Handbook of Research on Emerging Technologies for Digital Preservation and Information Modeling

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Chapter 19

Digital Technologies for "Minor" Cultural Landscapes Knowledge:
Sharing Values in Heritage and Tourism Perspective

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ABSTRACT

The chapter aims to point out the most emerging technologies in analysing and sharing knowledge about 'not outstanding' cultural landscapes. Therefore the chapter starts focusing on the concept of 'minor' cultural landscapes in the wider debate on heritage, then shows the changing approach to the question: the relevance of bottom-up vision in considering heritage. Secondly are taken into account image and information technologies through some definite research topics: Educating by multimedia; Experiencing and sharing new contents by people; Transmitting local heritage; Using image and information technologies to share collective experiences of places; Answering demand for social participation and free access to sources; Connecting tangible and intangible heritage in a tourist perspective. The goal of the chapter is to show how digital technologies can support knowledge and share of values about 'minor' cultural landscapes both through inhabitants and potential tourists to be attracted to.

INTRODUCTION

Cultural Landscapes are the result of the ongoing increase of cultural values within natural environment, made up of tangible and intangible dimensions; so while tangible settings represent the place where people live, the intangible assets are the roots of cultural identity.

The speed of socio-economic transformation and urban environmental changes is a threaten for traditional landscapes, that are gradually replaced by new ones. The conservation of Cultural landscapes is a worldwide concern that has been taken into account since the *World Heritage Convention* (1972), which

stated that *Landscape has different characteristics in each region depending on the cultural background and geographical condition*. Nevertheless, it considers only cultural landscapes as outstanding universal value and, in such a way, the consequence is creating a kind of values' hierarchy, addressed to remarkable sites worthy to be preserved and visited by tourists on one hand, and "worthless" landscapes on the other.

It's well known instead that there are places, in Italy, in Europe and more in general all over the world, less affected by urbanization and development, where survive human traces and cultural layers that are consisting legacies of tangible heritage (structures and housing infrastructure and productive cultural sediments, environmental and landscape resources ...) and intangible (cultural traditions, customs, local knowledge, authenticity ...).

Knowledge and documentation even of these cultural landscapes is crucial for several reasons: first of all to record the changes on respect of the places' authenticity but also because it can impact people's understating of places.

Innovative research today looks carefully at digital potential, so the chapter intends to deal, within the broader topics of Cultural Heritage, with the perspective offered by digital technologies available for knowledge, communication and information sharing of cultural landscapes considered as "not outstanding" value.

In particular, the chapter therefore focuses on what is meant as "minor cultural landscapes" in the wider debate about the cultural heritage and what may be the digital technology useful for their knowledge, shared values and dissemination of information in a supralocal dimension.

Digital resources made available primarily in the field of ICT, can contribute to a better understanding of heritage and landscapes at local but also regional, national and international levels, allowing, through the dissemination of information by the network, to implement and possibly boost the economy of these sites through sustainable tourism strategies, with a marked cultural approach.

"MINOR" CULTURAL LANDSCAPES IN THE HERITAGE DEBATE

Cultural Landscapes: Concepts and Definitions

In order to outline the definition about 'minor' cultural landscapes and their fruitful connection to digital technologies in enhancing heritage and territory, it is necessary to recall briefly the framework of the main definitions and international conventions on Cultural landscapes' theme; first of all the definition itself:

'Cultural landscape' as a term was apparently invented in academia in the early twentieth century. The term, and a particular idea it embraced, was promoted by Prof. Carl Sauer in the United States in the 1920s and 1930s. It only came into accepted professional use in conservation circles in the 1990s (Jacques, 1995), not least through its adoption by the World Heritage Committee and its promulgation throughout the world by the World Heritage. (Fowler, 2002)

The *World Heritage Convention* (1972) in fact states that *Landscape has different characteristics in each region depending on the cultural background and geographical condition*, thus introducing a relevant legitimacy principle of diversity even though, in general, the approach by UNESCO and ICOMOS on the issue is to consider cultural landscapes as outstanding universal value and, in such way, creating a kind of hierarchy in values.

Cultural landscape, as the combined work of nature and man, enabled to move toward a broader concept, used today in preserving world cultural and natural heritage: landscapes designed and created intentionally by man such as parks, recreational gardens, plazas, squares, cemeteries, promenades, yards..; gardens related to monumental buildings and/or ensembles; organically evolved landscapes; continuing evolving landscape; associative cultural landscapes connected with religious/cultural natural elements.

The acknowledgement of cultural landscape is however focused on the rarity of type, considered as a natural monument, although a debate is still running at Icomos to find useful interpretations to widen the field of preservation.

On this respect, the document Icomos-IFLA (Verbania, 2006) affirms the need to widen the evaluation and preservation of architecture to its context, and, at the same time, it recognizes that the notion of "landscape architecture" is actually unsatisfactory to describe the multilevel diversity of landscapes.

Nowadays there is a growing interest in those landscapes modified by human work, which in the past were considered unremarkable from an aesthetical and architectural point of view but, at last, a more careful look is addressed to rural and urban landscapes (Sirisrisak & Akagawa, 2007).

As common factor in World Heritage Cultural Landscapes listed by UNESCO, is relevant the presence of towns and villages within the designated area: so they are places where people usually live and so they are living landscapes; sometimes they can be remote but in general they are not only wild or deserted places.

The *European Convention of Landscape* (Florence, 2000), now ratified by all the EU States, has introduced a relevant change on the way landscape is perceived, no longer as an *"outstanding universal value"*, but as shared heritage by people living there. Maybe one of the main purpose of the Convention consists in *disclosing or giving back a landscape dimension to territory* (Priore, 2009). Such a stance seems to take awareness of ongoing territorial transformations, and first of all of living landscapes (*Living Landscape*, 2010).

Another crucial point arising from ELC is adopting specific policies on matters like training and education, identification and assessment of landscapes, development of landscape quality objectives and introduction of policies for landscape protection, management and planning.

In this debate, the concept of Cultural landscape as result of intertwined works of nature and of man, "outstanding universal value" is therefore today an area under discussion in a focusing process combining enhancement and protection of tangible and intangible goods related to the territory and landscape.

