of the 23rd International Congress on Acoustics : integrating 4th EAA Euroregio 2019 : 9-13 September 2019 in Aachen, Germany* (pp. 6100–6105). Aachen, Germany: Deutsche Gesellschaft für Akustik.





# LISBON LIVING LAB

The Lisbon Living Lab will be centred on **teenagers** (young people 13 to 17 years of age) as they are a particular age group with specific needs and interests on public spaces, the relationship between teens and public spaces is very intrinsic, as public spaces may serve as a fundamental (play)ground for teenagers' development.

The **Lisbon's Alvalade neighbourhood** will be living lab to explore how teenagers use and behaviour in urban fabric and what are they needs and preferences on public open spaces. The main objective is to engage teenagers in a process of the co-creation of urban spaces, by exploring the leading research question: "How can we capitalise on teenagers' new-found love of the wired life (Thomas, 2013) to encourage them to be more outdoors?"

## Local Partners

- Universidade Lusófona Interdisciplinary Research Centre for Education and Development
- National Laboratory of Civil Engineering
- Secondary School Padre António Vieira
- Parish Council of Alvalade

## Living Lab





## C3PLACES LISBON



**Joana Batista, Inês Almeida, Carlos Smaniotto Costa, Marluci Menezes**

C3Places in Lisbon implemented living labs on urban planning and design targeting teenagers in Alvalade neighbourhood.

The labs were developed for **co-creative and collaborative practice**, exploring opportunities for a direct **involvement of teenagers** in placemaking, providing a platform for learning and free expression of values and ideas about and for urban fabric.

The methodology encompassed different tools, such as thematic workshops, exploratory site visits in the neighbourhood, discussions and debates sessions and questionnaires, focused on teenagers' practices, uses and needs on **public open spaces**.

The living labs were implemented in two phases.

A pilot phase was organised between February and May 2018 with two 10th grade classes (N=49 students, aged 15 to 18), consisting in total of 24 hours intervention per class, with both indoor and outdoor activities, aimed at discussing the city and its production.

A methodological decision was made by the researchers on which data should be analysed in more depth. Materials as questionnaires and the facilitators observational notes, as direct tools for data collection, were prioritized. Questionnaires had closed questions, analysed quantitatively, and open questions, analysed through thematic analysis (Braun & Clarke, 2006).

Other data resulting from materials that provided support for the activities and exercises complemented and reinforced these analyses.

The second phase, a week-long lab was organised in May 2019 with two classes of the first year of professional training education (N=20, aged 16 to 18). The students developed and justified design proposals for the space in front of their school.

The labs were organised in four sessions of 1,5 hour each with an emphasis on group work and on **the use of digital tools** (Padlet, image bank, presentation programmes and Google Maps). The facilitators observational notes, a questionnaire to assess importance of co-creation and the teenagers' proposals presented by teenagers analysed.

Living labs were complemented with other methods of data collection, as space observations and interviews with experts. Space observations enabled to obtain an overview of the whole neighbourhood, as well as a more focused outline on public spaces used by teenagers.

Two sets observations were conducted, undertaken at different periods of the day and different days of the week. Descriptive notes and an image library enriched the field work. The first set of observations consisted of mapping out the local public spaces. In the second set, the Marquês de Soveral Street, where the school is located, and well known and used space by the teenage students, was selected for detailed observations (during a twenty-day period).

Data were collected with the aid of two distinctive observation grids. Semi-structured in-depth interviews were conducted with the four planning experts working with public space issues at the Junta de Freguesia de Alvalade (parish council).

The quality of the analysis is secured through several steps, such as: familiarization with the data; generating initial codes which were then aggregated into potential themes; initial themes review, and identifying final themes (Braun & Clarke, 2006).



## THE C3PLACES MOBILE APPLICATION



**Inês Almeida, Joana Batista, Carlos Smaniotto Costa, Marlucci Menezes**

Developing and testing of a mobile application to support research activities is one of the goals of the C3Places Project. The C3Places application is designed to enable researchers to address questions related to the use of public spaces via digital technology. A relevant aspect of the **digital and mobile technologies** lies in their possibility to enhance communication with prospective users, hence enabling possibilities for creative participation in placemaking and **co-creation**.

The C3Places application consists of two main components: a web service (web platform) and the smartphone application (app) and is enabled to be used anywhere in the world. It allows researchers to collect evidence base and demonstrate the social values of public spaces - backed by users' opinion and views. Also, by providing evidence and demonstrating that public space is having a positive societal impact can increase the enthusiasm for more inclusive and responsive public spaces.

By collecting such data, the C3Places App contributes to better explore and more precisely research on public space practices, as well integrate the use and point of view of several users on different spaces. Another interesting feature lies in the possibility to collect the weather conditions automatically, therefore researchers can also reflect on how weather conditions affect (or not) the usage of **public open spaces**.

Finally, considering that it is up to the researcher to create the questions or the photo questionnaire, the possibilities are infinite and can be addressed directly to each research topic that is being carried out. So, the C3Places app allows scholars and researchers to make more specific or broader public open space research and, since it runs in Android operative system, the range is quite extensive. The use of the C3Places App is free and can be requested at **[c3places.coordination@ulusofona.pt](mailto:c3places.coordination@ulusofona.pt)**. The manual for preparing a research subject with the help of the C3Places App can be downloaded **here**.





## LOOM OF IDEAS



Joana Batista, Inês Almeida, Carlos Smaniotto Costa, Marlucci Menezes

As a way to engage a higher number of students in a reflection on the use and quality of the space in front of the school, a visually attractive and interactive board - called Loom and Clothesline of Ideas (Figure 2.1).



Figure 2.1: Loom of Ideas with collected answers. Photo C3Places Project (2019).

The Loom was developed to encourage a broad **participation of students** identifying spatial qualities and problems and stands in the school hall from May to July 2019. It had seven multiple choice questions displayed in columns (place of living, mode of transportation from home to school, frequency of public open space use for leisure, the activities performed, use of commercial places in free time and reason for it and use of smartphone).

A nail indicated the place for each possible answer. For each school grade different coloured woollen yarns hanged next to the questions (the school has grade 7 to 12). To provide their answer the students should wrap the yarn around the corresponding nail (altogether 56 answers were collected) (Figure 2.2).



In the clothesline students could write down in cards comments, suggestions or ideas and hung them in the line (Figure 2.3).

Altogether 35 cards were collected. Two main issues raised from the cards: the request for more sitting facilities in the school yard and around the school, and the call for more outdoor activities.

Yet, placemaking can only make a direct contribution for the first issue, but on the flip side, when the outdoor conditions are more suitable, the second call – more outdoor activities – can be easier accomplished.

Figure 2.2: A student is contributing with some answers to the Loom. Photo C3Places Project (2019).



Figure 2.3: Some ideas teenagers' left in the Clothesline. Photo C3Places Project (2019).



## BRIEF NOTES ON SOCIAL VALUE OF PUBLIC SPACES



Joana Batista, Inês Almeida, Carlos Smaniotto Costa, Marlucci Menezes

Public space is here conceptualised following UN-Habitat (2015: 15) as “all places publicly owned or of public use, accessible and enjoyable by all for free and without profit motive”. Among them are streets, squares, plazas, marketplaces, parks, green spaces, greenways, community gardens, playgrounds, waterfronts, urban forests and agricultural used land. C3Places research focus only on urban **public open spaces**.

Public spaces have been idealised as democratic domains, places of inclusiveness where is possible to be among friends and strangers, encounter differences and engage in planned or serendipitous interactions (Innerarity, 2006). Central to a city well-being, public spaces contribute to the quality of urban life, fostering social, cultural and economic capital (UN-Habitat, 2016). A vast body of literature focus on their social function (Figure 2.4), as providers of the place for peoples' interaction with other people (Carmona, Heath, Tiesdell, & Oc, 2003; Gehl, 1987; Innerarity, 2006; Jacobs, 1961; Lefebvre, 1991; Sennett, 1977) and with their environment (Smaniotto & Menezes, 2016). Public spaces act as stage for the enactment of citizenship, to practice publicness, and as such they play a key role within the complex social infrastructure (Smaniotto Costa & Menezes, 2016). Societies' differences and similarities are put on display in public spaces, allowing distinct groups to claim their right to appropriate particular places and manifest their sense of belonging to society (Innerarity, 2006; Mitchell, 1995). Public spaces enable symbolic identification (Carmona et al., 2003), they are the places where social and cultural identities and the individuals' role in their community are negotiated, and this may foster the context for mutual understanding and respect, enabling the development of social bonds. Yet, historically, public space was also the site where power structures manifested themselves and dominant social and moral orders were produced, imposed and perpetuated (Sennett, 1977).





Figure 2.4: Public spaces as places of social interaction. Photo C3Places Project (2018).



Figure 2.5: Green spaces are beneficial for urban environmental quality and for urban quality of life. Photo C3Places Lisbon (2018).



Moreover, those public spaces covered by plants and with soft surfaces (Figure 2.5) offer further environmental benefits as they improve the urban environmental quality (such as air purification, water storage, CO<sub>2</sub> sequestration) and provide space for leisure and recreational activities (Smaniotto Costa, Suklje Erjavec, & Mathey, 2008).

They offer also further benefits for public mental health (Muñoz, 2009) and for decreasing in contemporary health problems as obesity and sedentarism (Godbey, 2009). Jacobs (1961) and Gehl (1987) drew attention to the importance of putting people at the centre of public space, analysing how people appropriate specific places, what are their spatial practises and needs towards creating better and more inviting public spaces.

C3Places following those premisses is analysing **how specific users – teenagers or elderly – appropriate urban public open spaces** and how they can be better configured to respond to different needs. In **Lisbon**, observations seem to indicate that urban public spaces of transit, as streets (Figure 2.6), are used mainly for matters of convenience and proximity to primary spaces of daily significance as the home and the school.

Figure 2.6: Streets as central public spaces in people's daily life, both as spaces of transit and circulation and of social interaction. Photo C3Places Lisbon (2019).



