

# ICTs and Smart Territories. The Knowledge and Use of the UNESCO Heritage by Using the QR Codes System

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**Abstract.** The heritage sites included on the World Heritage List are important and highly qualified resources for the territories and communities in which they lie. UNESCO heritage should be recognised as representing the beautiful and the best of its territory, and as being a “useful” resource, in that it is capable of increasing the territories’ economic, social, and cultural values. To this end, in a period characterised by deep recession and by crisis in the markets, new forms of exploitation of the heritage must be put in place. In the context of “smart management” of UNESCO heritage, new tools have been utilised, such as ICTs. In relation to this, this study proposes an extension of the use of the QR Code as a support to communication, integrated enhancement, and the coming to fruition of the territorial resources of the UNESCO site of “The Late Baroque Towns of Val di Noto”.

**Keywords:** Smart territories, Smart heritage, QR Code, UNESCO, Knowledge-based economy, Integrated enhancement.

## 1 Introduction

The assets registered on the World Heritage List are, for the territories and communities which hold them, an important and highly qualified resource.

The UNESCO heritage should be recognised as being the beautiful and the best of its territory, and as being a “useful” resource to its own territory, in that it is capable of increasing the territories’ economic, social, and cultural values.

To this end, in a period characterised by deep recession and by crisis in the markets, new forms of exploitation and utilisation of the heritage must be put in place.

Today, in the era of Smart Cities, the advent of Information and Communication Technologies (ICTs) offers the conditions for implementing new forms of sustainable economic development, for enhancing quality of life, for promoting human and social capital, for intelligently managing the natural resources, and for promoting engagement and processes of participatory action. An extension to the field of the Smart Cities concept, and, therefore, of the methodologies and tools of support, can

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usher in a new era, in which territorial management is of the smart type, and so it is possible talk about “Smart Territories”.

Within the framework of the smart management of UNESCO heritage, new instruments have been put in place, some of them in implementation of legislative guidelines provided by the Law of 20 February 2006, no. 77 (Gazzetta Ufficiale no. 58 of 10 March 2006). Under the impulse of such national legal guidelines and in observance of the guidelines promoted by the European Union (the Europe 2020 Digital Agenda for Europe initiative), it is possible to envisage new scenarios for the development and use of the territory that can be supported by the utilisation of QR Code (Quick Response Code).

This tool facilitates communication by, and utilisation of UNESCO sites and therefore improves the quality of the services offered, in a context where cultural tourism is always of a type 2.0. Today it is possible to extend the experience so far conducted in the use of QR Codes by Italian UNESCO World Heritage sites, to match what is being done on a global level with the Word Wonders Project created by Google in collaboration with UNESCO, the World Monuments Fund, and Getty Images. In this experience, the use of Google Street View technology enables the heritage sites of the world to be visited online, encouraging their exploration.

In this regard, the study proposes that the use of QR Codes be extended to communication, promotion, and integrated use of the territorial resources of the UNESCO sites. In particular, the study proposes a process of integrated enhancement for the South-East Cultural District through the design of a technological platform supported by multiple ICT instruments.

## 2 Methods

### 2.1 The Smart Territories

An extension to the concept of the *Smart City* could define a new direction of development for it, ushering in the era of the *Smart territory*.

The Smart City project was born from the conducted experience in the city of Rio de Janeiro, in which some smart technologies designed to improve community life, reduce waste in the energy sector, and improve waste management were implemented for the first time. In the Euro Area, the application of the *Smart* concept began to find support from the provisions of specific policies since 2010.

For the Spanish economist Gildo Seisdedos Domínguez<sup>1</sup> (Seisdedos, 2007; Seisdedos and Vaggione, 2012), the concept of the Smart City is essentially based on increasing the efficiency in the performance of cities, which can be achieved through the implementation of suitable management policies supported by two main strategic

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axes: that based on the integration of ICT tools, and that based on the active participation of citizens (Seisdedos and Mateo, 2010; Seisdedos and Coca, et al., 2010).

The objective of policies based on the smart concept is to create added value in terms of quality of life for citizens, improve the competitiveness of enterprises (Porter and Millar, 1985), and institutions by implementing more efficient models of governance (Trovato, 2013).

The concept of smart is not only related to the use of ICT tools or high-tech projects but rather, refers to a broader sense of intelligence that involves the instruments, the subjects at all levels and from all sectors, and models of management for all the resources (O'Reilly, 2005a, 2005b, 2006).

In this regard, the knowledge-based economy supports the development of the competitiveness of the territories on the basis of the development of collective and individual intelligence, which in an increasingly globalised environment can become the levers for boosting the local economies.