About the point on "Cultural Diversity and Heritage Diversity", the main document is represented by the *Nara Document on Authenticity* (1994), written in the related ICOMOS Conference. Starting from Charter of Venice (1964), this document presents a challenge for conventional thinking in the conservation field, expanding the purposes of cultural heritage, considering cultural and heritage diversity to conservation practice. It focuses on the diversity of cultures and heritage as a richness for all humankind because all cultures and societies are rooted in the particular forms and means of tangible and intangible expression, which constitute their heritage.

As several authors think about the topic:

It is difficult to apply the universal methods or tools for the conservation of different landscapes. The Nara Document on Authenticity (1994), an international document that addresses the understanding of authenticity of cultural heritage, recommends that each heritage site should develop its own conservation approaches appropriate for its specific culture (Logan, 2001, quoted in Lennon, 2007). (Yang, 2015)

According to the Unesco norm, the responsibility for Cultural heritage and its management is a right in the first place for the cultural community that has generated it, and subsequently to that which cares of it.

The respect due to all cultures requires that heritage properties must be considered and judged within the cultural contexts to which they belong; increasing awareness within the symbolic dimension of heritage is an absolute necessity in order to arrive to concrete measures for safeguarding the vestiges of the past.

In other words, this means developing greater understanding of the values represented by the cultural properties themselves, as well as respecting the role such monuments and sites play in contemporary society.

Summarizing the key-points of the Nara document, it opens some interesting perspectives in cultural landscape research: first of all setting a relationship between goods and territory, recognizing the diversity of cultures, giving the responsibility for cultural heritage to the cultural community that produced them.

In addition, as consequence of such cornerstones, today it is possible to take in consideration those landscapes characterized by the transformation of human work, in the past considered not worthwhile and today including rural landscapes and more in general those ones that differ, for example, from the stereotypes of outstanding landscapes or big tourism capital city, almost today wholly homologated.

CONNECTING HERITAGE IN THE DIGITAL ERA

On the other hand, in Europe exist many "minor" and less known places, particularly the "inner areas" - rural landscapes, inlands, places far from urban areas and from the flows of globalization and tourism attractions - preserving at the same time traces of common roots and differences of identities. For examples in Italy, there are almost six thousands villages or hamlets, accordingly with a recent ISTAT survey, partially abandoned but very rich in heritage. Some are now regenerated by adopting diverse new technologies in different fields, i.e. using environmentally friendly materials: it is the case of Torri Superiori in Liguria, or Colletta, another small village in the same region, which has been completely wired by optic fiber and now it is a kind of "internet hamlet".

So the point on "minor" cultural landscapes is taking them in consideration looking at the same time at the past but also at future, in a dialectic of meaning attribution by scholars, stakeholders, and first of all by the communities living in the territories. In this sense, the document *Communication from the European Commission, "Towards an integrated approach to Cultural Heritage for Europe"*, in July 2014, encouraged a vision of the heritage addressed to share values and promote social cohesion.

Cultural heritage plays in fact a crucial role in the European Agenda for Culture, above all for three main objectives:

- *Promotion of cultural diversity and intercultural dialogue;*
- *Promotion of culture as a catalyst for creativity;*
- *Promotion of culture as a vital element of the Union's international dimension* (*Towards an integrated approach…*).

Furthermore, in this document, heritage is considered for the capacity to promote social cohesion and integration, regenerating neglected or abandoned areas, producing there new jobs, generating shared

understanding and new senses of community. Connecting heritage to its territory and landscape is a way to strengthen awareness and responsibility about places where people lives and create new opportunities for both young and elder people, so promoting new relationship between cultures and generations.

Particularly the paragraph *Connecting our heritage and making it widely available in the digital era*, recalling the principles of "The European Digital Agenda", states:

The digitisation of heritage contributes to the European Agenda for Culture, by improving public access to different forms of cultural and linguistic expressions. Digitising cultural heritage, making it accessible online, and supporting its economic exploitation are also activities at the heart of the Digital Agenda for Europe. Digitisation multiplies opportunities to access heritage and engage audiences; while digital tools such as 3D scanning can facilitate the preservation and restoration of physical cultural assets. (Towards an integrated approach….)

This major document, which summarizes European policies in terms of Heritage points out thus, at least three aspects in the relationship between heritage and digital technologies: on the one hand emerges the importance of a different and a new accessibility to heritage through digitization; on the other, the role that local communities can play in this process, both in terms of the progressive awareness of the protection of their living environment, and for the economic impact, also in terms of tourism development, this aspect also requires a commitment on cultural landscape, assumed as a set of cultural assets belonging to a specific landscape and which they express. Last but not least and fundamental in this chapter, the relevance of the Heritage potential in the processes of regeneration of neglected or abandoned areas that can be considered as minor cultural landscapes.

CULTURAL HERITAGE IN DIGITAL "PRESENTATION" AND "INTERPRETATION"

In the sector of technologies applied to know and communicate heritage, over the last twenty years, a lot of experiences have been carried on in international field. For the purpose of this chapter it needs to quote principles and best practices arising from information systems to study, to preserve, to manage and to communicate architectural structures, which are the background for further and diverse research lines.

On this point, ICOMOS stated that the essential actions are "interpretation" and "presentation" of Cultural Heritage Sites, and explains the respective meanings in a chart taking the same name:

● *"Presentation" denotes the carefully planned arrangement of information and physical access to a cultural heritage site, usually by scholars, design firms, and heritage professionals. As such, it is largely a one-way mode of communication.*
● *"Interpretation", on the other hand, denotes the totality of activity, reflection, research, and creativity stimulated by a cultural heritage site. In this respect the input and involvement of visitors, local and associated community groups, and other stakeholders of various ages and educational backgrounds is essential to interpretation and to the transformation of cultural heritage sites into places and sources of learning and reflection about the past, as well as valuable resources for sustainable community development and intercultural and intergenerational dialogue. ()*

As regards the first point, i.e. the methodologies of data collection and presentation, the most advanced solutions today consist in realizing "master models" representing accurate digital reproductions of the original artifacts with their features (Gaiani 2012).

The 3D Reality-based models make up core groups of information system generating a mock-up with diverse features (geometrical, material, formal, architectural). The outstanding result for such models is to let them get a visual shape; further they, as for their clarity and readability, allow going over the limits of existing information systems.

In fact "a 3D semantic based information system aims to present contextualized information, providing artifacts of a proper "context" semantically integrating 3D objects by 2D images, texts, references, to let users make queries based on a context and on a semantic content" (De Luca, Véron, Florenzano, 2007).

So 3D GIS represent effective and meantime very complex tools, useful to entirely fulfill what a clear and adequate "presentation" of a cultural heritage site requires.