## BRIEF NOTES ON USER'S PARTICIPATION IN PUBLIC SPACES PLANNING AND DESIGN



Joana Batista, Inês Almeida, Carlos Smaniotto Costa, Marluci Menezes

For C3Places a public space must be inclusive and responsive, allowing people to use it without restrictions and to fulfil socio-spatial needs. To achieve more inclusive and responsive spaces, users should have a voice in the process of planning and design, also known as placemaking (PPS, n. d.).

Engaging people actively calls for appropriate methodologies as inclusive design (Carmona, Heath, Tiesdell, & Oc, 2003) or co-creation, the last is at the core of C3Places research.

C3Places uses the terms inclusive and responsible place to describe a far-reaching framework of principles and best-practice on which communities can build a shared commitment to sustainability in social and urban development. For that, **communities** should be engaged in the making and transforming of public spaces from the very beginning.

Public space as a shared common good is the fundamental premise – public space is a resource which, if used responsibly, can help transform the way people live, work, recreate, and interact. In placemaking, stakeholders should have a clear understanding on how specific characteristics and shapes affect the experience of the space (Alves, 2005; Stevens, 2007). Therefore, interested parties as different users' groups, community facilitators, professionals, local authorities and municipalities, should be engaged directly, their opinions accounted for and their needs responded to by placemaking (Alves, 2005; Carmona et al., 2003; Thompson, 2002; UN-Habitat, 2015).





Figure 2.7: Living Lab Lisbon – brainstorming exercise with participants to reflect on characteristics of and ideal public space.  
Photo C3Places Lisbon (2018).



Figure 2.8: Living Lab Lisbon – group work to draw ideas and proposals for transformation of a public open space.  
Photo C3Places Lisbon (2019).

The case-study in Lisbon followed this recommendation and different stakeholders were brought together in the development and operationalisation of **living labs** (Figures 2.7 and 2.8) (Smaniotto-Costa, Almeida, Batista & Menezes, 2018).

Participative approaches bring challenges of different sorts: in terms of time to be invested, human resources, monitoring and structuring the process that may impose demands that are too high for planners and authorities to see



the advantages; in deciding who to involve; the time offset between participation in the process and benefitting from the outcome may be too long for users to engage and, due to transitory needs of users', too stretched to provide a response while the changes are still valid; questions may be considered too technical or complex for the comprehension of non-professionals and; participation may add a legitimacy to the process but without truly respecting the opinions and ideas of those involved (Alves, 2005; Jupp, 2007; Talen, 2000; Valentine, 2004).

Figure 2.9: Living lab Lisbon – outdoor exercise for participants to observe and discover different public open spaces. Photo C3Places Lisbon (2018).

However, creating collaborative environments for planning, designing and transforming public spaces is fundamental for a placemaking process more interactive and able to meet the needs of the community, and to produce public places that are more attractive, meaningful, inclusive and sustainable.

Co-creation, as an open process with no previous fixed results, is a challenge for all parts involved but it is at the same time an open door for innovative ideas and solutions. In co-creation a broader range of people come together around the same table to negotiate and reconcile their different needs and interests, solve problems, freely express their concerns and expectations and, ideally, foster a community around public spaces ensuring more sustainable use (Figure 2.9).

The experiences gained within C3Places in the living labs in Ghent, Lisbon, Milan and Vilnius are described at the site **MyC3Place**.





## REFLECTIONS ON TEENAGERS USE OF PUBLIC OPEN SPACE



Joana Batista, Inês Almeida, Carlos Smaniotto Costa, Marlucci Menezes

**C3Places Lisbon** reflected on teenagers use and needs on public open space. Space observations evidenced the strong role of public spaces in Alvalade but, in broad terms, revealed that teenager's usage turned out much lower than supposed. This was confirmed also by the difficulty identifying public spaces in the neighbourhood in the living labs. In the school surroundings, teenagers' use of public space is directly related with school activities and schedules. Students using the space, mostly are in groups, talking, hanging out or smoking. Due to a lack of sitting equipment in the area, the students use the bus stop shelter (where there is the only bench available), or sit in different places with other functions (at a bikes station, café tables, on the floor, on walls and access ramps, or on the steps of the building entrances), what can cause conflict among teenagers and with other users. However, it seems clear that the majority of students also only cross this space (Figure 2.10). Experts from the parish council see teenagers as a difficult group to work for/with since they mostly assume that teenagers' behaviour in public spaces is inadequate and damaging to the space and its equipment.



Figure 2.10: The broad streets crossing in front of the school.  
Photo C3Places Project (2019).

Nevertheless, they are aware that adolescence is a period of transition and acknowledge that there is a lack of public spaces that meet teenagers' needs. Experts expect that the creation of flexible and multipurpose places, suiting different users, can diminish potential conflicts. Regarding the involvement of teenagers, a collaboration with schools is perceived as beneficial to engage teenagers in public discussions, from where they are currently absent from.

The teenagers engaged in **co-creation**, had a weak urban literacy, what made it difficult at times to reflect on their use of public space. Their favourite places also seem to be private and indoor spaces, such as shopping malls, where they hang out and meet peers.

However, the labs boost discussion on public space and main conclusion seems to point to a lack of public spaces meeting teenagers' needs, in Alvaalde neighbourhood. Teenagers' want quality public spaces, diverse and well equipped, easily accessible (by private and public transportation) and where they can meet and hang out with friends, sit in groups and feel welcome.

In the second phase of **living labs** two groups propose ideas for transformation of a public space in front of the school, used by students. The first group proposes a public meeting place for social gathering, with benches and tables with trees casting shadows, and changes in the street structure to increase pedestrian safety (more crossing, street narrowing). The second group proposed a new street design with less parking slots to create shared spaces and therefore increase road safety. The group suggested a green space with kiosk, trees, circular wooden benches and enhanced with a wi-fi hotspot and water dispenser.



## POTENTIALS AND BOTTLENECKS IN DIGITAL CO-CREATION WITH TEENAGERS



Joana Batista, Inês Almeida, Carlos Smaniotto Costa, Marlucci Menezes

C3Places **Lisbon Living Lab** allowed to reflect on the potential and bottlenecks in digital co-creation with teenagers. The labs revealed the importance, of clear messages, goals and expectations, shared from the beginning.

Such messages have to encompass what is going to happen, why is it happening, when each task has to be performed, which results are expected and what are the benefits for **participants**.

In Lisbon, the labs revealed teenagers' have a weak urban literacy and low spatial representation skills, and difficulties in identifying own needs and expressing ideas for public spaces, but the theme sparks interest in most of them and the interactive activities provide a forum for learning about urban space and share experience of teenagers use of space and needs.

For this reason is important to assess the knowledge, abilities and motivations of the target participants, and harness their full potential to actively participate in **co-creation of public open spaces**. To assess the success rate and overall satisfaction with the labs, a short questionnaire was distributed at the end of the last session asking students to indicate the perceived learning effect. The results fluctuate between a high satisfaction and a dissatisfaction, in line with the general observation made during all sessions; while a group of students showed interest and conducted lively the discussion, another small group remained apart, even not reacting to a direct request to express their ideas or opinions. While in the questions related to personal experience with collaboration and exchange of ideas, the agreement with statements was low, the ones related to learning effect by taking part of the workshops the agreement was higher.



This can be analysed as a positive benefit for increased knowledge gained by this type of participative methodology.

In this respect, it is noted that the living labs were inserted in the daily school activities, and the school board selected the classes that participated in the two phases. The willingness and readiness to get involve in digital co-creation may be different than when students can choose on their own to participate.

The second phase of labs with teenagers tested the potential of using digital devices in co-creation of public open spaces. Tablets were provided for the participants and facilitators recommended the use of digital tools for collection and discussion of ideas and general group work. The use of this devices may be beneficial to allow for more interactivity in co-creation. For digital co-creation, devices and tools should be provided and integrated in the process, efficiently and logically.

In Lisbon, results highlight a important role of digital co-creation to increase the awareness on placemaking and provide opportunities for teenagers (and other groups) to discuss different needs on public spaces. That discussion is a crucial one in urban planning, since public spaces are common goods and everyone should be able and encouraged to use them and **share them with others.**



# EXPLORING TEENAGERS' SPATIAL PRACTICES AND NEEDS IN LIGHT OF NEW COMMUNICATION TECHNOLOGIES



**Carlos Smaniotto Costa, Joana Batista, Inês Almeida, Marlucci Menezes**

There is an increasing awareness and advocacy claim for engaging the society in the production of public open spaces. This contribution seeks to increase knowledge on the relationship between spaces and the social practices of teenagers, towards a more inclusive and interactive process of public space co-creation. It is based on two European Projects: CyberParks and C3Places, and explores teenagers' spatial practice and needs, and how to engage them in the process of co-creating more sensitive public spaces, while exploring the challenges and opportunities ICT open. This paper, the results of a case study taking place in Lisbon and the analysis of questionnaires and interviews are discussed.

 [Read the full article](#)



Smaniotto Costa, C., Solipa, J., Almeida, I., & Menezes, M. (2020). Exploring teenagers' spatial practices and needs in light of new communication technologies. *Cities*, vol. 98. DOI: 10.1016/j.cities.2019.102574.



# CO-CREATION OF TEENAGER-SENSITIVE PUBLIC SPACES



**Carlos Smaniotto Costa, Joana Solipa Batista, Marluci Menezes**

This paper explores the nexus public spaces - users and co-creation based on the research Project C3Places. The Project, using the potential of co-creation to inspire placemaking, aims to inform decision making to increase the attractiveness, responsiveness, and inclusiveness of public open spaces. It reflects on the results of a case study in Lisbon centered on teenagers as potential co-creators of public spaces, their spatial practices, along with perceptions, needs, and requirements. It also addresses the negotiation of public space by teenagers, the potential of living labs for placemaking and the analysis of local policies and strategies that support civic involvement. The living labs, a central part of this study, were completed prior to Spring 2020, so the research and insights do not reference the global public health crisis caused by COVID-19. This has changed our ordinary everyday life, and the major enduring effect is the way we are allowed to use and move through public spaces. However, when we all are suddenly forced to reconsider our relationship to public spaces, their potential to support a range of inclusiveness becomes even stronger.

