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Developing a Digital Co-Creation Assessment Methodology

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ABSTRACT Digitally enhanced public open spaces are ideal environments for the social innovations to emerge due to the involvement of the entire community and ICT (Information and Communication Tools) in knowledge creation and aggregation. This research paper presents an early-stage methodological digital co-creation assessment framework that considers a variety of aspects to transform public open places into co-created spaces: socio-cultural contexts, multi-stakeholder perspective, diversity in needs, incentives for participation of different groups and cooperation capabilities. The framework incorporates these aspects and proposes a suitable community-wide co-creation model employing the creative, innovative and cooperative applications of ICT. The assessment methodology is developed using a pragmatic mixed-method research design where the theoretical framework summarizes current research progress on the topic and the expert interviews allow to condense the complex and multi-dimensional realities for decision-makers seeking social innovations in the public spaces. The methodological assessment framework presented in this paper strengthens the scientific evidence regarding the potential of co-creation in developing social innovations and provides a managerial framework for developing co-creative initiatives.

KEY WORDS: Co-Creation, Public Spaces, ICT, Social Innovation

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1. Introduction

Urban social innovation is a rapidly growing priority for countries everywhere with increasingly urbanized world's population. Public spaces play a vital role in urban democracy and inclusiveness since they enable collective usage and reflection. Martinus (2014) explores the public opens spaces (POS) as platforms strengthening the social capital networks and supporting social innovation systems. The author suggests that "there is an economic and policy imperative to better understand the design, location and user perception aspects of urban space as determinants of user attraction" (Martinus, 2014, p. 44). This research paper presents an early-stage methodological framework that considers a variety of aspects in transformation of public open places into co-created spaces: socio-cultural contexts, multi-stakeholder perspective, diversity in needs, incentives for participation of different groups and cooperation capabilities. The framework incorporates these aspects and proposes a suitable community-wide co-creation model employing the

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creative, innovative and cooperative applications of ICT (Information and Communication Technologies). The article is a part of the C³PLACES project (www.c3places.eu) which focuses on developing the strategies and tools to increase the quality of public open spaces through the use of digital tools by positively influencing co-creation and social cohesion effects. The C³PLACES generates knowledge and know-how to use the co-creation approach in order to merge the ICT with the functions of the public spaces.

2. Literature review

One of the ways to make the open public spaces more attractive and inclusive is the use of innovative digital technologies. Digitization may lead to modern bottom-up initiatives where the citizens and civic organizations voluntarily lend their talent and resources to help the public entities in solving social problems and enhancing the quality of life. Similarly, Stewart-Weeks (2010, p. 83) suggests that "citizens are increasingly willing and able to translate their day-to-day experience into ideas, preferences and insights that can become powerful resources for innovation". 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 (Mačiulienė, 2018). However, the multiple studies on co-creation (Bason, 2015; Bulc, 2012; Brabham, 2009; Franz, 2015; Mulder, 2012; Mulder & Stappers, 2009), digital tools (Baldersheim & Kersting, 2012; Cheliotis, 2015; Certomà, Dyer, Pocatilu & Rizzi, 2017; Poplin, 2012) and their application in developing POS as separate subject lack a holistic perspective. The concept of digital co-creation itself is rarely clearly defined and operationalized. In response to the issues discussed herein, following sections demonstrate the relevance of ICT urban social innovations through development of digital co-creation assessment methodology.

3. Research Methodology

The development of the assessment methodology adopts a pragmatic mixed-method research design illustrated in Figure 1 and discussed in the following sections. Typically, the assessment criteria research is conducted through statistical analysis in order to demonstrate the multicollinearity of individual indicators. However, according to Hoelscher, Mildenberger & Bund (2015) concepts with multidimensional outcomes benefit from a mixed research strategy combining the theory (top-down approach) with experts' knowledge (bottom-up approach) in order to minimize the risk of overlooking dimensions. Here, the theoretical framework summarizes the current research progress on the topic and the empirical evidences allow to condense the complex realities for decision-makers seeking social innovations in public spaces.