Coming back to the other point stated by the above mentioned ICOMOS Charter, i.e. "Interpretation", this second issue opens remarkable scenarios as the relevant role that users can play, becoming more and more real "actors" in heritage sites, and therefore it needs diversifying the uses of information and communication technologies required for the whole activities of reflection, research, and creativity to be attended in a cultural site.

The second point, "Interpretation", can even reveal itself as crucial when we face "minor" landscape heritage which are the object of this Chapter.

So that is the case where the sites firstly have to be recognized, promoted and enhanced by the inhabitants themselves, employing the most fitting tools to outline material and immaterial heritage potentially attractive for visitors too.

As regards such research line, today strengthened practices still don't exist, as instead it occurs for architectural heritage or for archeological sites of great acclaim. So the way is to organize a detailed work addressed first of all to a process of knowing and appropriating widespread in the territory, and so discovering traces of the past in the meantime looking at the future.

This process should deal with the whole potential technologies about multimedia, ICT, Web, Social Networks, so finding multiple solutions for a new issue; in fact here technologies may have a crucial role allowing blending knowhow, and so pointing out the best practices to be adopted.

"MINOR" CULTURAL LANDSCAPES BY IMAGE AND INFORMATION TECHNOLOGIES

Experiencing Heritage Through Digital

Defining a framework, although constantly changing, on heritage subjects, seen in relation to landscape and especially focusing on "minor" cultural landscapes, allows us to broaden the approach to emerging technologies, to their potential features, their use in the context of knowledge, enhancement, sharing of cultural heritage in a site. As has been said so far, the technologies that will be described and discussed, affect primarily those which help to convey images and information at the same time, headed to a collective experience and consequently to social places, in two main directions: the inhabitants 'one and that of tourists. In this debate framework, another key point to consider emerging a technology is its ability

to carry traditional or innovative visions of heritage. In this sense, the top-down view by experts is now not totally shared, mainly in the policies of the European Commission; however, as we have previously underlined, together in the *European Landscape Convention* and more clearly in the document *Towards an integrated approach*, it has been definitely shifted the focus on a bottom up approach to the question.

Specifically, in this last document it is stated:

Conservation is increasingly geared towards preserving and enhancing a whole cultural landscape rather than an isolated site, and also becoming more people-centred. Old approaches sought to protect heritage by isolating it from daily life. New approaches focus on making it fully part of the local community. Sites are given a second life and meaning that speak to contemporary needs and concerns. […]

Moreover, as regards the potential of technologies:

Digitisation and online accessibility enable unprecedented forms of engagement and open up new revenue streams (Towards an integrated approach….)

Digitization of heritage is also included in a larger program provided by the *European Agenda for culture*, in which there are several platforms: among them plays an important role *Europeana* (www.europeana.eu) that now provides access to some 30 million cultural objects from more than 2,500 organizations; as consequence, the resources of Europe's cultural institutions are now more internet-friendly and more widely re-usable. *Europeana* furthermore facilitates develop and implement standards and interoperability in this area and affords a space where culture professionals share digital expertise.

Recent initiatives between many European platforms, such as *Europeana Space*, *RICHES*, *Civic Epistemologies*, *Photoconsortium*, aim to explore new digital destinations for heritage and academia (http://www.digitalmeetsculture.net/article/europeana-space-presented-at-dcdc2015-manchester-12-14-october-2015/)

In the debate, some crucial points are converging: first of all the consciousness that during the last two decades there has being an increase in digital content across the heritage and academic sectors.

A pivotal remark to do is that digital technology, integrating traditional formats, produces a wider user experience, so providing great opportunities for more actively audiences to engage in.

The main issue in the debate, is given by the assumption that in such process people have gone from being consumers of heritage content to active creators and curators, helping heritage professionals to contextualize and interpret their rich and diverse contents. (http://www.digitalmeetsculture.net/)

Emerging crowd-sourced matter has contributed to give contemporary relevance to heritage, adding complexity and diversity to established narratives: at the same time, digital platforms have conducted to democratize the experience and interpretation of heritage.

Digital Technologies and Tools for "Minor" Cultural Landscapes

So after shortly outlining the most update approaches about cultural heritage, firstly in the vision of the European Commission, now it's necessary thinking over the right tools to apply them and pointing out the foremost ongoing experiences, furthermore it's necessary monitoring in order to relate them to the field of 'minor" cultural landscapes.

UNESCO began to use computer-assisted information management in 1992 to help in the Angkor Wat protection; since then geospatial technology had a widespread diffusion in the documentation of cultural heritage.

As writes Yang on the topic:

Geospatial technologies have slowly superseded traditional cartography, supported by recent developments in Geographic Information System (GIS), Global Positioning System, and remote sensing (Hamylton, 2013). For example, applications for World Heritage nominations today must be in electronic format to create a uniform heritage archive for periodic monitoring (UNESCO, 2009). It is therefore necessary to develop innovative applications of digital tools to assist the documentation of heritage landscapes. (Yang 2015)

For the specific contents of this chapter, the main goal is to focus on those technologies able to engage audience and involve people, so it intends to cope chiefly some major and complementary ways listed below.

Educating by Multimedia, Describing Tools, and Case Studies for Cultural Heritage

A quote can help to introduce the first issue:

The need for Multimedia Communication for Cultural Heritage is becoming more and more evident for several reasons: reaching a wider audience, exploiting the possibilities of impact offered by new devices (e.g. tablets or smartphones), combining culture and tourism. (Paolini & Di Blas, 2014)

Multimedia consists first of all in merging texts and images, integrating them with audiofiles, video, graphics and each other medium fits in transmitting a given content. All these media allow realizing a storytelling that is today considered the best way to engage audience in heritage matters (Proctor and Cherry 2013).

Another key point is provided by interactivity:

Truly interactive narratives can support a variety of users' experiences. Systematic browsing, linear walk-through, random selection, search, exploration, etc. This property makes them specifically attractive for the cultural heritage domain, where different users with different needs access the same content: experts, scholars, students and teachers, visitors, tourists, etc. (Paolini & Di Blas, 2014)

The characteristic of interactivity is based on flexible fragments that can be shown in multiple devices, making at the same time interactive narratives remarkable both for users and for cultural institutions.