[Read the full article](#)



Smaniotto Costa, C., Solipa Batista, J., Menezes, M. (2021). Co-Creation of Teenager-Sensitive Public Spaces. The C3Places Project Living Labs in Lisbon, Portugal. *Focus, Journal of the City and Regional Planning Department*, San Luis Obispo, Ca: Vol. 17: 52-62.



# MILAN LIVING LAB

The Living Lab is promoted by the Computer Science Department of the **University of Milan**. It explores new dynamics of the open spaces as a value-added service for the community, paying attention to the parties interested, to the local context and to the different social groups.

The idea developed by the team is a vibrant new way to create a community that could really communicate and help and grow not only virtually but also in presence by means of technology.

Contributions of the University of Milan to the C3Places Project are various. The main task was the development of a co-creation platform providing a scientifically validated framework for citizens' interaction in and with public spaces, leveraging their diversity potential of co-creation.

## Local Partners

- Università degli Studi di Milano
- Department of Computer Science

## Social Campus







# PARTICIPATORY CO-CREATION AND URBAN SUSTAINABILITY: THE ROLE OF COOPERATION IN THE ICT ERA



Rita Pizzi, Alessandro Merletti De Palo

In the last decade Information and Communication Technologies (ICT) have become an important tool for socialization. However, living public open spaces firsthand remains fundamental for the development of the cultural identity of a community. ICT allows to develop strategies and tools to increase the quality of public open spaces, positively influencing the co-participatory creation and the effects of social cohesion (Figure 3.1). As part of a European research project called **C3Places**, we intend to generate knowledge and knowhow for a co-creation approach to be used to combine

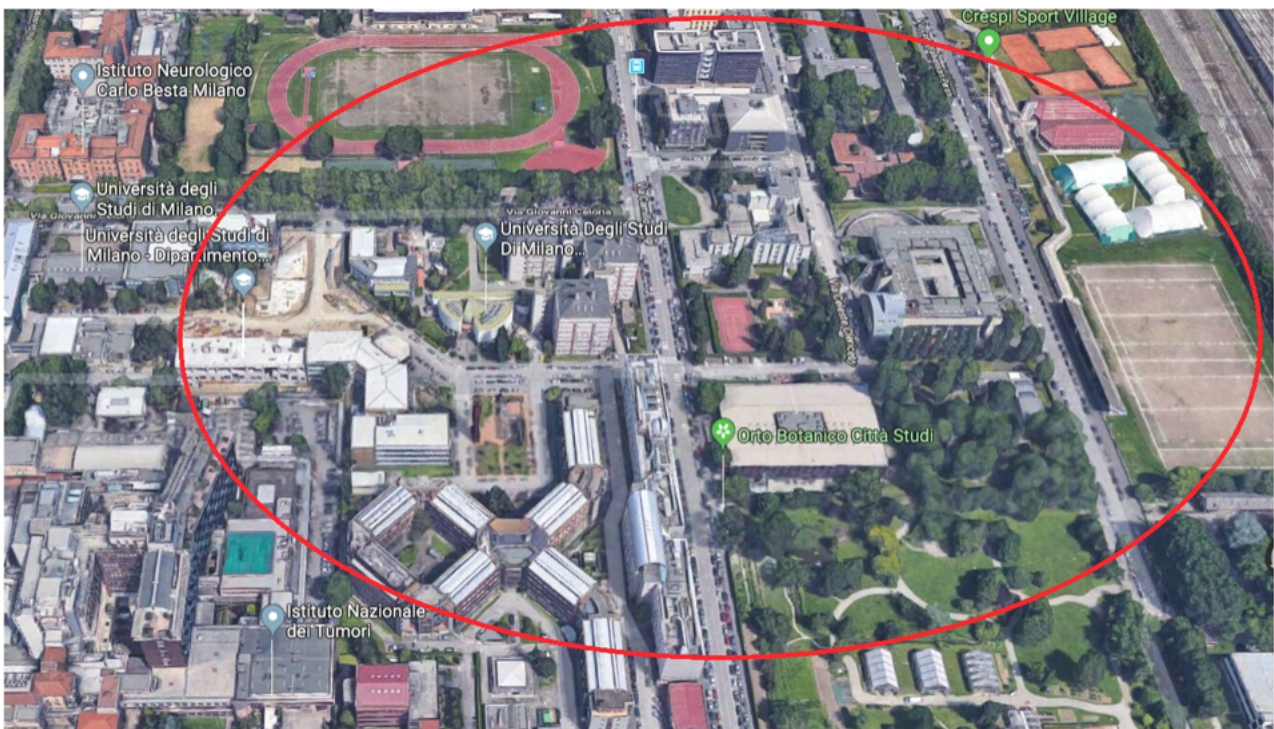


Figure 3.1: The university area "Città Studi" where the Social Campus points of interest are located.



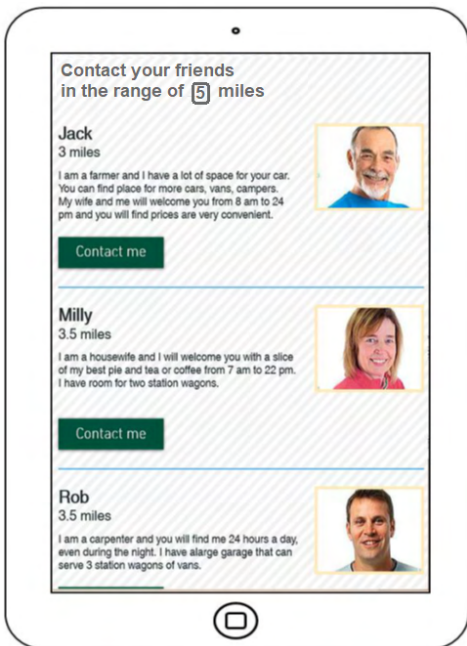


Figure 3.2: App interface: services and contacts of the private charging points.

the use of ICT and the studies on cooperation with the essential functions and new potential of the public open spaces (Figures 3.2 and 3.3).

We explored the new dynamics of the open spaces as a value-added service for the community, paying attention to the parties interested, to the local context and to the different social groups.

[Read the full article](#)

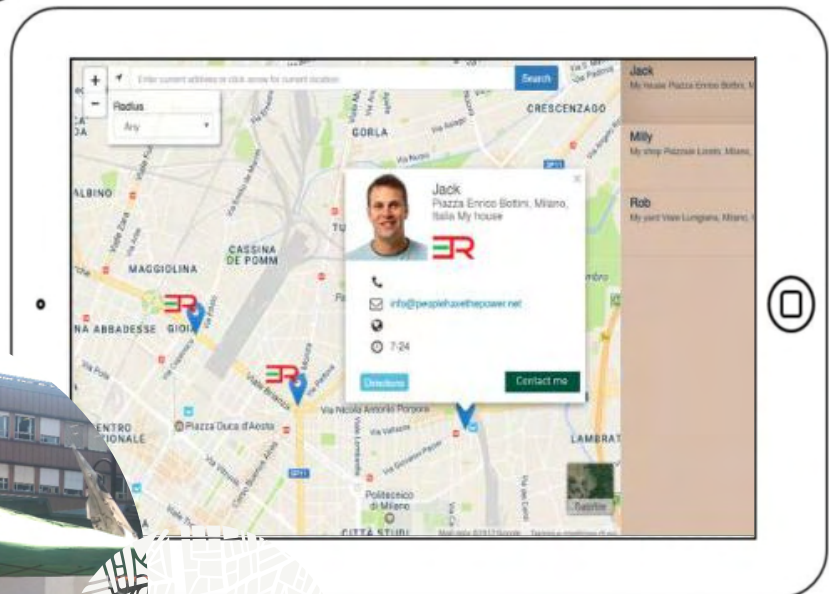


Figure 3.3: The private charging points are geolocalized.



*Co-Creazione partecipativa e Sostenibilità Urbana: il Ruolo della Cooperazione nell'Era dell'ICT 2018* / R. Pizzi, A. Merletti De Palo - In: *Città Sostenibili* / [a cura di] C. Fiamingo, V. Bini, A. Dal Borgo. - Prima edizione. - Broni : Altravista, 2018 Dec. - ISBN 9788899688400.



# ICT-BASED PARTICIPATORY CO-CREATION OF URBAN SUSTAINABILITY



Rita Pizzi

In recent times Information and communication technologies (ICT) have become an important tool for socialization. More and more people build and maintain relationships through various social media and increasingly this influences the way they organize their daily lives and how they use the city and its spaces. However, the quality of public open spaces remains fundamental for the development of the cultural identity of a community, as they are important gathering points in the urban fabric and offer occasion for interactions and collaborations between generations and different ethnic diversities.

People of all ages still need contact with nature and with other people, in order to develop different life skills, values, attitudes to health, satisfaction with their lives and responsibility towards the environment.

ICTs allow the development of strategies and tools to increase the quality of public open spaces, positively influencing participatory co-creation and the effects of social cohesion. New ways of cooperative co-creation must be considered, in particular by using ICT to facilitate community interaction and engagement for the integration of diversity, and identifying social needs in open public spaces, aiming at the development of vibrant and accessible urban communities (Figure 3.4). ICT gives also the opportunity to the urban communities to improve sustainability (Figure 3.5). This paper presents best practices and new ICT solutions for enjoyable, inclusive, participatory, sustainable urban spaces.

 [Read the full article](#)



*ICT-based Participatory Co-Creation of Urban Sustainability* / R.M.R. Pizzi. - In: INTERNATIONAL JOURNAL OF COMPUTER APPLICATIONS. - ISSN 0975-8887. - 182:30(2018 Dec), pp. 30-35.