The first step in designing the methodology was to build a theoretical framework. The analysis of the previous research efforts captured the theoretical influences and provided the basis for the selection and combination of framework dimensions. Lester (2005, p. 458) states that theoretical framework "provides a structure for conceptualizing and designing research studies. In particular, a research framework helps determine the principles of discovery and justification allowed for creating "new knowledge" about the topic under study (this refers to acceptable research methods)". Hence, the framework allowed to structure the further discussion and provided a theoretical rationale behind the evaluation tool.

The second step of the process was the expert interviews. The theoretical frameworks provide an interpretative approach to the social reality and empirical investigations are needed to test their consistency with the reality (Jabareen, 2009). Based on the literature review, we hypothesize that a set of dimensions are influencing the digital co-creation outcomes. However, there may be different configurations and additional preconditions. The in-depth knowledge provided by the experts on the key evaluation points is particularly suited for broadening the theoretical framework. Nine purposively sampled semi-structured face-to-face expert interviews were conducted to check and improve the theoretical model. During the research, 9 experts – in urban planning (4 experts), digital tools (2 experts) and co-creative initiatives (3 experts) – have been selected to be interviewed based on the professional experience, knowledge and the affiliation. The C3PLACES project collects data and information on designated POS in Belgium (Ghent Public Space Living Lab), Italy (Milano Living Lab), Lithuania (Vilnius Aukštamiestis Living Lab) and Portugal (Lisbon: Alvalade Living Lab) in order to develop the strategies

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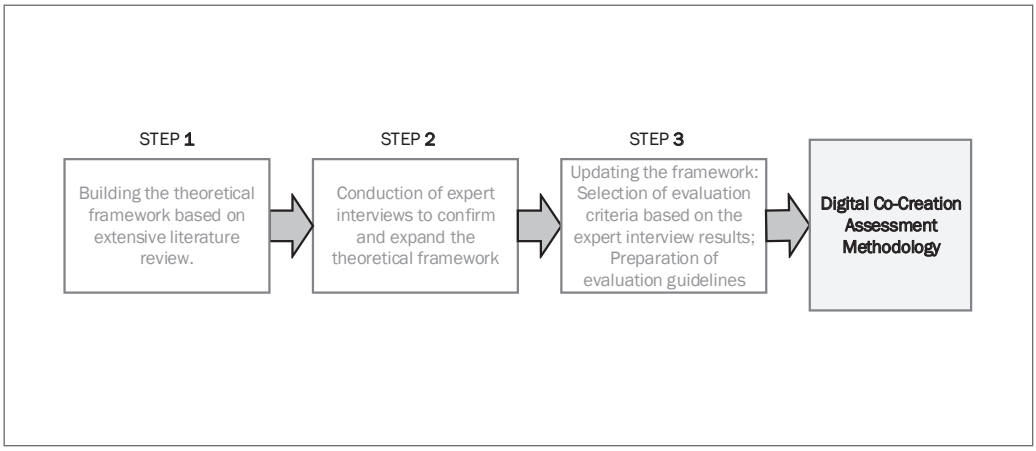

Figure 1. Design Process of Digital Co-Creation Assessment Methodology

to increase the quality of public open spaces through ICT. The experts were selected based on their involvement in these four case studies.

In the context of this research, the validity and significance of the results are based more on to the richness of the data collected and the sample selected and the competencies of the researchers to analyze the data than on the size of the sample (Patton, 2002). Open-ended questions allow receiving more in-depth and open answers based on personal experiences and perspectives. Reflective dialogues enhanced the quality and amount of data collected due to subjective interpretation of wider context not limited to particular questions. The instrument used in this study is a questionnaire based on the theoretical framework and consisted of 4 question groups – general, place attractiveness, digital inclusiveness, and social responsiveness questions. The dimensions were integrated in the interview guide in order to ensure the inductive design of the assessment framework. The interviews were conducted in the period of December, 2017 - February, 2018. The average duration of each interview was 1,5 hours. All interviews, except one (E2), took place by Skype. Interviews were transcribed and analyzed using content analysis procedures (Krippendorff, 2003) in a deductive category application, bringing the empirical data in connection with the prior formulated theoretical aspects of analysis.