A case study can better explain how this tool may be convenient: it has been applied for example in "*Roman Milan*", a multimedia narrative about the city of Milan, realized by the above mentioned Paolo Paolini. The narrative, in this case is assumed as way to make attractive for junior-high school students the history of Milan during the 4th Century after Christ

The narrative employs here a double level: on one hand there are fictions about significant social figures, like a law officer, a matron, a pagan patrician; on the other hand, available information is able

Figure 1. The narrative about" Roman Milan". On the left, the topic and sub-topics; on the right, the list of background information.

Source: http://hoc.elet.polimi.it/vitamilano/project/links/Approfondimenti/project/milano-romana-approfondimenti_page-3_nav-short.html

to clarify key features about Roman times, definitely the tool let the user free to combine different fragments and make experience of a personal and special narrative.

Paolini and Di Blas think in fact that "Multimedia interactive stories are a great way to "give people access" to cultural heritage, due to their light-weight nature that makes their consumption extremely pleasurable, their flexibility of use (across different channels/devices and scenarios) and their feasibility (they are quick in production and not expensive). For these reasons, - they write - digital storytelling is becoming "the" way of communicating in the cultural field" ((Paolini & Di Blas, 2014).

In the case of minor landscapes, it can be a useful way to identify their tangible and intangible heritage, illustrating the still visible traces of the transformation over time of the rural environment: it is not to describe the "big" story, but the "micro-stories" of the people's lives whose work and different crafts produced a rural environment and landscape worthy of interest. To describe and show uses, habits, agricultural production and food, places and buildings for manufacture, at a glance to use multimedia technology to present the tangible culture of a place, telling the "everyday life" of people who have helped to give shape to places in a far or recent past until to bring them to current state.

Experiencing and Sharing New Contents by People to Friendly Communicate Heritage Linked in a Territory

In general it is well known that Big Data represent a valuable tool for understanding the transformation of the urban environment; based on the computation, have proved useful when applied to traffic flows or the health of population groups. In the case of outlining changes in minor cultural landscapes how-

ever, one relevant aspect is making use of "small data", that is, of those allowing to tell the memory of places by the resident community, enabling to be aware of the past, but with an eye turned toward the future; the aim is to identify resources and potential of the cultural landscape to be spent for a possible and new enhancement.

According with this purpose, the "small data" can be raised through citizens' engagement and be more effective because they allow you to integrate digital data with people experience. Digital platforms (media platforms) to interconnect content, spaces and people, are therefore interesting tool as is the case of OPEN LOCAST, realized by the Mobile Experience Lab of MIT, "to understand better how evolving media technologies could be used to improve connections between people and their social, cultural, and physical spaces.[…] LOCAST- in fact - links quantative data and human expression in the form of rich media" (Casalegno, 2014).

Among the various LOCAST platforms, the closest to cultural landscape's issues is *Memory Traces*, a tool that has allowed collecting and making interactive stories of the Italian community in Boston.

The memories may cover several categories – education, family, food, language, sports, and working – which have been made accessible on a map.

The content on the Memory Traces map can be navigated in for different way. Users can listen to the entire interviewee's history in a linear way, discover memories from immigrants in categories of content, select a particular historical period, or explore memories geographically, since the media are "located" on the map by where the interviewee refers in the narration. These various methods of navigation correspond to our effort to embed human memories within the realm of the city writ large, and to overlap the built environment with digital content. A mobile application allows users to access this content on the spot, so they can interact with the content in the city's specific context. (Casalegno, 2014)

Figure 2. Interface of Memory Traces, an interactive collection of stories from the Boston Italian community
Source: http://locast.mit.edu/memorytraces/
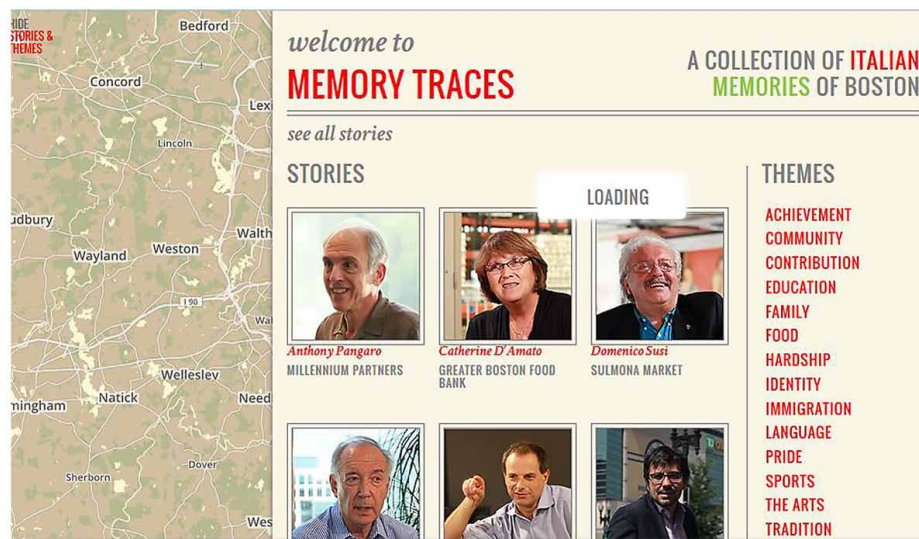
Such a device may be a good answer to the question of the perception of the cultural landscape by the local residents, helping firstly to share memories, enabling to collect the experiences of sites, becoming a place of debate and dialogue with administrators, in order to realize the memory of places' construction, characterizing that particular cultural landscape and to forecast a future which will enhance those roots.

To record on a digital map the history and memories of the places, at the same time, it's necessary to work for a new awareness of the landscape where you belong, to identify its cultural content and also be targeted to its tourist development. The instrument of participatory mapping is an innovative method, which enables to address public participation in the processes of analysis and decision-making, particularly taking into consideration the aspects about perception and definition of landscape quality.

In order to work on this perspective, the use of tools and techniques of participation and simulation intends to produce new descriptions of landscape, starting from the elaboration, use, experimentation of new ways of telling and reading the cultural landscape, but also new interpretative images, seen as descriptions, not just spatial, but also metaphorical and symbolic, like frames, scenarios, visions with a communicative role, in so far they are forms of interpretation of rules and forms of interaction between social actors. (Salerno, Casonato, & Villa, 2010)

On this matter and with these objectives, the use of tools for e-participation, as Geoblog and Participatory GIS (PGIS) represent innovative technologies. They both have been tested in an interesting case for this chapter, the "Urban Ecomuseum of Niguarda in Milan" - one of the first Italian eco-museums - desired by a community that has seen its town, before independent, to be encompassed within the Milan metropolitan area during the years of strongest industrial change of the city. The radical change that is followed, led to a marginalization of the urban structure and social relations, as the result of a transformation from uncontrolled rural center in the suburbs of a big city.