# THE UNIVERSITY OF MILAN CONTRIBUTION TO THE C3PLACES PROJECT



Rita Pizzi

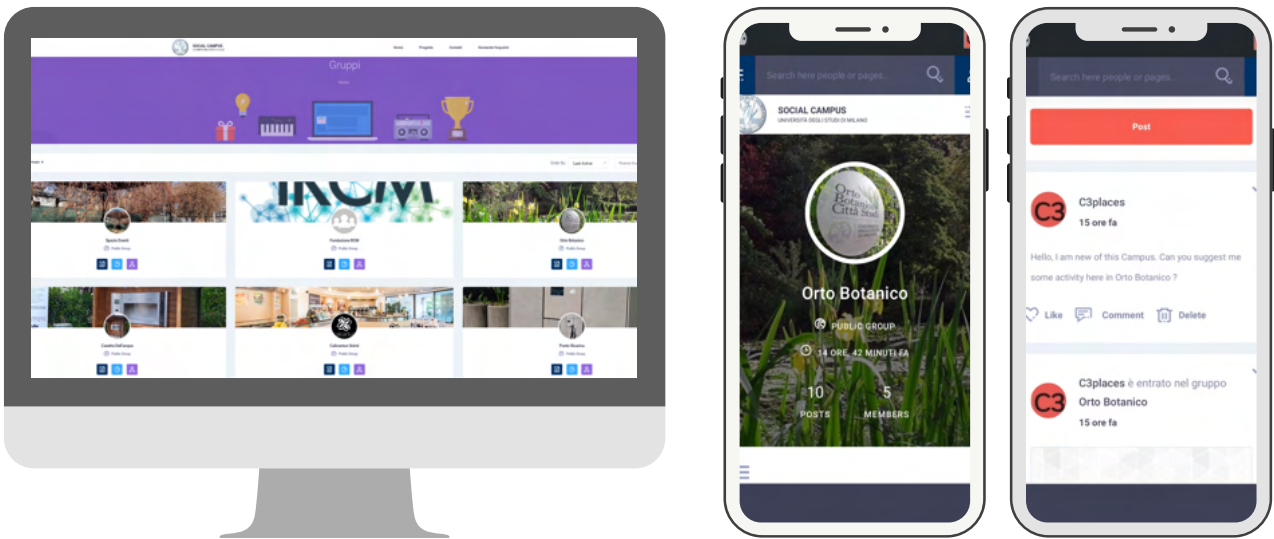
The presentation at the **link** describes the idea developed by the UNIMI team: a vibrant new way to create a community that could really communicate and help and grow not only virtually but also in presence \*by means\* of technology.

Urban open space can easily become center of shared services and cultural events and opportunities and knowledge (Figure 3.6).

The availability of public hot spots in public places can be seen as a social service, where digital infrastructures may become a way for the supply of public services, ideas, creativity, opportunities for co-creation and collective cultural and social interchange, promoting sustainability, responsibility and knowledge of nature, the city and citizenship in its cultural diversity.



Figure 3.6: View of the "Città Studi" area.



Figures 3.7-3.8: The PC and smartphone Social Campus interface: view of some points of interest. Clicking on the point opens the corresponding social group.

University of Milan main task in C3Places project was the development of a co-creation platform providing a scientifically validated framework for citizens' interaction in and with public spaces, leveraging on their diversity potential of co-creation (Figures 3.7 and 3.8). A social network built around points of interest of public open spaces, where people can exchange useful information, moods, requests, ideas (Figures 3.9 and 3.10).

A complete example has been developed and experiment, yield the novel digital tool to students of the Campus, open also to the citizens living in the area.

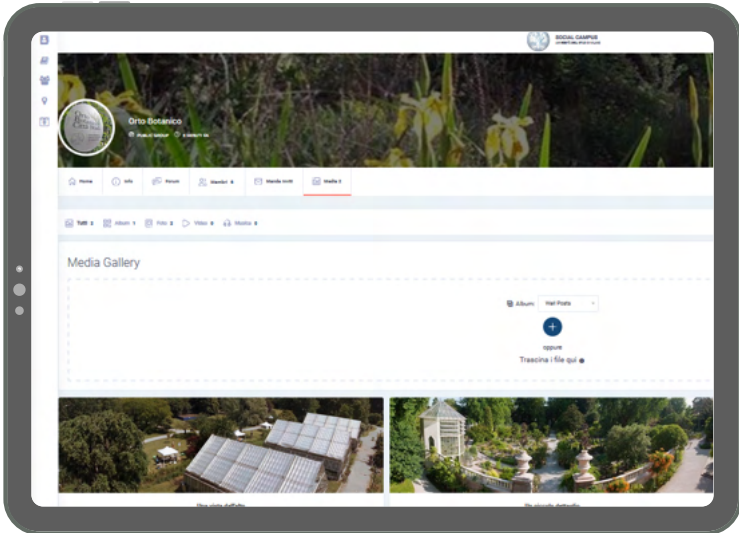


Figure 3.9: View of the Social Campus Media Gallery where the users can upload contents.

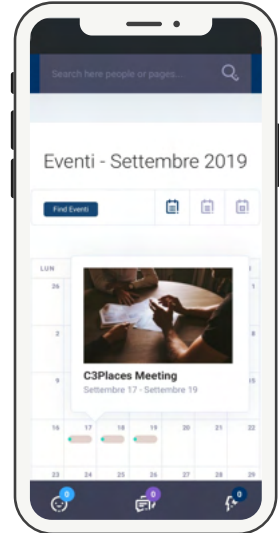


Figure 3.10: View of the Social Campus Agenda where the user can add and find events.





## SOCIAL CAMPUS



Rita Pizzi

The **platform** was created by the Department of Computer Science of the dell'Università degli Studi di Milano of the as part of the C3Places European Project, which aims to develop strategies and tools to increase the quality of open public spaces through the information and communication technologies. This platform aims to create a community of students, teachers and citizens who attend the Città Studi ("City of Studies") Campus and its open spaces.

On this web site you can ask, receive and yield information on the various places of interest scattered around the area simply by registering. Entering the dedicated pages it will be possible to interact with the registered members that share the same interests. In the groups section you will be able to communicate with the registered members (Figure 3.11). The group page can also be reached by scanning the QR code on the plate affixed in proximity to the point of interest (Figures 3.12 and 3.13).

[Join this new community](#)

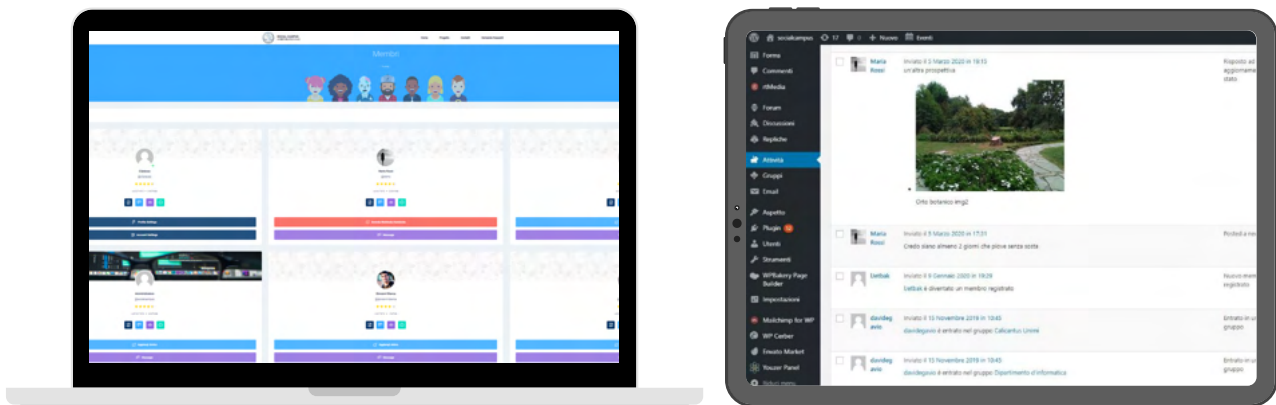


Figure 3.11: Social Campus view of the members page and of a chat between members.



Figure 3.12: Social Campus: an example of QR code tag.



Figure 3.13: Social Campus: enlargement of a QR code tag: it includes both QR code and a short description of the point of interest.



## AN EXAMPLE OF DIGITALLY SHARED INFRASTRUCTURE CREATING A PARTICIPATORY COMMUNITY IN AN URBAN OPEN SPACES



Rita Pizzi

An open project of the Department of Computer Science of the University of Milan, **PEOPLE HAVE THE POWER**, in collaboration with the Polytechnic University of Milan (Department of Architecture, Construction Engineering and Built Environment) has proposed a geolocalized app that allows to find in the vicinity of your vehicle private buildings available to lend an electric outlet for charging electric vehicles, especially in yards, garages or parking spots.

As shown in the dedicated platform, the app allows individuals, companies or commercial activities to register, describe their service, arrange payment via PayPal or credit card, or promote their charging spots with scores collection and exchange, discounts etc. Users can use the **recharge service** while leaving the vehicle for commissions or for leisure, or during a holiday trip or when stopping for the night. The project was developed and a charging point was realized in the Città Studi Campus and has become a point of interest of the **Social Campus platform** (Figures 3.14, 3.15, 3.16, 3.17).



C3places

### PUNTO PER LA RICARICA DI VEICOLI ELETTRICI LEGGERI

Luogo per diffondere la mobilità elettrica attraverso punti di ricarica innovativi, installabili sulla facciata di ogni edificio e condivisi con un sistema che incrocia i modelli di green e sharing economy.  
Place of diffusion of electric mobility through innovative recharging points, which can be installed on the facade of each building and shared with a system that combines the green and sharing economy models.

<https://sites.unimi.it/socialcampus/>



<https://c3places.eu>

Inquadra il QR code per maggiori informazioni e unisciti alla community del Campus  
Frame the QR code for more information and join the Campus community

Figure 3.14: Social Campus: the QR code tag of the Smart charging point for soft electric vehicles.



Figure 3.15: The Smart charging point, inserted in the facade of the building.





Figure 3.16: Smart charging point position.



Figure 3.17: Smart charging point close-up view.



## SMART CO-DESIGN

An interdisciplinary approach to urban planning via Augmented/Virtual Reality and Process Mining



**Barbara Piga, Marco Boffi, Nicola Rainisio, Gabriele Stancato, Paolo Ceravolo, Gabriel Marques Tavares**

In the field of urban planning and design, citizens' involvement has undergone a constant evolution. This has taken place in quantitative terms, with an increasing number of citizens involved in each urban transformation, together with a greater number of initiatives for collaborative approaches (Davies et al., 2012). Such evolution is also qualitative, as more attention is nowadays devoted to disadvantaged social minorities and citizens are more often considered as partners rather than passive observers (Bisschops & Beunen, 2019). In this context, the opportunities offered by ICT solutions have represented a natural field of expansion for these practices. This process has been further strengthened by the rapid and widespread diffusion of mobile devices, which allow building networks interconnecting different actors, at the same time and in different places, among them and with the city. Moreover, such interaction between urban planning and ICT has produced several innovations in terms of services offered to the citizens (Dunn, 2007; Piga et al., 2021).