The final step towards the completion of the methodological framework was the preparation of assessment methodology – design of updated framework, selection of evaluation criteria and proposal of assessment guidelines. The qualitative data collected during the interviews were analysed in the context of respondents' ideas, arguments and opinions in order to deepen the researchers' understanding of the analysed issues. Qualitative research aimed at establishing similarities, differences and relations between the interview text segments. The following principles were guiding the selection of framework dimensions and criteria: clarity, logic and simplicity, applicability to different local/regional/national settings, relevance and data availability. The findings allowed us to explain the processes of digital co-creation in specific context i.e. design and improvement of public spaces. The selection of criteria was performed based on possibilities for implementation, feasibility and adaptability of the framework. It must be noted that the subjectivity in the choice of dimensions and criteria is inevitable given the diffuse nature of the concept of co-creation and the lack of more straightforward definitions. However, the goal was to offer a generalized approach to undertaking the evaluation of digital co-creation initiatives. The overall intention was to ensure that the key dimensions of concern are assessed in similar ways.

4. Results

4.1. Theoretical Framework for Conceptualizing Digital Co-Creation

The section provides an overview of the insights from the previous studies by proposing a theoretical framework summarizing the main preconditions for the digital co-creation of public spaces. The framework has three pillars, which are crucial in the co-creation of public open spaces design using the digital tools (see Figure 2). The Public Open Space (POS) Quality pillar refers to the factors enhancing social integration and generating pleasure to communities. Authors (Bobenberg, 2014; De Lange & De Waal, 2013; Nouri & Costa, 2017) suggest that functional, visual and physical qualities of space influence the social interactions, comfort and security settings and attract people to engage with the space. To this end, the Project for Public Spaces (2009) evaluated thousands of public spaces globally and identified four qualities determining its attractiveness: uses and activities; comfort and image; access and linkages; sociability.

The Digital Inclusiveness pillar explains the technological readiness of the place for enabling co-creation, measures preconditions for the inclusiveness of public open spaces. Griggs and Wild (2013) model, which helps the public organizations to weigh the benefits and risks associated with the use of ICT and social networking applications, forms the base for the technological evaluation layer. The inclusiveness of public open spaces has three dimensions: expansion-related technologies, risk-related technologies, and value-related social technologies. The expansion refers to the depth, breadth and speed of connection created by technological solution. A solution with a capability to develop a network rapidly would rank highly on expansion related metric. The related technologies refer to the degree of the risk mitigated in association with a particular application of ICT. The privacy and personal data protection helps to create a potentially active community and encourages a diversity of opinions. Therefore, it is essential to introduce technologies safeguarding user security and, in some cases, anonymity (Skaržauskienė et al., 2015). The value-related technologies refer to the quality of the content, values of the stakeholders and technological solutions to support the knowledge creating activities. The new generation applications focus on the users` needs and aim at technological innovation to improve the collective decision-making, teamwork and better mutual understanding. The users play the major role in deciding what data and information is necessary and useful. According to the research results, the highly value-related ICT tools have to contain the rich high quality content that remains relevant to the society over time. In addition, such technologies have to support the knowledge creation activities in a community: promote engagement and participation, facilitate more dynamic and "democratic" knowledge dissemination and integration, foster sustainability, etc. (Skaržauskienė et al., 2015).