Figure 3. Interface of the Geoblog Ecomuseum of Milan Niguarda
EUMM Source: Daniele Villa, Politecnico di Milano

Here,

The Geoblog makes use of social innovations of Web 2.0 to combine visual data with geospatial data and to enable the general public to contribute their local knowledge through effective communication tools; Geoblog is a communication and visualization platform on the everyday landscape which brings together scientific information with feedback, sharing of local and historical information, observations of lay people. It broadens the thematic range of landscape issues by integrating the possibility of geo-referenced data with social networking tools, allowing listing and overlying all types of multimedia content. The technology employed is a virtual implementation of a system using satellite data in combination with in-situ data and helping to scale the information from global to local level. (Salerno, Casonato, & Villa, 2010)

Another interesting experience worthwhile to mention on the topic of sharing content by digital tools, is the "ISAAC Research". Fostered by EU funds, it brings together the question of heritage with their resident users and tourists: the acronym means "Integrated e-Services for Advanced Access to Heritage in Cultural Tourist destination". The research is headed to produce new ICT environment that "will serve both as a repository of intelligent cultural heritage content and as software architecture capable of offering customized e-services for retrieving and accessing complex multimedia information. The resulting ISAAC platform will integrate and harmonize currently diverse and dispersed knowledge on cultural tourism and local heritage to meet the needs of different users" (http://www.isaac-project.eu/goals.asp)

Main tools in the project are:

- **Mobile Technologies:** Use of the potentials of mobile technologies to enhance the links between local heritage and tourism;
- **Smart Agent Technologies:** A virtual repository for the integration of a large amount of information, with a reliable and secure framework;
- **World-Wide Adoption:** A system where users can experience the advantages enjoyed by tourists and other users without visiting the physical locations;
- **Context-Based Knowledge Handling and Intelligence:** Knowledge modelling and cognitive reasoning techniques to the information base;
- **Mobile / Wireless Full Multimedia:** A framework that extends interface components from common PC-based applications to homogeneous machine-independent platforms.

The aim of such different technologies is to assume a main interface role between citizens, tourists, decision makers, private/public stakeholders in the promotion of the tourism offer of a community.

Transmitting Local Heritage, Transforming Identity Value Chains

As previously recalled, cultural landscapes are the result of combined works of nature and man; also in the case of the "minor" ones, they represent the development of human society and settlement over time. They are influenced by "physical constrains and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal" (UNESCO, 2008).

Cultural landscapes should not be considered as static remnants, because they instead are dynamic entities that are mutually interrelated with people, more in general with society and ecological systems (Taylor & Lennon, 2011).

Such approach requires a dialogue between the researcher's data – other place and other people – and the researcher (Duncan and Ley, 1993): starting from this assumption, it's helpful to take into account the noteworthy digital technologies dedicated to acquire, store, analyze and share geographic information. The goal is unfolding the physical characteristics of specified locations on the Earth's surface and trying to combine them with cultural themes arising from people interpretation of the places.

Rather than just conducting a field survey of the physical environment,- writes Chen Yang (2015)- information system design should begin with exploring local stakeholders' cognitive maps of the place in question. This 'interpretative model' is consistent with the cultural landscape methodology that believes landscapes are culturally and socially constructed entities. Thus, only the landscape elements 'interpreted' by stakeholders as heritage can be integrated into the system. In terms of technology, this research uses GIS, one of the most powerful tools in cultural resource management, to build an information system for a heritage landscape. GIS is designed to capture, store, manipulate, analyze, manage, and present all types of geographically referenced data (Foote & Lynch, 1995).

Therefore, GIS tools should be interrelated with the environmental landscape values (Veland et al., 2014), and in the meantime, to explore an approach for mapping and data basing heritage landscapes containing both natural and cultural values. This methodology should allow covering aspects usually out of the field of the 'conventional' concepts of cultural heritage.

Furthermore, digital tools let be possible to integrate values coming from different stakeholders into a broad information system. The aim is to build an 'Interpretative model' in the design of information systems. As a type of landscape representation, designing and building information systems are seen as interpretative activities. That is the approach deriving from the 'critical cartography' (Crampton and Krygier, 2005) which considers landscape representations as forms of cultural and social construction (Harvey, 1989; Wood, 1992; Pickles, 2004); consequently it recognizes as worthy the role of active interpreters instead of utilize universal and neutral models.

Summing up, such vision corresponds to a bottom-up strategy looking carefully at local stakeholder's cultural landscape perception, and uses it as meter for database design. Furthermore, it allows outdoing the fragmentation of information, conveying data in a unique digital platform and so it better manages and interrelates the knowledge of individual heritage landscapes.

This innovative approach for building such information platforms can contribute, almost in three directions, to get a more effective documentation about cultural landscapes:

Firstly, an 'interpretative model' of database design facilitates a more explicit focus on information support, and is a potentially effective approach to user-centred design of GIS. Secondly, the cultural landscape perspective provides a holistic tool for heritage documentation, which integrates natural and cultural, tangible and intangible heritage, into conservation and management. Thirdly, it offers a pragmatic guide for building GIS, which can be used as references for other landscape documentation projects. (Yang 2015)