## **2.2 The Smart Heritage**

In the event that the territory has an infrastructure of resources (Sturiale, Calabrò, and Della Spina, 2010), of a historical, architectural, artistic, and environmental kind, implementing some specific smart measures may favour the creation or enhancement of some scale economies. In this regard, it is possible to introduce the concept of smart heritage as the development process that can be implemented through the use of knowledge.

The knowledge in this case creates additional knowledge (in a virtuous circle of knowledge that creates new knowledge) and added value for all the local components (Sturiale and Trovato, 2011).

In order to promote a development of this kind it is necessary to adopt a new approach to heritage, new interpretative models, and new tools such as intelligent systems and ICTs.

## **2.3 The ICTs and the Marketing Strategies**

The advent and spread of new technologies (ICTs) has potential applications in respect to the utilisation, promotion, and enhancement of cultural and tourist resources, especially for those in urban areas (Muzzi, 2002).

The use of ICTs to support the development, promotion, and use of tourist and cultural heritage facilitates access to the information and its strengthening, enables the integration of physical experiences with virtual ones, and promotes the exchange of content and the transfer of values.

Thus, the use of ICTs in this context may widen the sphere of the user's cultural experience, implementing one of the prerequisites of the Knowledge Age.

In this, it is necessary to pass from the information dimension of ICTs to the relational dimension.

In the information dimension ICTs are essentially used to create ways of

representing the cultural heritage through three-dimensional images that allow the reconstruction of sites and environments, or the creation of real virtual museums, as a result of a process of digitalisation of the heritage.

In the relational dimension, ICTs become a way to create new knowledge, for example the Geographic Information System (GIS), Geo Tools, and web GIS, which are instruments capable of producing new knowledge of a territory.

The combined use of the Internet, GIS, and Geo Tools allows, on one hand, access to digital content and related events for the remote user and, on the other, development of content and additional services and the exchange of experiences through social networks.

The World Wonders Project, developed by Google in collaboration with UNESCO, the World Monuments Fund, and Getty Images, which uses the Street View technology also developed by Google, offers users the opportunity of visiting some of UNESCO's world heritage sites.

#### **2.4 The QR Codes to Support the Cultural and Touristic Use of Heritage**

The Association of Italian Cultural Assets and UNESCO World Heritage, with the support of the Ministry of Heritage, Culture, and Tourism (under Law no. 77/2006), has promoted the use of the QR Code for the exploitation of UNESCO heritage.

This has resulted in the implementation of the QR Code for the Italian heritage of the WHL (Association of Italian Cultural Assets and UNESCO World Heritage, 2006).

These QR Codes link to a single reference, namely the Association's website [www.sitiunesco.it](http://www.sitiunesco.it), and provide access to the section relating to the particular UNESCO site. To make effective use of the intelligent system (Mengarelli, 2013) it is necessary to place the QR Codes on road signs, posters, and printed materials such as tourist information brochures, from which they can be detected by the user with their smartphone or tablet.

In a context in which cultural tourism has undergone a radical change becoming a web type2.0, the use of QR Codes may improve the quality of the service offered (Aranguren, Niccolucci and Poggesi, 2013).

In addition, it is now possible to extend the use of QR Codes by the Association of Italian UNESCO heritage, to the level of use seen in other parts of the world with the *World Wonders Project* (BS ISO/IEC 18004:2006, 2007), created by Google in collaboration with UNESCO, the *World Monuments Fund*, and *Getty Images*, in which the use of Google's Street View technology allows users to visit UNESCO sites online.

This application demonstrates the great potential of the QR Code for the Italian UNESCO Heritage which, if properly integrated with other ICT tools, can offer a smarter use of the heritage and the territory.

### 3 Application

The Association of Italian Cultural Assets and UNESCO World Heritage, with the support of the Ministry of Heritage, Culture, and Tourism (under Law no. 77/2006), has created QR Codes for the Italian heritage sites of the WHL.

Through these QR Codes, users can be directed to a dedicated space for each Italian UNESCO site on the association's website *www.sitiunesco.it*.

This is also the case for the UNESCO site which is the subject of this study, namely *The Late Baroque Towns of the Val di Noto*. This UNESCO site covers eight areas: *Catania, Caltagirone, Militello Val di Catania, Modica, Noto, Palazzolo Acreide, Ragusa Ibla, and Scicli*.

The QR Code should be placed on the road signs, posters, and on all printed material such as information brochures.

The QR Code can be detected through a user's smartphone or tablet, so can be sent immediately to the specific information section, that is contained in this website *www.sitiunesco.it*.

The action of promoting the touristic and cultural enjoyment of sites induced by the use of the QR Code is easy to implement.