In discussing the Social Responsiveness pillar, the research refers to the factors related to the capacity to involve people. The pillar is adapted from the Collective Intelligence Index (Skaržauskienė et al., 2015) and includes following dimensions: dynamism, openness, and flexibility; transparency; decentralization and self-organization; social maturity. Dynamism, openness and flexibility refers to the communities "with vague boundaries, allowing people the freedom to join or leave the community" (Luo, Xia, Yoshida, & Wang, 2009). Transparency refers to the information necessary to create trust between the community and the society (Prahalad & Ramaswamy, 2004). Theoretical and empirical study of Dabbish, Stuart, Tsay and Herbsleb (2012, p. 1278) suggest that "providing visibility of actions on shared artifacts supports cooperative work" and propose variety of ways that transparency can support innovation, knowledge sharing, and community building. Decentralization and self-organization describes the initiatives without central control. Following the Internet design, the networks adopted the decentralized structure, and contradicted the function of the traditional hierarchical mechanism. The structural units (nodes) being unable to interact with the center of network (which does not exist) have to interact with the whole network in the self-regulatory regime and develop one of the most productive forms of collaboration (Skaržauskienė et al., 2015). The social maturity dimension refers to the impact upon the society, social orientation and motivation, including the involvement and participation in social activities. The dimension describes the degree defining the sensitivity of group members to social cues and capacity to generate the public value. Meynhardt (2009, p. 212) explains

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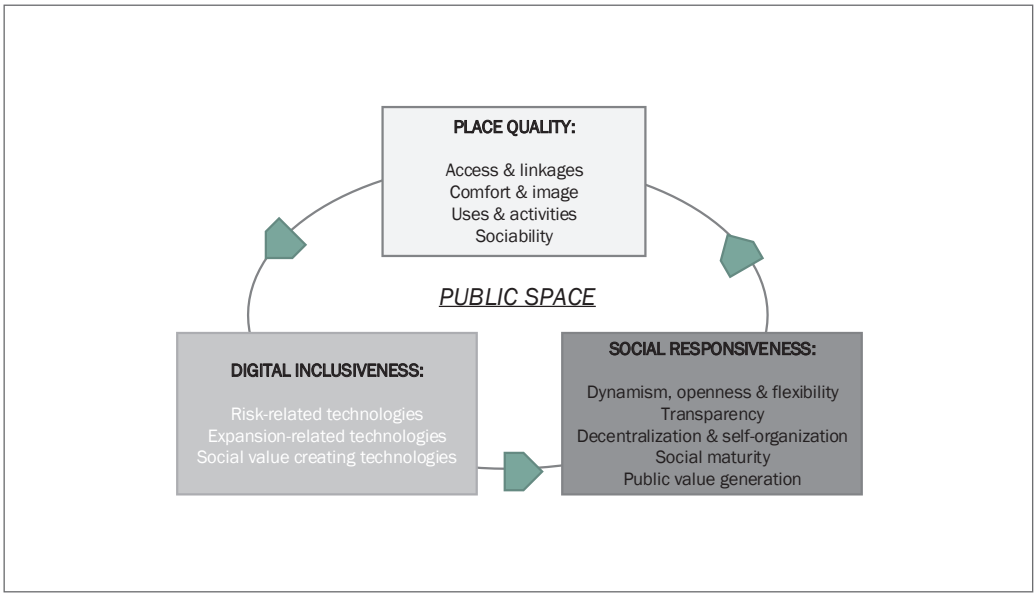

Figure 2. Theoretical Framework
Source: Adapted from "What Makes a Successful Place?" by Project for Public Spaces (2009). Available at https://www.pps.org/reference/grplacefeat; *"Social technologies and collective intelligence"* by Skaržauskienė, A., Ewart, J., Krzywosz-Rynkiewicz, B., Zalewska, A., Leichteris, E., Mačiulis, A., … Valys, T. (2015). In *Social technologies and collective intelligence*. Vilnius: Mykolas Romeris University; *"A Social Networking Adoption Model for Communication and Collaboration in e-Government"* (Vol. 1). by Griggs, K. Wild, R. (2013). In W. Castelnovo, E. Ferrari (Eds.), Proceedings of thr 13th European Conference on eGovernment (pp. 221-229). Como: Department of Theoretical and Applied Sciences. University of Insubria.