Yet, the role of the social sciences has so far been partial in those initiatives, despite the proximity of some research issues. In particular, environmental and community psychology developed several theoretical concepts and measurement tools relevant for this field. Thanks to their implementation, the relationships of individuals within a community and with the physical environment in which they live can be effectively described. This union between the physical and intangible components of the places we live has rarely been effectively integrated into applied tools (Boffi & Rainisio, 2017). At the intersection of these different perspectives on experiential urban planning (Piga, 2017) lies the starting point of the collaboration between the Università degli Studi di Milano and the Politecnico di Milano.

It was further developed thanks to the "AR4CUP: Augmented Reality for Collaborative Urban Planning" projects (2019 and 2020), part of the H2020 EIT Digital (Digital Cities) funding program whose Italian partnership was led by the Politecnico di Milano. The objective of the project is to support the design of urban spaces, through an app (AR4CUP) that makes people's urban experiences evident and quantifiable using synchronous behavioral data (Seeber, 2014).

In a nutshell, this smart co-design approach fosters the inclusion of the urban communities perspectives in the design process. Mixed Reality is exploited to combine real and virtual environments (Carmignani et al., 2011). The result is a combination of information coming directly from the real environment with information coming from design artifacts: data are collected recording the user response to this mixed reality in real-time. Indeed, the app has different functions that enable its application throughout an entire co-design process:

- 1.it shows, on-site through Augmented Reality and off-site through Virtual Reality, urban and architectural proposals geolocated in real dimensions before their actual implementation; it also allows to explore the current condition of the neighborhood;
- 2.it collects data from citizens' reactions to proposed urban transformations or to the current environment, combining emotional, cognitive and behavioral factors through scientifically validated instruments;
- 3.it develops automatic data analytics to study the user's behavior, to verify its conformance with the design goals and to identify space utilization not explicitly considered by the design plans;
- 4.it represents the outcomes in various forms, including charts and maps of the places as they are subjectively perceived.

The app and its outcomes are conceived as a tool for facilitating the interaction among stakeholders of urban transformations (e.g. Architectural Firms, Real Estate Developers), institutions (e.g. Local Public Administrators, Regional or National authorities) and citizens (e.g. dwellers, commuters, tourists). It eases the creation of a shared representation of places, combining together objective environmental features and subjectively perceived values. Such common ground is crucial for informing designers and decision-makers about citizens' needs, which might impact on the project development. In addition, it is a way to effectively inform citizens and actively engage them in the urban transformation from the very beginning of the process.



## VILNIUS LIVING LAB

The Vilnius Living Lab will be centered on **seniors** (elder person 60 and above years old) as they are a growing population of aging Lithuanian society with specific needs and interests on public spaces. Thinking about the public space as a service for community, the researchers will analyze how ICT and open space are used together today and from there come up with ideas how to provide the public services in a **more efficient way and more specifically tuned to the local context and different community members' needs**. The public space chosen for analysis illustrates good new practice of decreasing gap between age groups, inviting seniors to open space previously used for other age groups and let us follow development of new initiative between municipality, district community and seniors club. So, this will involve multi-stakeholder perspective and new business models such as crowd funding or public-private collaboration in sustainable public development.

### Local Partners

- Mykolas Romeris University
- Aukštamiestis

### Living Lab







# MAPPING DIGITAL CO-CREATION FOR URBAN COMMUNITIES AND PUBLIC PLACES



**Monika Mačiulienė**

Increasingly digital communication, social media and computing networks put the end-users at the center of innovation processes, thus shifting the emphasis from technologies to people. In the private sector, this shift to user-centricity has been conceptualized under such approaches as Service-Dominant Logic and Open Innovation 2.0.

Public sector conceptualizes the change through the New Public Governance and Open Government paradigms and suggest that the public value is no longer created by the governments alone but in collaboration between the public entities, private sector, civil society organizations and citizens.

While traditional approaches to public engagement and governmental transformations remain relevant, this article focuses on the growing potential of networked urban communities to solve the social problems. It expands the co-creation research field and suggests a typology discerning co-creation patterns when enhancing the public spaces with a community-wide participation with the use of creative, innovative and cooperative Information and Communication Technologies' applications.

The sample for web-based monitoring consists of 10 digital applications linked with design and improvement of public spaces in Vilnius, Lithuania. The proposed typology framework gives an overview of the state-of-art in the interaction between people, places and technology. The research helps to discern how different technological, organizational and other social factors influence and shape the patterns of co-creative initiatives.

[Read the full article](#)



Mačiulienė, M. (2018). Mapping Digital Co-Creation for Urban Communities and Public Places. *Systems*, 6(2), 14. doi:10.3390/systems6020014





# FRAMING THE RATIONALE OF C3PLACES





# HOW ICT PROVISION CAN IMPROVE ASPECTS OF SPATIAL USE AND QUALITY?



Ina Šuklje Erjavec

To better understand and present the complexity of the relationship between users' needs for space use and quality and the necessary attributes and ways of using ICT tools to improve various aspects of space quality, we have prepared an overview table that includes and shortly describes key spatial quality aspects of the outdoor setting, list of some user needs related to both spatial and ICT use, ICT attributes relevant to fulfil those needs, some possibilities and types of ICT implementation, and suggestions of related added values to listed spatial quality aspects.

Legend:

- **AR** = Augmented Reality
- **LT** = Location Technology
- **W** = Wi-Fi
- **VT** = Vision Technology
- **DM+** = Data Management plus more

SPATIAL QUALITY ASPECTS	USER NEEDS	DIGITAL TOOLS /ICT		ADDED VALUES
		Attributes	Type of implementation	
(Public) Accessibility	Physical accessibility orientation, navigation, access for all (inclusiveness)  Accessibility to technology – skills/use, affordability, equality (inclusiveness)	Easy to use (intuitive) devices, (no need to be ICT-literate) Path quality - access for all  Online information before visiting place - available for all needs	Wayfinding apps – “filtering’ based on user profile and requirements Overlaying of additional information within App for specific purposes (augmented reality); In-situ devices <b>LT, AR</b>	<ul style="list-style-type: none"> <li>• Enhancing access for all (facilitating it)</li> <li>• Responding more specifically to user requirements,</li> <li>• Possibility for user feedback to enrich data</li> </ul>

Security	<p>To feel safe in the space, not to be controlled or observed; to retain:</p> <ul style="list-style-type: none"> <li>- physical safety</li> <li>- emotional/</li> <li>- psychological safety</li> </ul> <p>Internet security - not to be hacked</p>	Physical and virtual privacy, confidence, alert to danger, feedback, security check	<p>ICT tools and apps for:</p> <ul style="list-style-type: none"> <li>- Lighting</li> <li>- Sound and light interactivity</li> <li>- Suitable structure of place, good visibility,</li> <li>- Validated networks</li> </ul> <p>Monitoring cameras <b>AR, LT, VT, W, DM</b></p>	<ul style="list-style-type: none"> <li>• Social networking</li> <li>• User's involvement</li> <li>• New users</li> <li>• Higher usability</li> <li>• New ways of lighting</li> <li>• Flexibility</li> <li>• Activation system</li> </ul>
Legibility	To understand the place/move easily	Readability	Planning - Layout and way-marking <b>AR, LT, VT, W, DM</b>	Better orientation flow of movement
	Clear Identity of place	Unique features	Artworks, landscaping, facilities	Recognition, significance
Sociability	Participation and inclusion Interaction	Gathering / social settings Interactive settings Play features	Clear space/ICT demarcation /time-independent but spatially localised social interaction <b>AR, W, DM, LT</b>	Well-being and social cohesion, ownership/care sense of belonging, e-agera
Adaptability	Adapt to special needs Co-create – temporarily change Capacity for individual change	Future-proof design Flexibility Ephemerality	Apps, Wi-Fi Sensors, Screens and other in-situ devices and settings (Regular maintenance and updating needed) <b>VT, DM, W</b>	Co-creation, citizen input, experimentation of solutions, possibly temporary
Functionality	Accessibility Comfort	Welcoming spaces, clear pathways	Social design and facility provision <b>DM, LT</b>	System trust
Connectability	Between spaces (permeability), people and information	Secure and high-bandwidth provision	Maintaining networks, facilitation <b>W, DM</b>	Social cohesion, communication



Variety	Attractors Opportunity of choice	Gaming, social, information layers	Embedded games and play, socially hybrid spaces – e.g. chess/coffee <b>AR, LT, VT, W, DM</b>	<ul style="list-style-type: none"> <li>• Enjoyment</li> <li>• Play</li> <li>• New uses</li> <li>• Innovation</li> </ul>
(Social) resilience in the face of emergency	Obtain and give effective and reliable information; Knowledge as to where to go; Access to amenities Organisational support for groups	Quick responsiveness Spatial adaptability to user needs ICT-functioning support Accessibility (to both space and technology)	Energy independence or passive energy generation Monitoring devices e.g. air/water quality, waste... <b>W, DM, VT, LT</b>	<ul style="list-style-type: none"> <li>• Timely information provision and exchange</li> <li>• A direct communication channel e.g. via social media</li> <li>• Monitoring available resources</li> </ul>
Environmental / ecological sustainability	Optimal microclimate Water retention Biodiversity Pollution and natural disaster mitigation	Real-time monitoring via sensors Visualising the information in situ	Sensors Screens Apps <b>DM, VT, LT, in situ sensors</b>	<ul style="list-style-type: none"> <li>• Raising awareness and knowledge</li> <li>• Support policymaking and management</li> </ul>
Health (physical and mental) and wellbeing	Outdoor physical activity Mental restoration (connection with nature) Knowledge about optimal environmental conditions to carry out physical activity	Challenging and attractive environment for physical activities; Virtual environment to enhance wellbeing; Real-time information; Health-related statistics	Innovative elements that invite one to perform physical activities Screens, Apps Games <b>AR, VT, LT, DM</b>	<ul style="list-style-type: none"> <li>• Raising awareness, knowledge, promotion of a healthy lifestyle;</li> <li>• Attract new people outdoors; Incentivise activity of visitors;</li> <li>• Offer new experiences</li> </ul>



# CO-CREATION OF PUBLIC OPEN SPACE – CHALLENGES AND OPPORTUNITIES



Barbara Goličnik Marušič, Ina Šuklje Erjavec, Vita Žlender

To facilitate the smoothness of a co-creative process, different kinds of participatory tools, methods and technologies have been developed, most of them aiming at being easy to use and available to users anywhere and anytime. Commonly, it is still urban planners who are designing and initiating the process, so the selection of participatory tools mainly depends on them. However, the actors involved in the co-creation and the variety and relationships among them are of crucial importance for the success of the creation process. The relationship between all involved is a partnership, though some literature stresses the communication gaps between various actors involved.

