

The role of ICT in mapping resources for sustainable historic urban regeneration

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The Role of ICT in Mapping Resources for Sustainable Historic Urban Regeneration: Case Studies of Amsterdam and Salerno

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1 ABSTRACT

According to the UNESCO Recommendations on the Historical Urban Landscape (HUL), mapping the available resources is critical for successful project implementation. These resources entail natural, cultural and human resources ranging from tangible to intangible. Mapping these resources can contribute to a systematical identification, analysis, and classification of location-based values for the management of a sustainable historic urban regeneration process. Currently, the mainly adopted mapping approaches are paper map, online mapping applications, non-spatial mapping, geography information system (GIS), surveys and interviews. These tools include both traditional and innovative tools, however they are quite diverse and not integrated. The innovative tools incorporating information and communication technology (ICT) are recognized to be useful to foster a public inclusion and a bottom-up management for the sustainable historic urban regeneration. This because these tools enable a variety of actors to create and visualize data. Based on this proposition, this research investigates the role of ICT in mapping resources in particular in a participatory way to support an inclusive implementation of sustainable historic urban regeneration practices. In this paper, the role of ICT is studied through literature review and case studies. The literature review provides the current application in and future potential of ICT for mapping resources. To complement the results of the literature review, two case studies are conducted in Amsterdam (The Netherlands) and Salerno (Italy). The case studies show that different data sources such as location-based social networks, administrative data, online and offline surveys and interviews, and local sensors are useful for participatory mapping of resources. This assessment of two case studies revealed that ICT platforms such as open data platforms, interactive platforms, decision support systems are recognized as three main solutions for disseminating knowledge to the public and enable their participation in historic urban regeneration processes. The outcomes show that ICT has potential for fostering the public participation to achieve sustainable regeneration of historic urban areas.

Keywords: regeneration, GIS, mapping, ICT, sustainability

2 MAPPING RESOURCES

Mapping resources is reported as the first step in the implementation of the Historic Urban Landscape approach advocated in the Recommendation on the United Nations Educational, Scientific and Cultural Organization (UNESCO) General Conference in 2011 (Veldpaus et al. 2016). The HUL approach presented in the 2011 UNESCO Recommendation on the Historic Urban Landscape offers a new understanding and holistic vision. It is recognized as an approach contributing to a sustainable urban development. The HUL approach integrates concerns relating to environmental, economics, social and cultural aspects, into the planning and implementation of historic urban landscape development (Veldpaus et al. 2016). Among the six critical steps for the successful implementation of the HUL approach, mapping resources is listed as the first fundamental one.¹ “To undertake comprehensive surveys and mapping of the city’s natural, cultural and human resource”, this elucidates the essential meaning of mapping resources in the sustainable urban development. These resources encompass the urban environment with history meanings as the antecedent of social cohesion and livability, roots of cultural diversity and drivers of creativity and innovation.

¹ General Conference 36 C/23 Item 8.1 – Proposals concerning the desirability of a standard-setting instrument on Historic Urban Landscapes: (1) Undertake comprehensive surveys and mapping of the city’s natural, cultural and human resources; (2) Reach consensus using participatory planning and stakeholder consultations and to determine the attributes that carry these values; (3) Assess vulnerability of these attributes to socio-economic stresses; (4) Develop an integrated urban development and conservation strategy to integrate heritage values and their vulnerability status into a wider framework, including potential for change, non-changeable parts and areas of opportunity; (5) Prioritise actions for conservation and development; (6) Establish the appropriate partnerships and local management frameworks.

A lack of a clear definition of resource mapping in the HUL approach is still a gap noticed in literature. Based on the current literature relating to resource mapping, diverse definitions were identified. In these definitions, the most mentioned terms are (participatory) cultural (resources) mapping (Freitas 2016; Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Murray 2017; Evans 2008), assets mapping, community (assets) mapping (Kerka 2003; del Campo and Wali 2007). Most of these mapping processes acknowledge the significance of these resources for urban development and admit the importance of an inclusive approach by empowering different stakeholders. These mapping methods can slightly differ from each other and how they are described in the HUL approach with respect to threshold, territory and the reasons for mapping. According to the resource mapping mostly defined by the literature and practices in the field of the HUL approach cultural (resource) mapping is one of the most relevant and adopted approach (Veldpaus et al. 2016; Turner and Singer 2014). From this point of view, resource mapping can be defined as a systematic and participatory planning and development tool and “process of collecting, recording, analyzing and synthesizing information in order to describe the cultural resources, networks, links and patterns of usage of a given community or group“ (Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010, 8; Duxbury et al. 2015).