the public value as "any impact on shared experience about the quality of the relationship between the individual and society". According to Millard (2013), the public sector can create value for the public alone but its potential to do so increases by involving external actors and stakeholders. The quantitative criteria, however, cannot measure all aspects of public value, although some numeric data is extremely important. Collective intelligence of the community and "public value" for society considers new knowledge, ideas, problem solving methods and solutions, shaped up or structured opinions, innovations, prototypes, etc.

4.2. Digital Co-Creation Assessment Framework

The in-depth interviews of the research study reveal a wealth of insights into how to expand the theoretical framework. Through the analysis of the data, the insights were categorized based on the dimensions of the theoretical framework. The results of the expert interviews are summarized in Figure 3 and detailed with the illustrative quotes from the interviewed experts below.

The POS Quality pillar connects the factors enhancing the social integration and communities' satisfaction with the public place generated by digital co-creation initiative (4 dimensions and 13 evaluation criteria). The assessment of place quality provides the context of digital initiatives and offers operational canvas to describe and compare different case studies. The discussion on the evaluation of POS Quality divides into four areas based on the dimensions of the theoretical framework. Evaluating the access and linkages dimension, the experts stressed the importance of readability ('visible from outside' E1; 'ease with which visitors understand and remember

the information' E2, E3), convenience for movement ('easily walk to the place' E2, E3; 'sidewalks lead to neighboring areas' E1) and accessibility ('transportation options' E1, E2; 'surrounding pedestrian paths' E3). When deliberating comfort and image dimension, the experts suggested to evaluate the criteria of captivation level ('good first impression' E3; 'people taking pictures' E2, E3), comfort and cleanness ('enough places to lounge' E1, E3; 'free of litter' E2; 'good maintenance' E1, E2, E3), safety level ('people feel safe' E2, E3; 'someone is responsible for safety' E2). Uses and activities dimension divides into level of equipment ('what equipment is present and who can use it' E1, E2, E3), level of vitality ('full or empty' E1; 'people standing in groups' E3) and variety of activities ('choices of things to do' E1, E2). In discussion on sociability of public open space, the experts mentioned welcoming ('would you meet your friend here' E2; 'locals use it with pride' E3; 'point to features of the place with pride' E3), level of publicness ('does the place include everyone' E2, 'inclusive to all social groups' E1, E7, E9), interactivity ('people talking with each other' E1, E2, E3; 'people smiling and making eye-contact' E2) and diversity ('mix of gender, nationalities, generations' E2, E3).

The expert discussions on the digital inclusiveness of co-creative initiatives allowed to detail the dimensions of theoretical model. In discussing risk-related technologies, the experts stressed the importance of security and privacy assurance technologies ('mechanisms for providing secure and legal online/offline activities' E5, E6; 'protection of personal data' E1; 'effective message control' E5). When talking about expansion-related technologies the interview participants elaborated on the availability of networking and collaboration technologies ('availability of various communication tools like chats, forums or social platforms' E5, E6; 'access by all devices' E5, E7). The dimension of social value of technologies divides into the following evaluation criteria based on the expert insights: existence of data collection and access technologies ('tools to collect data' E5; 'digital abilities to evaluate and analyze the performance of an initiative' E6; 'ability to share data with the public and re-use it for the public good' E5, E6); knowledge-creation technologies ('tools to add value to the content' E5, E6; 'how to generate feedback from the stakeholders E8, E9; 'ability to visualize and organize the knowledge with the help of IT' E5; 'technologies to involve crowds, groups of people into design processes' E7), and decision-making technologies ('how to involve people into brainstorming sessions in designing the spaces' E2; 'creating tools for voting and rating ideas, suggestions' E5, E6; 'ways how to reach collective decision or conclusion' E7). The expert deliberations on the Digital Inclusiveness pillar, uncovered the need to expand the theoretical model by adding two dimensions important in evaluating digital co-creation initiatives. The experts (E5, E6, E7, E9) stressed the importance of pervasiveness of ICT tools referring to the ability of the digital tools to easily function when and where needed. In addition, the analysis of the qualitative data allowed to add the dimension of appropriateness referring to the ability of digital tools in addressing its group of users ('can the tool solve the problems of target groups' E5, E8; 'can everyone understand how to use it' E8, E9).