Figure 4. The user interface of the GIS database for St Helena Island
Source: Yang,2015
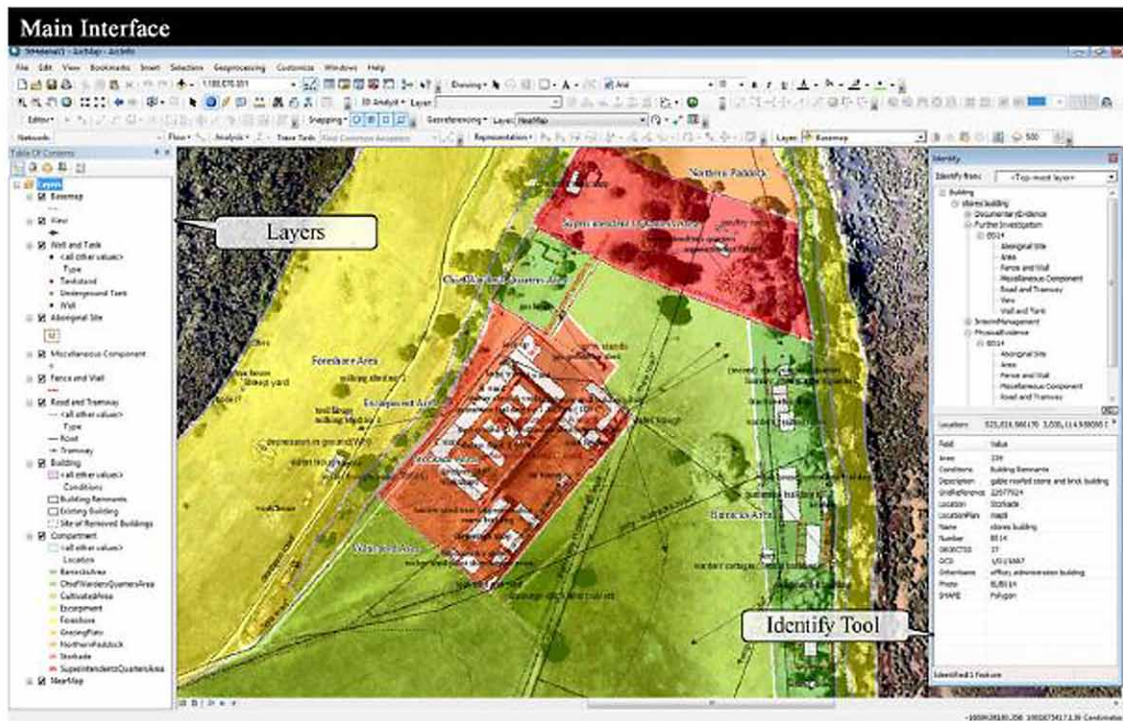
The case of St Helena National Park in Queensland, Australia, illustrated by Chen Yang in the above-mentioned paper, may be an interesting solution to apply to "minor" cultural landscapes. It has been based on stakeholders' interpretation gathered through interviews in order to realize a database, or in other words, to design a digital inventory, providing to collect documents about the remnants and at the same time to contextualize them in the landscape, so revealing the main subjects of different sites as regards historic research, landscape restoration, and tourism development.

Using Image and Information Technologies to Share Collective Experience of Places

In the bottom-up perspective in considering cultural landscapes, the role played by laymen and stakeholders is crucial, above all as regards the action of interpreting heritage and landscape values, as seen before.

On this topic, the text of Freeman Tilden "Interpreting our Heritage" (1957) is considered a cornerstone for assuming the action of interpreting, as "an activity that should forge emotional and intellectual connections instead of simply communicates factual information." On this respect, this can be understood as the starting point to involve visitors and tourists through Mobile Devices using Augmented Reality.

Continuing to quote Tilden's book, is worthy to underline mostly a point: the need to connect information and experience of visitors. So Augmented Reality is a digital tool suitable to answer this request:

on one hand it is a creation of Culture Communication and Design, on the other it works for Heritage Interpretation: Augmented Reality consists in fact in overlapping in real time a virtual digital object on the digital image of a real object, improving information.

This tool may be used in preserving digital artefacts, ensuring scientific correctness, and at the same time a fruitful device for heritage from the point of view of management practice: it allows almost three main outcomes, to handle cultural datasets, to manipulate virtual objects, and to distribute them on a global scale.

Some definitions help to explain how Virtual Reality works:

- **Reality View:** A video image captured by the smartphone video camera, in real time;
- **Registration and Tracking:** A method for aligning a virtual object within a three dimensional co- ordinate in the reality view; it uses the GPS technology embedded in the smartphone;
- **Point of Interest (POI):** A representation of an information point in a digital geographic map corresponding to a real point;
- **Virtual Object:** All digital content overlapped to the reality view captured by the camera. Different media can do the content: text, 2D and 3D images, 2D or 3D animations, movies, music, sound effects, interactive media and hypertext;
- **Markerless and Marker Based AR:** Optical systems for the recognition of brands used in aligning virtual objects;
- **Location Based Tracking:** To obtain georeferenced information through the use of location sensors;
- **Six Degrees of Freedom:** Track system capacity to maintain aligned a real world object in a three-dimensional space (Casella & Coelho, 2013).

This technology provides an answer for the need of contemporary audience about receiving digital content in personal device, like mobile phones and tablet, in visiting a heritage site; as consequence, noticed Namho & al: *Recently, self-service technologies have been introduced as a part of smart tourism by a variety of tourism organizations.*

As Augmented Reality is a visualization technique synthesizing various multimedia information with real view, it is capable to convey information about destinations and attractions allowing a user to read information and visualizing images of heritage in their display. In other terms, it is a tool able to build up contiguity of space and time by overlapping information onto physical objects and spaces.

The appeal of this technology derives from multiple reasons: technology readiness and acceptance, usefulness and simplicity of use. However, there is also visual attractiveness in AR, in fact aesthetics plays an important role in the decision to use this information and communication technology.

Finally yet importantly, Augmented Reality can play a crucial role in heritage landscapes and tourism sector, for the capacity of enhancing users' experiences.

On this issue, *ITacitus* has been a remarkable research, worthy to be quoted: "Intelligent Tourism and Cultural Information through Ubiquitous Services" funded under the Sixth Framework Programme for information society technologies (2006-2009); it explores different ways in which information technology could be used to support cultural tourism.

Figure 5. An application of Augmented Reality to cultural heritage
Source:http://www.yildirimmedya.com.tr/UserFiles/2/foto_galeri/compositec"hurchstreet.jpg

Starting from the observation that Cultural heritage sites have huge amounts of information, but not presented in an engaging way, the platform adopts augmented reality to provide compelling experiences at cultural heritage sites.

- **Superimposed Environments:** 3D objects are placed into the scene on the spot in order to overlay the real scene. Like missing paintings, statues or architecture models.
- **Annotated Landscape:** Abstract context sensitive information overlays showing images, texts and videos about a certain spot.
- **Spatial Acoustic Overlays:** Transporting a place's original ambiance by virtually placing spatial audio clips in the surrounding (http://grid.ece.ntua.gr/?projects=itacitus).

Another research field of Itacitus has concerned the development of an interactive itinerary planning easy to use in findings items which match tourists' interests and capable to be handled by the system automatically.