Mapping cultural resources “is used in both a literal and metaphorical sense, where it goes beyond strict cartography to include not only land but also other cultural resources and information recorded by alternative techniques.” (UNESCO n.d.). Based on the definition of The HUL approach, the resources entail both tangible and intangible resources concerning natural, cultural and human aspects. According to UNESCO, resources are classified as anthropological, sociological, archaeological, genealogical, linguistic, topographic, musicological and botanical aspects (UNESCO n.d.). The tangible and intangible values of culture resources is not only linked to the value satisfying the current demand, it also contains “attributes of uniqueness, aesthetic/artistic quality” for potential future use and other places (Angrisano et al. 2016, 169). A clear knowledge of local resources can improve city identity and cultural commons for city branding. In the meanwhile, revenue generated from tourism, commercial use, and higher land and property value could be used for maintenance and preservation of urban heritage. The social-economic development at both local and national level can also be fostered through the tourism revitalization, related industries, and other functions.

3 THE ROLE OF ICT IN MAPPING RESOURCES AS AN INCLUSIVE APPROACH FOR SUSTAINABLE HISTORICAL URBAN REGENERATION

3.1 Current tools for mapping resources

Recognized by many scholars and institutes, resource mapping does not necessarily have to be in the format of the traditional map (Municipal Cultural Planning Incorporated 2010; Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010). The mapping process can be both spatial mapping and non-spatial mapping. The Creative City Network of Canada identifies the resource mapping with six inclusive stages from planning, project design, implementation, synthesis, finalizing the report to going public with 15 steps. It starts with “objective determination” with the participation of the community in the planning stage and ends with “getting the word out” in the “going public” stage. During the whole process, multiple tools such as surveys, interviews, GIS, Web-based inventory and tourist map, text-based reports, artist-drawn maps, hand-drawn maps, etc. are observed (Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010). These tools for this location-based documentation, are not only limited to the paper map, but can also be represented through graphs, online mapping applications, non-spatial mapping such as diagrams, GIS, surveys and interviews (Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010).

The implemented tools for resource mapping are diverse, from traditional to innovative tools such as GIS. Paper map, online mapping applications, non-spatial mapping, GIS, surveys and interviews are the most adopted tools (Ferguson 2017). The selection of the tools in the resource mapping process depends much on the objective, the scope, the character of the tool used and the available support such as budget, human resource and time (Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010).

3.2 The Role of ICT in Mapping Resources: literature and the Case Studies of Amsterdam and Salerno

3.2.1 The significance and challenges of mapping resources

No.	Dimensions of Sustainability	Functions and Benefits of Resource Mapping	References
1	Social, Cultural	Providing a comprehensive and organized approach for gathering and presenting knowledge of local cultural resources information with an inclusive approach	(Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Poole 2003; Municipal Cultural Planning Incorporated 2010; Ferguson 2017)
2	Social, Cultural, Economic, Environmental	Creating a capacity roadmap with a different and inclusive perspective of local culture with data, locating gaps, needs, overlaps, effectiveness and opportunities of the resources	(Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Ferguson 2017; Blais 2014; Bernstein and Hansen 2016; Evans 2008)
3	Social, Cultural	Safeguarding the cultural diversity and increasing appreciation of local culture, building up local cultural commons, sense of place and urban identity.	(Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Ortega Nuere and Bayón 2015; Huovinen et al. 2017; Duxbury et al. 2015; Panagiotopoulou, Somarakis, and Stratigea 2018)
4	Social, Cultural, Economic,	Identifying the networks and hubs in cultural actors; the link pattern between society and culture	(Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Freitas 2016; Murray 2017; Duxbury et al. 2015; Panagiotopoulou, Somarakis, and Stratigea 2018; Lee and Gilmore 2012)
5	Social, Cultural, Economic	Establishing the appropriate partnerships for cultural vitality	(Municipal Cultural Planning Incorporated 2010; Ferguson 2017; Blais 2014)
6	Social, Cultural,	Empowering the public under a common cause and increasing the democracy	(Fuller, Guy, and Pletsch 2002; Ferguson 2017; Blais 2014; Ortega Nuere and Bayón 2015)
7	Social, Cultural, Economic	Enabling public and private sectors to socially justify and reach a consensus on cultural investment	(Ortega Nuere and Bayón 2015)
8	Social, Economic,	Evaluating the feasibility of the projects, such as scale and investment.	(Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010)
9	Social, Cultural,	Serving as the first stage of cultural planning, and embedded into an inclusive heritage management plan	(Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Blais 2014; Duxbury et al. 2015; Panagiotopoulou, Somarakis, and Stratigea 2018)
10	Social, Cultural, Economic, environmental	Supporting evidence-based and inclusive decision-making integrated into municipal plans (e.g. land use, tourism, economic development)	(Municipal Cultural Planning Incorporated 2010; Ferguson 2017; Blais 2014; Lee and Gilmore 2012)
11	Social, Cultural, Economic	Benefiting the promotion purpose; and giving access to easy-understanding, interactive and visually information about local cultural resources	(Municipal Cultural Planning Incorporated 2010; Ferguson 2017; Blais 2014; Lee and Gilmore 2012)
12	Social, Cultural, Economic, Environmental	Providing a development tool for strategic planning, community development, organizational development	(Fuller, Guy, and Pletsch 2002; Freitas 2016; Murray 2017)