In reflecting on Social Responsiveness dimension, the interviews led to identification of eleven evaluation criteria. Dynamism, openness and flexibility dimension divides into criteria of interaction and engagement degree ('opportunities to disseminate knowledge generated by the involved community' E8; 'adoption of digital tools for different age groups' E7, E9; 'external relationships' E8, E9), supply of critical mass ('potential individuals/communities/target groups' E8, E9, 'unique, total and repeat visits' E7), and degree of diversity in the source of ideas ('different people providing ideas and participating' E8; 'number of diverse contributions' E8, E9; 'balanced representation of the community' E3, E7, E8). In discussing transparency issues in digital tools, two criteria were established development of transparent structure and culture ('clear rules of engagement' E7; 'clear roles and responsibilities' E9) and degree of independence ('need of a privacy policy' E8; 'equal rights for all participants involved in co-creative processes' E7, E8, E9). Decentralization and self-organization dimension evaluates by determining its' degree ('community has to have common norms' E9; 'shared mental models' E8; 'the community involved has to have a common vocabulary in discussing the issues' E7, E8). Interviewed experts in discussing the social maturity dimension elaborated on the social impact ('how to engage civic community' E8,

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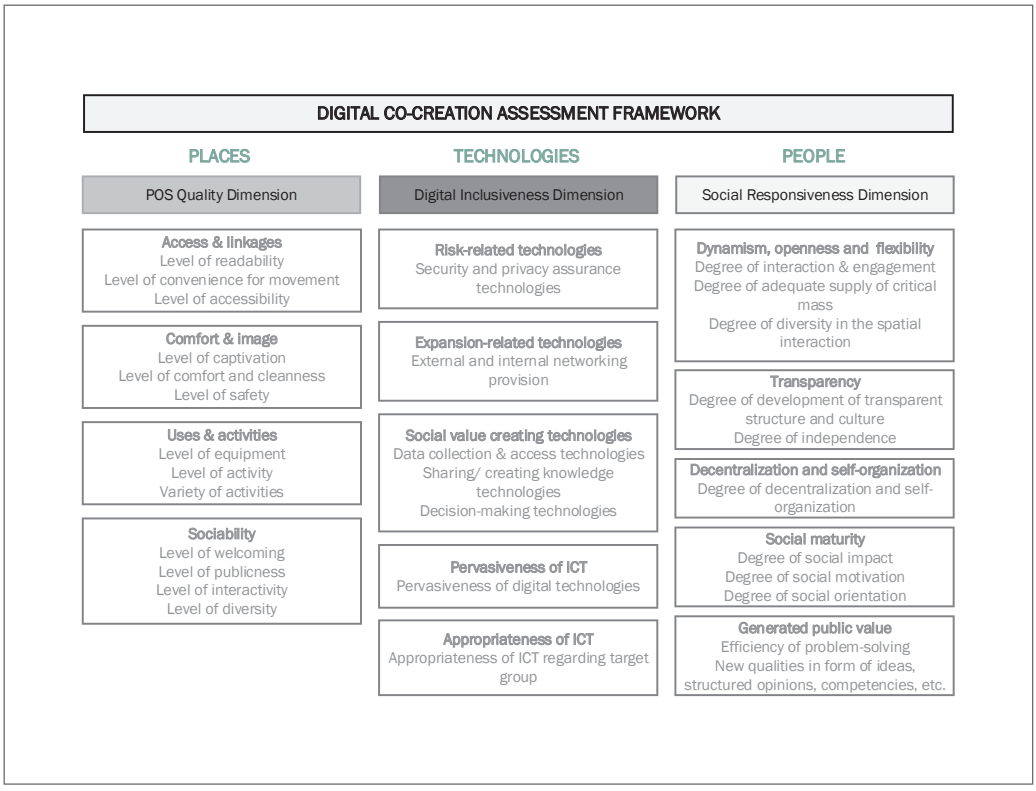