The third pillar consisted in using contextual filtering based on the user's location, interests and history to determine what information to present to the visitors mobile device.

Answering Demand and Free Access to Sources: Open Data and Web Based Tools

As affirm Pescarin and Forte:

WebGIS is the perfect way to share even geographical information, allowing the user to view raster and vector information in overlay, to load and unload, query, compare, upload and download data in a

Figure 6. Interface of Itacitus platform
Source: virtualmuseu.jpg

simple way, through a browser[…] But there are today also other possibilities offered by the Free and Open Software movement and Open Source projects. (Pescarin, Forte & al., 2005)

Tools employing such technologies and vision can offer an interactive approach to share information about cultural heritage: they in fact, on one hand, allow the visualization of fully three-dimensional geographical data inside 3d environments and, on the other hand, such *open* tools (OpenSceneGraph, VTerrain, MapServer, PostgreSQL and PostGIS) let to collect heterogeneous data at different levels of detail (historical, architectonic, topographic, etc), that makes possible to overdo the same WebGIS platform.

It is for example the case of the Appia Antica Project, realized to publish on line archaeological data and to create a base for a shared interactive system together for the team working group, and then opened to public access (scholars and tourists). This project is based on a 3D spatial archive of the monuments of a wide archaeological park in Rome (the Appia Antica Archeological Park), through intense mapping and GIS and modelling activities. Furthermore, a virtual reality application enables the user to interact with representations characterized by different levels in order to access varied content and possibilities of interpretation. The aim of the project is to permit municipal administrations and research centers to give public access to a wide community of users to spatial cultural data.

Figure 7. Inteface of Appia Antica Project
Source: http://www.appia.itabc.cnr.it/

The main idea of this methodology is to broaden the scientific communities toward an open approach in which everybody can be an actor, and information can be considered dependable through transparency of sources and development process.

Another possibility to make use of an *open approach* to heritage matters and specifically toward knowing and enhancing 'minor' cultural landscapes is not only to use open source software or interact in a dedicated digital platform but also to test the role of e-participation in mapping practices in crowd-sourced-based place.

It is possible in fact to employ a collaborative use of ICT (geo-social networks) within a process of social sharing of images in communicating tangible and intangible cultural heritage and cultural landscapes.

Among the Italian cases in the field of innovative ICT use, it's remarkable to mention the experience of the Osservatorio *del Paesaggio del Monferrato Casalese* (www.monferratopaesaggi.org), which takes up a cultural landscapes vision as made up with manifold intertwined aspects and takes into account definitions, uses and consequences deriving from digital heritage. Hence arises an interest in designing and testing use of analysis tools on quantitative territorial data (GIS) comparing them with qualitative ones, in order to enclose even topics about social perception of landscapes and cultural memories in a territory (Bonfantini & Villa, 2015).

A careful attention should further be paid to those raising ways, also by Web, taking into account the point of view of inhabitants, of tourists and more in general of people living landscapes, allowing to include minor tangible and intangible heritage.

It's has been the aim of web-app "Alpinescapes" (www.paesaggiculturali.polimi.it), within a study on mountain areas of Lario e and Ceresio, funded with an Interreg Italia-Svizzera research, titled: "*Il*

Figure 8. Inteface of Alpinescapes project
Source: www.paesaggiculturali.polimi.it

paesaggio culturale alpino su Wikipedia: Valorizzare il paesaggio culturale attraverso dati aperti, Wiki-pedia, Sit e allestimenti analogico digitali", "The Alpine Cultural landscape on Wikipedia: Enhancing cultural landscape by open data, Wikipedia, Sit and analogic-digital tools".

In this case, the need to link together very varied sources on Alpine cultural landscapes has led to a hub useful in georeferring and mapping on a unique topographical picture, information coming from local database and from the ones powered by Wikipedia. On one hand it avoided multiplying sources, permitting instead, an open access and to integrate the information data about those mountain areas, so realizing a new way to interpret the minor digital sources.

About this experience it is worthy to provide detailed steps, as they can make up a good practice for further developments:

- Database analysis on alpine cultural landscape subject present in the territory, paying particular attention to geo-localized information potentially collected in a whole integrated system to be used on-line;
- Analysis of Wikimedia environment sources (Wikipedia- Wikidata - Wikimedia Commons - Wikisource – Wikivoyage etc…) in order to embed them with other landscape and territory data groups;
- Analysis and process of Openstreetmap map-bases to realize a dedicated web map, open data based, allowing to design and achieve a alpine landscape map fitting with the project;
- API (Application Programming Interface) matching for each environment, from which to get information;
- Mapbase arrangement on Openstreetmap source for continuous upgrading and graphic and dynamic output of the project;
- Design and put online of the application, to get matching among features, interaction design, adapting to mobile devices;
- Open of geo-database coming from Provincia di Lecco to get open-data, in order to add some information level in the web app of the project.

The map, a real hub of data, has been lastly set to collect increasing upgrade made by users on Wikimedia and OSM operating system and on the web site of Comunità Montana Valsassinacultura.

More in general, the new forms of voluntary and involuntary participation via web by different visualization techniques, can be also employed in promoting new practices of sustainable cultural tourism and processes of tourism policy making, that include the inhabitants' role, their expectations, expertise and memories.

Connecting Tangible and Intangible Heritage in a Tourism Perspective

In order to practice a convincing strategy in enhancing a 'minor' cultural landscape, collection of data, memories and images should convey toward a shared consciousness of values by inhabitants and in the meantime be able to integrate meanings assigned by communities in cultural and environmental planning.

Moreover, for an effective redevelopment of a site it is necessary that attributes, perceived as relevant by the goal of the market, have to be identified before (Crompton et al., 2006).

It comes to building interpretive strategies able to induce awareness among visitors of the visited places and at the same time as a valuable tool to communicate and reveal the meaning's heritage and the information generated from both the direct and the media.

The strategies of interpretation should to be realized by a "big picture" and so guide demands that interface with the more established interpretations.

Here a list of contents conveying to the goal where Image and Information Technologies play a leading role.

- Tangibilising the Intangible:Create an amalgam of tangibles and intangibles based meaning and representations;
- Evaluating cultural heritage target;
- Focusing on brand and tools for image creation;
- Pointing out the relationship between cultural heritage, brand, images and place imaginary;
- Linking intangibles and storytelling;
- Recognizing places which are thought as special from people;
- Interpreting ever changing and individual meanings;
- Taking into account that tourist bring ideas to sites they visit and therefore such ideas should be embedded in people's interpretations, both confirming previous ideas or denying them (Hems, 2006).