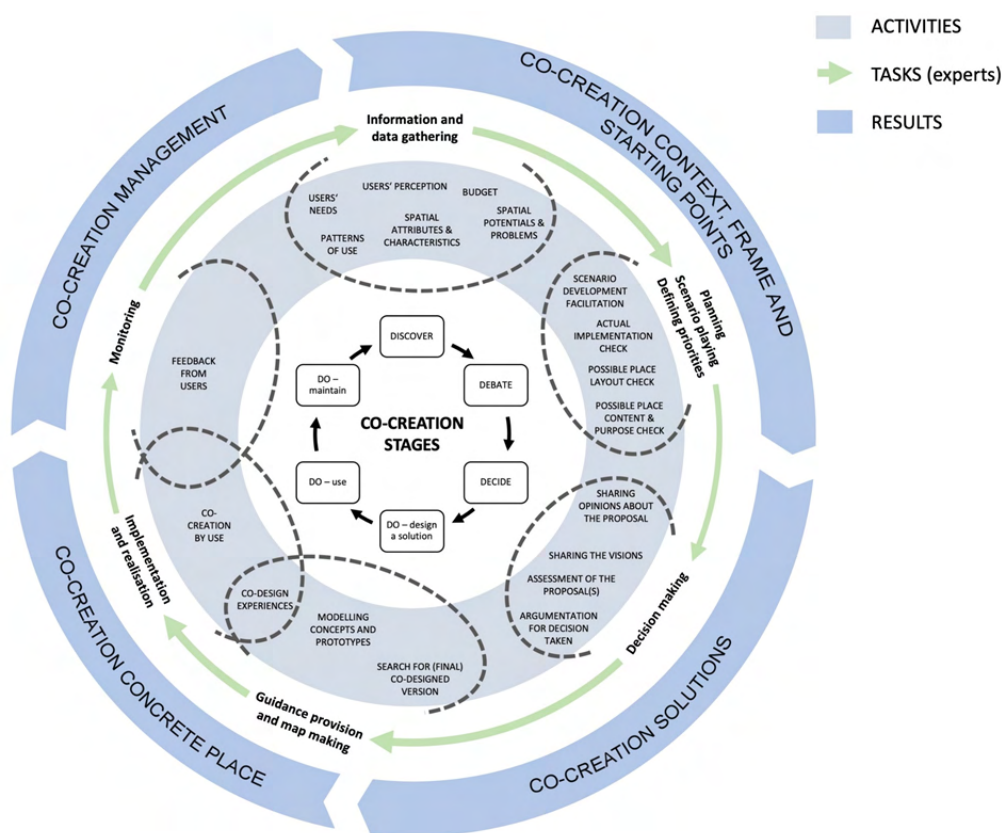


Figure 5.1: Co-creation stages, activities, tasks of actors and likely results within the POS development process (Žlender et al., 2019).

## Type of Activities and Tasks of Actors

We defined specific tasks of planning experts and users as the actors involved in the process, and further develop the activities and tasks for each co-creation stage (Figure 5.1).

**Discover.** In this phase, activities performed mainly relate to:

- Patterns of use: gathering information about the patterns of how people use a place to provide an overview of behaviours, activities and movements of people in POS;
- Users' needs: collecting information on citizens' needs, wishes, preferences, complaints, and more;
- Users' perception: collecting information on citizens' perceptions of the environment;
- Spatial potential and problems: information on spatial potentials, problems, obstacles, etc.;
- Using databases: spatial attributes and characteristics information on spatial attributes and other characteristics;
- Budget: data on budgetary possibilities.

**Debate.** In the debate phase, most important activities refer to:

- Scenario development facilitation: facilitating the development of the predictions and scenarios to help identify parameters that may impact on people's use of a POS;
- Actual implementation check: checking financial possibilities and calculations for the implementation and management of different scenarios as possible realisations;
- Possible place layout check: recognizing or understanding place types and their attributes to support the debate about priorities and possibilities once/if implemented; and
- Possible place content and purpose check: recognizing ideas and suggestions shared by the public and other stakeholders about the purpose, vision, aims, possibilities, problems, preferences and priorities of a place once/if implemented.

**Decide.** In this phase, the final decision is met, and the solutions are co-created. Main activities of this phase are:

- Sharing the visions: expressed comments and visions from diverse actors involved;

- Sharing opinions about the proposal(s): opinions about the proposal(s) based on results from the previous phase;
- Assessment of the proposal(s): appropriateness of the proposed solution(s) against selected criteria; and
- Argumentation for the decision taken: arguing and evaluation steps for decisions taken.

**Do.** The final phase encompasses co-designing, delivering and implementing a solution, including the actual design use as well as its maintenance as a precondition for the long-term attractiveness and conduciveness for usage. In this phase, the activities may refer to:

- Search for (final) co-designed version: ways for searching for actual co-design solutions;
- Modelling concepts and prototypes: ways for and types of modelling concepts and virtual prototypes;
- Co-design experiences: co-design the site-specific experiences of various actors;
- Co-creation by use: ways of use and types of actual experiences in co-creation according to use;
- Feedback from users: gathering feedback from users.





## ACTORS AND THEIR ROLES IN THE CO-CREATION OF PUBLIC OPEN SPACE



**Barbara Goličnik Marušić, Ina Šuklje Erjavec, Vita Žlender**

Despite the agreement in the academic literature that co-creation is a collective creative endeavour (Arnstein, 1969), we believe that the role of citizens and that of professionals differ.

With regard to the roles of citizens, Goličnik Marušić & Šuklje Erjavec (2020) elaborate on three diverse roles of the citizens as co-implementers, co-designers, and co-initiators, of which, only the co-initiator is highly involved in various steps of the contemporary planning process.

With regard to the roles of professionals, scholars use different terms to denote them, ranging from the role of initiator, metadesigner, negotiator, involver and enthusiast (see e.g. Eggertsen Teder, 2019; Vandael et al., 2018).

These roles might overlap with those identified in other literature as facilitator (e.g. Vandael et al., 2018) or a mediator (Goličnik Marušić & Šuklje Erjavec, 2020). Different terms used might be a reason for the confusion and the uncomprehensive overview of roles.

Nevertheless, it is clear that the co-creation process needs structure and clearly defined roles, yet it should also remain open to individual suggestions and approaches to enhance the creativity of all parties involved and facilitate constructive problem solving.

We elaborated on the roles in Figure 5.2.

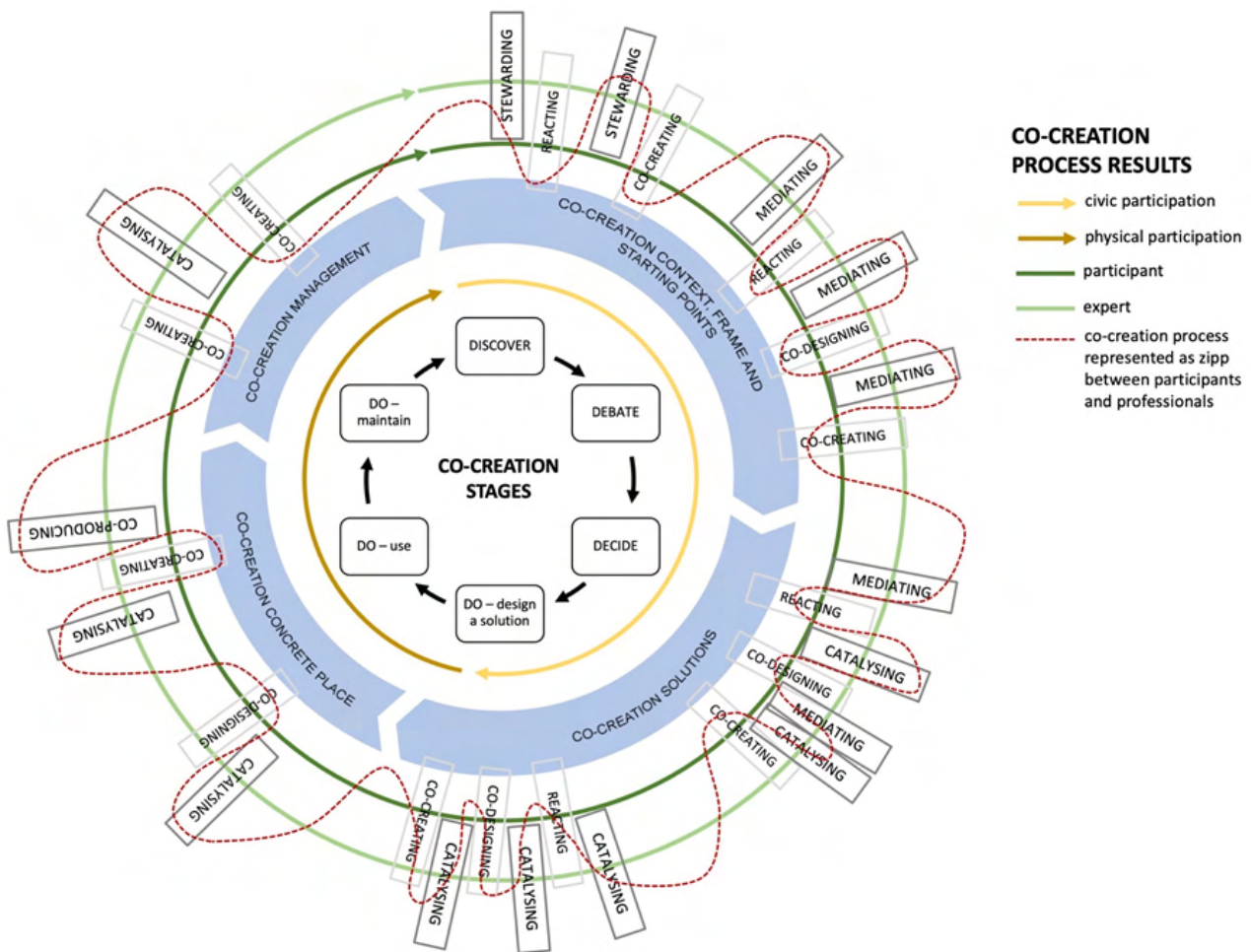


Figure 5.2: Roles of actors in the co-creation within the POS development process. (Žlender et al., 2019).