In fact, once the sites have their specific reference code, it is necessary to organise the placing of road signs and posters in strategic points of the municipalities concerned, in rest stop areas, in pedestrian and vehicular routes close to bus stations, and around the railway stations and the airports and to enhance or adapt the Wi-Fi zone available in the municipalities within the area concerned.

These actions yield great potential for relatively little cost.

In theory, compared to the amount of investment required, the use of the smart system QR Code offers good advantages for increasing territorial competitiveness and adapting the touristic offer to new tourism and cultural models (Pencarelli, Betti and Forlani, 2005) of considerable interest.

To date, however, despite the fact that the QR code for the UNESCO site of *The Late Baroque Towns of the Val di Noto* has been created, the project has not been implemented completely, in that the support system of micro interventions is still missing.

This is in terms of the Wi-Fi zones which have not been strengthened or in some cases are missing (Cogo, 2010), the road signs and posters, which should be placed at strategic points of tourist flow, and the official brochures for the site, which should be distributed in local tourist offices, hotels and museums, which have not been produced.

In addition, the cognitive campaigns to support the local and industry stakeholders or the potential users have not been implemented (Rieh and Danielson, 2007).

The QR Code project has had a partial implementation. Another criticism of the QR Code project for this UNESCO site relates to the low level of connectivity of the proposed network, namely that the user is directed to the site *www.sitiunesco.it*, which offers a range of general information, such as the history of the site, the criteria for enrolment in the WHL, and the correlations with other historical, artistic, and archaeological sites, such as the historical centre of *Syracuse and the Rocky Necropolis of Pantalica*, the *Villa Romana del Casale* in Piazza Armerina, the *Archaeological Area of Agrigento*, the *Aeolian Islands*, and other UNESCO sites in Sicily. However, there is no link on this site to the official website of the *South-East Cultural District*, *www.datanetstorage.eu/portali/siciliasudest*.

The *South-East Cultural District* is a new territorial entity that incorporates all the Val di Notos stakeholders, as well as new stakeholders from other nearby UNESCO

sites in the area.

The South-East Cultural District covers the entire Noto Valley area, and other nearby areas in the south-eastern part of Sicily, and incorporates: the UNESCO site of *The Late Baroque Towns of the Val di Noto*, the *Syracuse and the Rocky Necropolis of Pantalica*, the *Villa Romana del Casale* in Piazza Armerina, and three other sites, *Acireale*, *Ispica*, and *Mazzarino*, which are in the candidacy phase for inclusion on the UNESCO list.

In total, the *South-East Cultural District* comprises 16 municipalities (*Acireale*, *Caltagirone*, *Cassaro*, *Catania*, *Ferla Ispica - Mazzarino*, *Militello Val di Catania*, *Modica*, *Noto*, *Palazzolo Acreide*, *Piazza Armerina*, *Ragusa*, *Scicli*, *Siracusa*, and *Sortino*), and has its head quarters in Syracuse, at the Superintendent BB.CC.AA. Piazza Duomo, 14.

The website of the *South-East Cultural District* relates the heritage of more UNESCO sites and all the historical, cultural, archaeological, artistic, environmental resources, and food and wine products of this territory, offering multimedia services, and virtual tours in support of the tourism (D-web, 2010).

Thus, as part of the tourism and cultural promotion of the UNESCO site of *The Late Baroque Towns of the Val di Noto*, it would be appropriate to make use of the information infrastructure and services offered by the website of the “South-East Cultural District” (Sturiale and Trovato, in publication phase), which is the only official website among the many that use the *UNESCO brand* or the *Val di Noto brand*, but which are not official or reliable.