Table 1: The functions and benefits of Resources Mapping through the method of sustainability screening (Sources retrieved from the literature review).

Table 1 identifies and classifies the significance of resource mapping according to the four dimensions of sustainability (Social, Cultural, Economic and Environmental). It elucidates the necessity of employing

resource mapping for sustainable urban regeneration and development. Twelve aspects of contributions of resources mapping are identified, which can also be used as criteria in evaluating a successful and efficient resource mapping, contributing to sustainable historical urban regeneration. The result of the resource mapping is a database that contributes to an informative, location-based and participatory decision-making process towards a sustainable future development, planning and implantation for historic urban regeneration (Longley and Duxbury 2016). Mapping tangible and intangible resources, such as networks, links and patterns of usage in a given community or group are of vital importance for urban resilience. (Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010; Fuller, Guy, and Pletsch 2002). According to UNESCO, the cultural mapping is recognized as a “crucial tool and technique in preserving the worlds’ intangible cultural assets”, and the result will be “invaluable information for the development of national strategies” (UNESCO n.d.). Resource mapping, as a valuable tool, benefits the officials, experts, institutions, tourists, investors, municipalities and also the general public and other stakeholders during the decision-making process (Fuller, Guy, and Pletsch 2002). Therefore, mapping resources is a fundamental step for a holistic approach for sustainable historic urban regeneration.

Many challenges are identified during the process of mapping resources. The feasibility of resource mapping needs to be taken into account since the mapping can be demanding in time, budget and human resources (Sterwart, 2010 Legacies Now, and The Creative City Network of Canada 2010). The mapping should be tailored according to its purpose and objective. Based on literature review, several main aspects are defined as crucial factors and challenges for a successful mapping. They include the integrated location information, big data management with currency issue, valuable resource identification and participation of different actors (Longley and Duxbury 2016; Evans 2008). All of this highlights the challenges of formulating a reliable database of local resources.

3.2.2 The role of ICT in mapping resources

Technological capabilities and innovations enhance the creation, analysis, visualization of datasets and mobile usability (Duxbury et al. 2015). It creates challenges as well as opportunities in contemporary urban planning and heritage management. The application of ICT tools in cultural heritage conservation is recognized to be beneficial for cultural heritage management as well as resource mapping (Campelo et al. 2018:). ICT contributes to data management, such as inventory, data acquisition, documentation process, and data analysis and evaluation. ICT also enables resource management with interaction in a smart city context, achieving an inclusive and supportive approach (Marconcini 2018; Panagiotopoulou, Somarakis, and Stratigea 2018). Regarding mapping resources, as one of the fundamental steps for cultural heritage management, most of these ICT tools offer straightforward solutions to the highlighted challenges.

The word ‘mapping’ in ‘mapping resources’ indicates the essence of location information related to these resources. The effective mapping of resources and should be a geographic representation of information in the database, making the invisible visible (Municipal Cultural Planning Incorporated 2010). In the 2003 report Cultural mapping and indigenous peoples: a report for UNESCO, Peter Poole emphasized the importance of geographical accuracy and proposed seven mapping methodologies. This methodologies include sketch maps, paper map, participatory rural appraisal, graphics software, collaborative construction of 3-Dimensional landscape models, global positioning system and GIS (Poole 2003). The location information in mapping resources is of vital importance, and GIS can be an important ICT tool to ensure this.