## POSSIBLE BENEFITS OF USING ICT TOOLS IN CO-CREATION PROCESS



Ina Šuklje Erjavec, Vita Žlender

To effectively use all the ICT potential it is important to understand co-creation in its broader sense: as a process that includes all stages of POS development and addresses all types of related collaboration activities, such as involving end users (citizens) and other relevant stakeholders, sharing information and local knowledge, collaborating on data gathering, expressing opinions, needs, wishes and values, defining priorities, visions and aims, working on decision making as well as placemaking with different participatory planning and co-design activities and co-management (Šuklje Erjavec, 2017; Šuklje Erjavec & Ruchinskaya, 2019).

As further next step towards better understanding the possibilities for co-creation, we developed the following structure of the possible use of different ICT tools. It explains the type of function and way of integration in the process of planning and design, place making, place management and community engagement.

### **FOR EXPERTISE WORK – technology for supporting spatial development processes**

> *in the **process of spatial planning and design**, digital tools could be used to better:*

- Understand, analyse and evaluate spatial and social state of the art faster, more deeply and comprehensively
- Assess and evaluate proposals more transparently
- Develop more transparent solutions, scenarios and models
- Present solutions more understandably and efficiently for non-experts (hardware and software)
- Perform sharing, co-production, co-creating, co-designing between experts and with stakeholders

## FOR PLACE FUNCTIONING – technology in place & technology supporting the use of place

> *in the **process of place making**, digital tools could increase:*

- Responsiveness and adaptability of place
- Communication about place and within place
- Orientation and access to information
- Attractiveness, usability and playfulness of place
- Identity and recognizability of place
- Personalization and individual creation possibilities
- Education possibilities
- Research possibilities, etc.

> *in the **process of place management**, digital tools could increase*

- Monitoring – environmental and spatial quality
- Maintenance feedback (sensors, mobile apps, platform)
- Work coordination
- Traffic management
- Cultural content management
- Technical management
- Maintenance management
- Information management, etc.

## FOR COMMUNITY ENGAGEMENT – technology for supporting community engagement

> ***to raise awareness and increase involvement of the community**, digital tools could increase the effectiveness of:*

- Information collection, sharing and management
- Social communication, interactivity and networking management
- Public involvement and participation
- Co-creation process management
- Construction of community capacity and common issues and goals





# EVALUATION OF DIGITAL TOOLS FOR CO-CREATION OF PUBLIC OPEN SPACE



Ina Šuklje Erjavec, Vita Žlender

In relation to the Digital Co-Creation Index – a tool to assess, measure and compare digital co-creation initiatives, a conceptual framework was elaborated to convey the penetration of ICT into public spaces. The criteria are structured according to three aspects: spatial quality aspects, user-related aspects, and technological aspects (Figure 5.3).

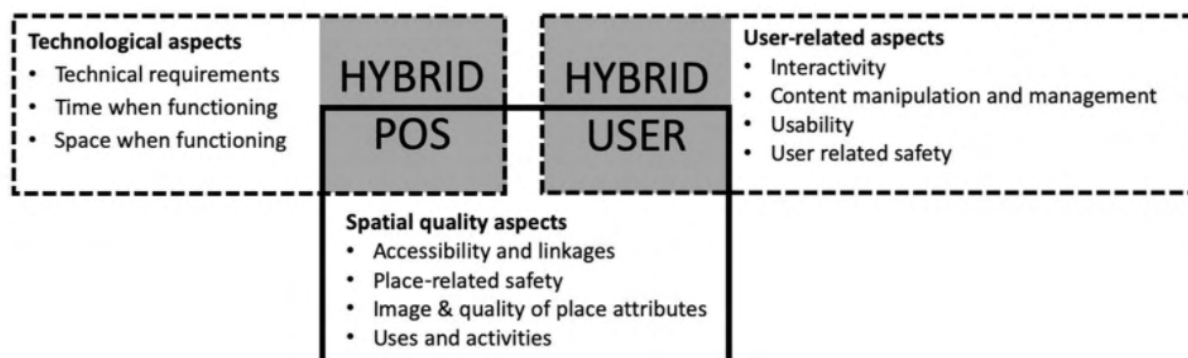


Figure 5.3: Three aspects and criteria to consider when selecting ICT for co-creation of public spaces.

## SPATIAL QUALITY ASPECTS

The approach to evaluating these aspects is grounded on basic principles of researching, understanding and designing public spaces developed by theorists and practitioners such as W.H. Whyte, J. Gehl, S. Carr and others. Specifically, the criteria, indicators and tools from the Project for Public Spaces “The Place Diagram” (Project for Public Spaces, 2009) and Jan Gehl’s “12 Urban Quality Criteria” (2017) were examined more profoundly.

## SPATIAL QUALITY ASPECTS

The approach to evaluating these aspects is grounded on basic principles of researching, understanding and designing public spaces developed by theorists and practitioners such as W.H. Whyte, J. Gehl, S. Carr and others. Specifically, the criteria, indicators and tools from the Project for Public Spaces "The Place Diagram" (Project for Public Spaces, 2009) and Jan Gehl's "12 Urban Quality Criteria" (2017) were examined more profoundly. In addition, we took into consideration the outcomes of the CyberParks Project and evaluated the performance of the C3Places POS Quality Index (C3Places, 2019) for the Living Labs assessment that we adapted to the current context of POS, with its digital transformation in mind. The main spatial quality aspects which include additional dimensions relevant for ICT penetration into POS, are defined as:

- **Accessibility and linkages** – Legibility, Navigation, Convenience for movement, Interlinking, Level of physical, social and digital accessibility.
- **Place-related safety** – Vandalism, Traffic, Injuries, Environmental safety (monitoring).
- **Image & Quality of place attributes** – Attractiveness, Personalisation and individual creation possibilities, Adaptability, Monitoring, Environmental quality and Ecological sustainability.
- **Uses and activities** – Communication and education possibilities, Access to information, Sociability, Research possibilities, Playfulness, Variety, Responsiveness, Service provision, Health and wellbeing.

## USER-RELATED ASPECTS

To define criteria for these aspects, our guiding question was: Which characteristics of ICT are needed to satisfy use and successful co-creation experiences? As basis for development of criteria the Social Responsiveness Index and the Digital Inclusiveness Index were used, plus a sub-indices of Digital Co-Creation Index (C3Places, 2019) and literature review of existing classifications and criteria of ICT features to enable satisfactory user experience. We considered criteria for methods and approaches selection from "Participedia" (n.d.) and the work of Kaplan & Haenlein (2014), who focused on collaborative projects, such as one on ICT tools, grouping them along two dimensions: type of knowledge that is created within a collaborative project, and mutual independence of individual contributions. We define user related aspects as:

- **Interactivity** - User's engagement along with the device/ media/ application used, its type of interaction, degree of interaction and type of experience

- **Content manipulation and management** – How is it provided and what is user supply?
- **Usability** - Ease of use, respect for privacy, saving work for future use, customization potential, possibility of choice
- **User-related safety** - security and privacy assurance technology (protection of personal data, anonymity of ideas, etc.) and social resilience

## TECHNOLOGICAL ASPECTS

The guiding question for the technological aspects was: How can digital technology support quality of place and the way the place is used and developed? The main issues to define are:

- **Technical requirements regarding** software, hardware and network communication, and their installation: is there a need for the internet, are any specific operational systems required, i.e. electricity, speakers, etc.?
- **From the time-related point of view:** is the ICT tool functioning permanently or temporarily, continuously or intermittently?
- **From the point of view of functioning place:** is the ICT tool static, located in the POS, portable, to be used in POS, or remotely accessible to be used for distant POS-related activities?

On this basis, we have systemised types of ICT tools and their supporting devices in three main categories which describe where the tool is installed in relation to the open space and how an ICT tool interacts with the user. The subtypes of tools are defined according to POS, user-related functions and specific characteristics. Thus, the developed framework for classifying digital tools for co-creation is addressed in the **next section**.



## TYPES OF ICT TOOLS



Ina Šuklje Erjavec, Vita Žlender

The development of digital technologies opened new opportunities for different collaborative processes, many new possibilities to engage and activate people, and for new ways of interacting with the environment. On the basis, of the possible use of different ICT tools in the relation to the type of function and way of integration in the process of planning and design, place making, place management and community engagement. We have systemised types of ICT tools and their supporting devices according to location of the tool in the relation to the open space and the way of its interaction with the user. In that was we defined three main categories:

- Place-located ICT tools
- Portable ICT tools
- Remotely accessible ICT tools

Each category is also structured into the subtypes of tools, which are defined according to POS, user-related functions and specific characteristics. The subtypes of tools are defined according to the POS and user-related functions and specific characteristics.

### Place-located ICT tools

These tools are located 'in place' and installed as a part of physical features of POS. Such digital tools add new functions into existing place or are part of the design of the new one, combining digital and physical layers into a new hybrid use. The overview of place located ICT tools is presented in the following table.