SOLUTIONS AND RECOMMENDATIONS

Aiming to improve cultural and historic values' awareness in a site, in a "minor" cultural landscape, in this Chapter manifold ways have been presented; they can be implemented employing the digital resources above listed and they also should blend each other.

Over such process it should be taken into account utility today offered by digitization of contents as starting point for further processing them; this allow in fact to get, by means of several simulation forms, output fitting to multiple employs and, at the same time, they are able to link together complex contents made more accessible though more flowing apps.

New systems to let digital contents communicate each other should be used, looking at unifying strategies for storing, recording and so exploiting a "blend" of different technologies to get multiple and suitable uses.

In wider terms, in order to "interpret" a site and the related widespread heritage, it requires to make use of more simplified models", easier to handle, whose employ is based on automatic processing applications; architectural model will become more readable whether put in relationship to full views, overlapping and connecting several analysis and information layers in a unique operating system Web or WebGis 3D.

Such tools should be user-friendly and allow embedding contents and data by inhabitants and visitors so that elements 'interpreted' by stakeholders as heritage can be integrated into the system.

Like technologies also collection of data, memories and images, both by inhabitants and by visitors should be "blended" in order to offer multiple views and issues on values and heritage meanings in order to promore a sustainable development of sites.

The above mentioned detailed example about "Alpinescapes" web-application offers a first approach to handle data about cultural landscapes, not by means a umpteenth web portal to store and manage specific items and geolocalized data, instead proposes an hub where make to converge types of data even disparate, unified by their localization and visualization in a definite area. The whole information architecture is here based on open tools, open sources, open data. It deals with an information model open and incremental, easily adaptable to similar contexts and capable to grow without limit toward further information layers.

More in general such model can gather collective memories, images and information, focusing on the scattered heritage of "minor" places.

More in general, as regards digital cultural heritage, it should be paid attention not exclusively to translate analog information into digital copies (texts, images, drawings, maps, data sets, funds audio / video, etc.) but, to try to answer a growing demand for social participation and free access to sources; in this sense digital cultural heritage aims to use open-data and web-based tools useful to expand the effective dissemination and sharing use of contents and values, assessing the possible operational impacts in the process of selection and transformation at different scales.

The technological tools turn out to be therefore essential to build, activate and maintain the network of relations between territorial assets, activities and actors of cultural programs, both for locals and tourists.

FUTURE RESEARCH DIRECTIONS

New technologies now make possible to experience a major source of innovation network for example for new forms of narratives; make possible to improve interactivity facilitating the use and at the same time play a crucial role as a mirror of the identities of the territories themselves. Using new digital communication tools, you can consider the applications of integrated enhancement of cultural heritage and territory, improvement actions regarding conservation and use of artistic and architectural heritage, and, more generally, the construction of cultural specific landscape and territorial realities.

New technologies allow to support the activation of the synergies required for an enhancement of tangible and intangible assets, respectful of sustainable development.

- Moreover, Digital Technologies give today the possibility to handle more effective information and datasets on cultural landscapes and at the same time to renew the way to build and grow the local cultural identity and to share it at different levels, using smart, direct fast, accessible, user friendly and inclusive interaction.
- More specifically, Information and Communication Technologies will be considered as an enabler to support "minor cultural landscapes" in order to demonstrate that they:
- Increase knowledge transfer across the stakeholders and indirect beneficiaries to enhance awareness and improve the relationship between cultural heritage existing in the landscape (both tangible and intangible), sustainable economic growth and local identity;
- Develop content easily available and sharable, fostering bottom-up dynamics, reducing the digital divide, helping Heritage Continual Education;
- Expand public access to different forms of cultural expressions strictly related to the transmission of local heritage, shaking up and transforming identity value chains;
- Foster forms of standardization in managing and mapping Heritage Spatial Data using Open Data and FOSS (Free open source software).

CONCLUSION

The Chapter aims to illustrate the relevance of digital technologies in knowing and sharing 'not outstanding' cultural landscapes. The goal is firstly to broaden the number and the characteristics of sites valuable to be preserved, outdoing in such way the vision and the policy carried on by UNESCO, because as it is known this list includes natural and cultural landscapes considered exceptional for humanity only due to their uniqueness.

Therefore, it is necessary changing the point of view about the question, helping that merely scholars can point out cultural landscapes worthy to be preserved, but taking seriously into account inhabitants' and visitors' visions.

The role of innovative technologies in such process, and particularly in making effective the change of perspective, may be crucial, both in increasing awareness of landscape heritage values and in sharing information and enhancing them in a tourism perspective.

Technologies assume different forms and purposes to get; summing up, they deal with: Educating by cultural heritage multimedia; Experiencing and sharing new contents on territory heritage by people; Transmitting local heritage and meanwhile transforming identity value chains; Using ICT to share collective experiences of places; Trying to answer the demand to free access resources; Connecting tangible and intangible heritage in a tourism perspective.

Digital technologies affect at the same time, preserving heritage considered in relationship to sites and promoting the 'big picture' of a cultural landscape in order to involve more actors in processes of "interpreting" heritage and attracting cultural tourism.

At the present condition, it is possible to turn to numerous technologies about digitization contents, operating system setting, simulating and 3D modeling, user friendly interfaces to access information, information coming from local database and from the ones powered by the Wikimedia environment (Wikipedia- Wikidata - Wikimedia Commons - Wikisource – Wikivoyage etc…), web operating system and web Gis 3D showing the wide and varied range of possible approaches to the issue of knowing, circulating and communicating contents about "minor" cultural landscapes.

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KEY TERMS AND DEFINITIONS

Cultural Landscapes: The result of the increase of cultural values within natural environment, made up of tangible and intangible aspects.

Cultural Tourism: Tourism concerned with a country or region's culture.

European Landscape Convention: The European Chart about landscapes that introduces the relevance of everyday landscapes (Florence, 2000).

ICT for Cultural Heritage: Digital technologies and tools used in order to communicate and share cultural landscapes knowledge and values.

Shared Approach to Cultural Heritage: Approach that strengthens awareness and responsibility about landscapes by inhabitants.

Tangible and Intangible Heritage: Physical legacy of the past – monuments, collections, objects – and traditions or living expressions inherited from our ancestors.

Transmission of Local Heritage: Ways of communicating heritage linked in a territory.