The database to map resources can be an issue to manage, due to the requirements for massive data management, following the acquisition of meaningful datasets and currency issues relating to data. An example of massive data is given by the city of St. Thomas. Their Cultural Assets Mapping Project identified a total of 537 cultural resources across the six major categories, such as cultural heritage, natural heritage, festivals and events, cultural facilities, cultural enterprises, and community cultural organizations (Blais 2014). The accessibility of the information is also brought up because of the difficulty in effective communication among different actors in resource mapping. GIS contains geographic locational aspects with a precise coordinate system and data including information attached to the spatial features. Due to the maturity of GIS the potential for spatial data management, visualization and revealing the interlinks and associations between the resources is increased (Ferguson 2017; Gibson, Brennan-horley, and Warren 2010; Gerundo and Adad 2019). Further, the recognition of the resources should overcome the temporary and spatial scale. The resource map is a live document valid under certain urban contexts, with currency issues.

An efficient platform to access resources for periodical updates and maintenance has to be considered. ICT tools such as local sensors can offer real-time data, which can be integrated with GIS technology, increasing the reliability of the resource database.

The participatory approach of stakeholders is of vital importance. The participation of stakeholders, which represent different interests and backgrounds, offers distinctive perspectives for an inclusive mapping approach. One of many participatory approaches is the community-engaged mapping. It includes multiple groups and is capable of uncovering diverse assets. However, this arrangement needs physical host spaces and individual voices might be lost due to the time schedule issues. The inclusiveness can be improved by the application of ICT tools, fostering the foundation for e-planning and e-participation as a complement for traditional participatory (Panagiotopoulou, Somarakis, and Stratigea 2018). The interactive communication platform of ICT tools contributes to “a bottom-up information share approach” (Koramaz 2018, 292). Such a perspective can easily be supported by a series of ICT enablers such as location-based social network and online and offline surveys. For example, Planning Support Systems (PPS); Decision Support Systems (DSS); Simulation Models (SM); Public Participation GIS (PPGIS) are all belonging to participatory ICT enablers. Furthermore, Web-based participation is one of the latest technologies in social networking platforms. (Panagiotopoulou, Somarakis, and Stratigea 2018; Jan 2018; Dhonju and Xiao 2018). The applications of ICT tools add the democratic values to the planning process. The transparency and accessibility of ICT aided resource mapping process empower the participation of community members, citizens and tourists without incommensurable and bureaucratic procedures. It eliminates the weaknesses of physical community-engagement mapping by reaching out to more potential voices. This also enables local communities to play a decisive role in planning, reaching a more inclusive and collaborative spatial planning and urban regeneration process.

3.2.3 Two case studies: HUL workshops in Amsterdam and Salerno

In 2018, we organized two HUL workshops both within Europe, one in Amsterdam (The Netherlands) and one in Salerno (Italy). For these two workshops with 6 round-tables, we invited the stakeholders and experts from public and private sectors to discuss about the 6 HUL steps in adaptive reuse and historic urban regeneration. Six tables were set up, representing the six steps of HUL implementation. It includes: 1) mapping resources, 2) reaching consensus, 3) assessing vulnerability, 4) integrating, 5) prioritize actions, and 6) establish local partnership. During both workshop in Amsterdam and Salerno, the first table is about mapping resources.

From the discussion, several tools are described by the stakeholders. The tools are related to those providing different data sources such as location-based social network (LBSN), administrative data, online and offline surveys, and interviews, and local sensors. Among the discussed tools, LBSN is recommended for mapping the local perceptions, values, and needs of community. It is also recognized useful for including the locals to share the experience and knowledge. The use and occupancy of buildings can be mapped with local sensor and administrative data. Besides of this, administrative data is also recognized important build local material passport. Survey and interviews together with LBSN can foster the sense of place as a result of the resource mapping. The result of these two case studies revealed that ICT platforms such as open data platforms, interactive platforms, decision support systems are pointed out as three potential solutions for disseminating knowledge to the public and enable their participation in the historic urban regeneration process. Furthermore, the stakeholders mentioned mapping resources in a participatory way is useful for the adaptive reuse and historic urban regeneration. ICT has potentials for fostering the stakeholders' participation to achieve sustainable regeneration of historic urban areas.

4 CONCLUSION

This paper revealed the contributions of resource mapping to historic urban regeneration with regard to the social, cultural, environmental and economic dimensions of the sustainable development (Table 1). Challenges in the resource mapping are identified including the integration of location information, big data management, the currency issue of the datasets, valuable resource identification and effective participation of different actors. ICT is recognized feasible in all phases of resource mapping, as a straightforward solution to solve the highlighted challenges facing by resource mapping. The case studies of Amsterdam and Salerno indicate that some stakeholders from the Netherlands and southern Italy acknowledge the importance and

potential of ICT in resource mapping. By matching the commons between literature review and case studies, ICT tools are recognized useful and important for a sustainable historic urban regeneration. Future application of ICT tools The specific ICT tools for mapping resources should be further and systematically researched in a future study.

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