Type	Subtype
<b>Individual digital elements</b> as new types of equipment in POS	Digital public displays
	Public interactive and pervasive displays
	Multimedia interactive elements



	Multifunctional tech totems
	Interactive and responsive sound installations
	Responsive lighting elements
	Multimedia pavilions
	Interactive POS elements: a combination of different digital elements (e.g. screens + speakers + lighting) as artistic installations per se or frames for them, responsive sculptures and fountains, play equipment, etc.
	Individual elements for energy provision, as electric vehicle charging stations, solar energy stations, etc.
<b>Digital part(s)</b> of POS elements or parts of surrounding buildings and elements	Digital elements upgrading or supporting the functioning of urban elements (these are incorporated into traditional types of POS furniture like bench, table, fence, light, playing or sport equipment, etc.)
	Digital additions for upgrading the functioning, maintenance or experience of the area like WI-FI hotspot, speakers, QR codes, sensors, beacons, universal intelligent nodes
	Elements for energy provision to support use of portable ICT devices that are incorporated into traditional types of POS furniture, playing or sports equipment, etc.) in a form of plugs, solar panels, etc.
	Media facades as part of other built structures, e.g. facades, walls, etc.
	Projection mapping (Digital projectors) Digital projectors as part of other built structures, e.g. facades, grounds, walls, etc.
	SAR (spatial augmented reality) systems: - Shader lamps (projector-based augmentation) - Mobile projectors - Virtual tables - Smart projectors (projection mapping), etc.
<b>Responsive materials</b>	Adaptive pavements (adapting to the weather, accessibility needs, etc.)
	Responsive verticals (changing by touch, sound, etc.)
	Measuring materials (for monitoring the use, conditions, etc.)
	Self-cleaning, self-repairing and materials

## Portable ICT tools

These tools bring a user to the public open space and establish a relationship with space, other users and/or other premises. Their main purpose for POS development and co-creation is to develop new forms of uses and activities in POS by extending human abilities, i.e. adding a digital sense to five basic human senses and to support a direct feedback of users for better POS development and management. Their structure is presented in the following table.

Type	Subtype
<b>Smart devices</b>	Smart phones and tablets Smart glasses (e.g. Google Glasses) Smart grid Smart watches (e.g. iWatch), etc.
<b>Place related mobile APPS</b>	Directly supporting learning about place and its natural and manmade characteristics, adding to the experience of place, support moving through it, activity and movement tracking) Collect and share data on environmental conditions, evaluate conditions, etc. Directly support place evaluation and feedback VR and AR apps for opinion and proposal development and sharing, etc. Other apps are discussed within web platforms and apps (Table 3)
<b>GPS-positioning devices</b>	Individual or as part of other smart devices
<b>Other personal VR and AR devices</b>	Head-mounted displays (e.g. headsets, eyeglasses, contact lenses) Multi-projected environments Combination with physical environments or props (e.g. 3D mouse, the wired glove, motion controllers, optical tracking sensors)
<b>Cameras, recorders</b>	Many different options
<b>E-textiles – aesthetic and performance enhancing</b>	Smart garments, smart clothing, smart textiles, or smart fabrics providing the added values to the wearer, enabling the interaction with the environment and responsiveness to the personal activities and condition Wearable computing with microcontrollers, sensors and actuators
<b>Digital health and fitness tools</b>	Devices and apps to encourage healthy habits, fitness and other physical activity tracking, health measurements, Internet connected fitness systems, Environment quality sensors and alarm systems

## Remotely accessible ICT tools

This group encompasses, on the one side, a broad variety of ICT tools such as laptops, PCs, screens, mobile phones and other hardware, and on the other, web platforms and apps used for digitally networked interactions such as distant society engagement, public consultation, information and opinion collection, exchange and sharing, voting, etc. Their general advantage is that they can at one time reach a much larger number of people who can also choose their own time of use.

In the structure we focus on aspects that are very important to support different co-creation activities for POS development, such as preparation, discovering, debating, deciding, designing, implementation, maintenance, use, and monitoring of public open spaces. The following table provides a general overview on how different components and tools enable and support different dimensions of remote public involvement.

Type of components/ tools	Examples
<b>Social networking platforms and sites</b>	Pinterest, Facebook, Instagram
<b>Static web sites</b>	Professional portfolios, digital curriculums
<b>Blogs and microblogs</b>	WordPress, Joomla, Drupal, Twitter
<b>Tools for social bookmarking, tagging</b>	Tools for social bookmarking, tagging
<b>Online storage</b> (Cloud storage, file synchronisation, personal cloud)	Dropbox, GoogleDrive, iCloud
<b>Social network aggregation</b>	Hoot Suite, FriendFeed
<b>Encyclopaedia</b>	Wikipedia
<b>Survey</b>	Google Forms, SurveyHero, Typeform, SurveyMonkey, InvolveMe
<b>Content communities</b> - Online databases of multimedia content, that allow users to share online multimedia materials by photo, video, podcasts, presentations, etc.	Flickr, SmugMug, Picasa, GigaPan Youtube, Vimeo iTunes SlideShare, VoiceThread
<b>Internet forum/ Message board</b> Textboards and Imageboards	Quora, SkyscraperCity
<b>Chat rooms</b> in the form of Web conferencing, Video conferencing, etc. <b>Instant messaging</b>	Facebook Messenger, Gmail messenger, WhatsApp
<b>Electronic mailing list, news group</b>	Mailing lists of different organisations, companies, institutions, etc.
<b>Online dictionaries</b>	Urban Dictionary
<b>WEB GIS</b> <ul style="list-style-type: none"> <li>Analytical</li> <li>Animated and real-time</li> <li>Collaborative (e.g. PPGIS)</li> <li>Online atlases, etc.</li> </ul>	Open Street Map, Google maps, Apple maps, and many different projects specific and city specific data collection platforms

<p><b>Web-based simulation platforms and apps</b> for discrete events, continuous events, etc.</p>	<p>Digital participatory platforms: Mobility Testbed, Commonplace, coUrbanize, TransformCity, etc.</p>
<p><b>Construction and management simulation games</b>, e.g. city building games</p>	<p>Lincity, SimCity, etc.</p>
<p><b>Augmented reality apps</b></p>	<p>Pokemon GO, ScentExplore</p>
<p><b>Virtual social worlds</b></p>	<p>Second life</p>





# DIGITALLY SUPPORTED CO-CREATION WITHIN PUBLIC OPEN SPACE DEVELOPMENT PROCESS

Experiences from the C3Places Project and  
Potential for Future Urban Practice



**Vita Žlender, Ina Šuklje Erjavec, Barbara Goličnik Marušić**

This research aimed to explore information and communication technologies (ICT) types to support co-creation activities in public open spaces (POS) at different stages of the co-creation process.

We conducted state-of-the-art research on the methods, best practices, obstacles and potential of ICT tools and co-creation activities to ease the interaction between stakeholders engaged in the process. Based on those findings, we proposed an ICT tools selection framework. Four living labs were analysed to better understand the practical side of digitally aided co-creation. We conclude by exposing challenges and suggest ways to move forward toward genuinely digitally supported co-creation of the POS.

 [Read the full article](#)



Vita Žlender , Ina Šuklje Erjavec & Barbara Goličnik Marušić (2020): Digitally Supported Co-creation within Public Open Space Development Process: Experiences from the C3Places Project and Potential for Future Urban Practice, Planning Practice & Research, DOI: 10.1080/02697459.2020.1829286



## METHODOLOGICAL FRAMEWORK FOR LIVING LABS FOR CO-CREATION OF PUBLIC SPACES

The methodology proposed for the Project C3Places covers the coordinated implementation of the case studies - each one devoted to different user groups and different types of public spaces - enabling C3Places to reach a wide range of users and urban spaces typology. The case areas identified will give an overview of state-of-art in the interaction between people - places and technology, and will serve as living lab for exploiting new approaches. The Methodological Framework for living labs in European Cities sets the guidelines for application of C3Places framework in 4 national living labs and supports their coordination.

The cases of living labs address communities' or government initiatives, stakeholders, existing and new ICT-based applications from local and global industrial companies. The data and information collected on selected public open spaces in Belgium, Italy, Lithuania and Portugal enable C3Places to analyse and compare expectations, behaviours and attitudes of different user groups.

The proposed methodology is mainly concerned with assessing and monitoring the impacts and processes before, during, and after the implementation of cases where co-creation plays a vital role. The Methodological Framework consists of the Methodology for Exploring living labs, the Template of living lab Work Plan and the Template of living lab Report.

Through the proposed framework several aspects relevant to assessment and understating of co-creation processes (e.g. collection of data, generalization of gathered data in living lab studies) will be tested and evaluated against the comparability levels.

[Read full report](#)



## CO-CREATION OF PUBLIC OPEN PLACES. PRACTICE - REFLECTION - LEARNING

In 17 chapters different invited authors share their experiences in actively involving stakeholders in the production and consumption of public open spaces. With these chapters the Project sparks the discussion on the co-creation for more sustainable, inclusive, attractive and responsive public open spaces. It intends to help researchers, governments and drivers in understanding and implementing more collaborative actions.

The authors share experiences, visions and reflections on how co-creation and participatory processes can open up possibilities for a sustainable and equitable future. This book emphasises three dimensions: **practice, reflection, and learning**. **Practice** concerns driving actions, identified and analysed experiences that serve as key models. **Reflection** refers to exploring and examining the results and performances of a co-creation process. **Learning** approaches the knowledge transfer and replication induced by the synergy of the different actors involved in this book.

📄 Smaniotto Costa, C., Mačiulienė, M., Menezes, M., & Goličnik Marušić, B. (Eds.) (2020). Co-Creation of Public Open Places. Practice - Reflection – Learning. C3Places Project. Lisbon: Lusófona University Press. Doi: <https://doi.org/10.24140/2020-sct-vol.4>

# OUTCOMES BY THE PROJECT PARTNERS

The Project C3Places produced a series of academic publications, keynotes, talks and posters considering the relationship between people, places and technologies as well as about the four living labs. A complete list is available at:



<https://c3places.eu/outcomes>

## FURTHER READING

C3Places provide a vast array of publications on co-creation in practice, on engaging different stakeholders and on digital tools:

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Using ICT for Co-Creation of Inclusive Public Places

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