Figure 3. Digital Co-Creation Assessment Framework

E9; 'what is the feedback from governmental entities' E1, E8, E9; 'interaction with community stakeholders' E7, E8), social motivation ('motivation of project initiators to deal with challenges in the society' E7; 'social sensitivity' E8; 'balancing individual and communities' objectives' E8) and social orientation ('socio-cultural context of co-creative initiative'; 'social responsibility'; 'continuous learning'). In discussion on generated public value two criteria are important in evaluation of digital initiatives – efficiency of problem-solving ('providing ideas and data to governmental and public institutions' E7; 'influence on public opinion' E9; 'awareness of the social issues' E6, E7, E8) and new qualities in form of ideas, structured opinions, etc. ('number of new ideas, projects' E8; prototypes can come up from such co-creative initiatives' E9; 'ideas can be improved after comments' E6).

5. Conclusions

Our proposed assessment approach focuses on facilitating a framework to evaluate digital co-creation initiatives aimed at improvement of public spaces and identify cases that can be potentially transformed into co-creative systems. The experts provided their knowledge on how to evaluate the digital co-creation initiatives aimed at creating social innovations in public spaces. Following the logic of theoretical framework, a hierarchical digital co-creation assessment framework (illustrated in Figure 3) consists of three building blocks: Public Open Space Quality, Digital Inclusiveness, and Social Responsiveness. Each dimension reflects from the grouping of different criteria presented in the theoretical framework and additional ones proposed by the experts.

The assessment criteria provide a context for measurable impacts and offer an operational tool to de-

scribe and to compare the different public open spaces. The proposed criteria are interdependent and not mutually exclusive. Their relative meaningfulness for a specific evaluation requires further assessment and trade-offs discussed in each case avoiding unnecessary effort and expense. This set of dimensions and criteria used in this paper is limited, but can easily be expanded. The list was not intended to be prescriptive but should offer an organizing framework which can be adapted to the needs of the user.

The assessment is a crucial aspect of the implementation of any initiative, as it provides the context for its impacts to be measurable and offers the operational tools to compare the different cases, as well as the same case before and after the strategy implementation. The proposed methodological framework 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 evaluation serves as a holistic monitoring and regulatory mechanisms allowing to establish whether the predefined goals have been achieved, to what extent and what areas need to be improved.

6. Limitations & Discussion

Digitally enhanced public open spaces are ideal environments for the social innovations to emerge due to the involvement of stakeholders and ICT in the knowledge creation. The proposed digital co-creation assessment framework focuses on facilitating framework to evaluate digital co-creation initiatives aimed at improvement of public spaces and identify cases that can be potentially transformed into co-creative systems. The framework provides a useful approach for the managers of co-creative initiatives, urban planners and public officials in allowing both quantitative or qualitative dimensions, the results remain explorative in nature. Context specific nature of the social aspects influencing success of co-creative initiatives remains one the main challenges for developing a universal methodology. While this study has certain limitations, they offer opportunities for future research. By testing the framework on real-life case studies and employing a more quantitative approach to evaluation of co-creative initiatives, the methodology will be developed into index-based assessment tool. The methodology provides a useful approach to develop explorative digital co-creation assessments as it allows identifying potential areas of improvement for co-creative initiatives and allows conducting comparable case study research.

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