## 4 Results

### 4.1 ICTs and the Integrated Promotion of the South-East Cultural District

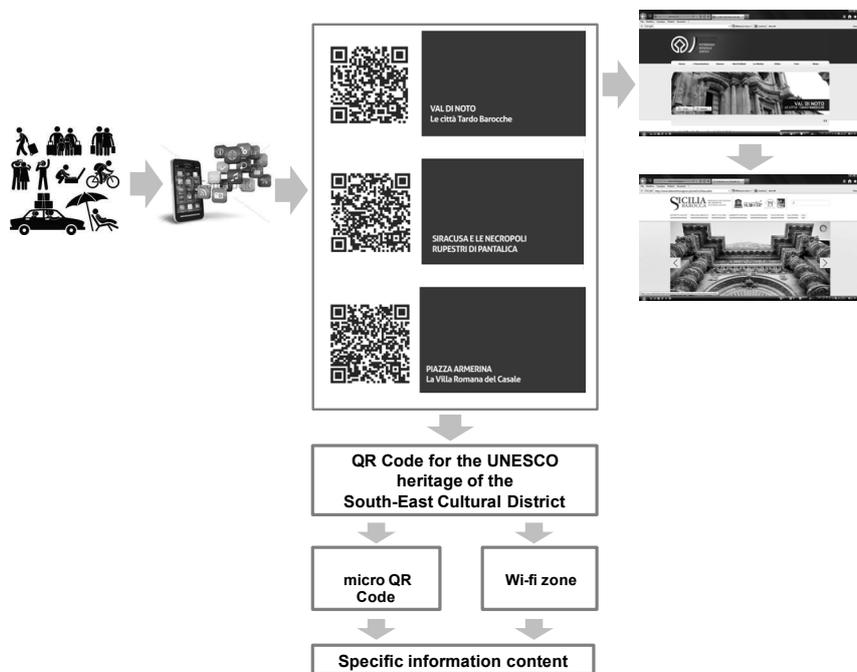
The *South-East Cultural District* is a vast area that is characterised by the presence of three UNESCO sites. The District’s heritage is of the historical, cultural, artistic, archaeological, architectural, and urban type.

In this regard, the three UNESCO sites have obtained enrolment in the WHL on the basis of several criteria types.

But the District’s area is also qualified by the high level of the environmental, agro-food, and social resources, and its political institutions.

The enhancement of these sites is to be implemented through a marketing project in which the use of ICTs has been considered as a powerful tool for adapting the cultural and tourism offer to the new models of demand. In particular, it is possible to integrate the QR Code project proposed for the UNESCO sites and implemented by the Association of Italian UNESCO Heritage, with the support of the Ministry of the Heritage, Culture, and Tourism (Law no. 77/2006), into this marketing project. Connection to the website of the South-East Cultural District does not currently form part of the Association’s proposed project, but considering what has been noted in the previous paragraph, this action would appear to be a prerequisite to qualify the cultural and tourism offer in this area.

The new technological platform to support the integrated promotion of the *South-East Cultural District* can be implemented by using a structure based on the QR Codes of the Italian UNESCO sites, which have already been created, on the strengthening of the Wi-Fi zones of the municipalities, many of which are already present, and on the introduction of a micro QR code project which has yet to be realised, in order to have access to some specific information related to the events, museums, the restoration (Scarpitti and Milaneschi, 2013) of monuments, such as the restoration of Noto's Cathedral of St. Nicholas, after the damage it sustained in the earthquake of 13th December 1990, and the structural collapse on 13th March 1996 that, due to a serious construction defect of the principal nave's pillars, led to the collapse of the entire right aisle of the central nave and the south transept, which left only a small part of the drum standing; and the restoration of the *Villa Romana del Casale* in Piazza Armerina, as well as information about the local wine and food products, and about all the qualified cultural resources of this area.



**Fig. 1.** The technological platform to support the integrated promotion of the South-East Cultural District

## 5 Conclusion and Discussion

The actions aimed at increasing the attractiveness and competitiveness of places of culture in the context of a 2.0 tourism type should focus on the level of quality of services offered to the web-globetrotters by the websites.

The improvement of additional services requires a relatively low level of financial investment, and is more related to the short or medium term dimension (Laurent, 2008).

Therefore, this type of improvement is easier to implement than that required to increase the level of perceived cultural value of a site, or of its identity, or even of increasing the quality of the available accommodation, all of which generally require long-term planning.

In the era of the *Knowledge Age*, ICTs enhancing local competitiveness in a globalised context means turning our territories into Smart territories, thus promoting the development of a territory of an integrated, intelligent, participatory, technological, open, and interactive type, and where the prevailing criteria are those of efficiency, clarity, democracy, and knowledge as a tool for enhancing the different forms of territorial capital.

The new technologies (ICTs) can find applications in the sector of the use, promotion, and enhancement of cultural and tourism resources.

Their application is changing the relationship that classically links the subject who has control of the asset, with those who promote it and enhance it, and those who benefit from it.

This is opening the door on an era in which the managing entity can directly control the actions of promotion and enhancement, and consequently influence and directly guide the use of the heritage.

In addition, the use of ICTs promotes the strengthening of information through the integrated use of physical and virtual experiences; and expands the contents and the transfer of values, evolving from an informative to a relational dimension.

From this it is clear that the approach of a knowledge and experience based economy, and the new ICTs, can provide the tools necessary to create a new layout of coordinated development between the heritage and the user, that is capable of generating a new valuation of the heritage that makes use of a new type of *smart heritage*.

Even the European regulations are moving in this direction (with the Europe 2020 Digital Agenda for Europe initiative), which promotes, among other aspects, the use of the QR Code for the use of UNESCO heritage.

An extension of the use of the QR Code for the activities of communication, promotion, and integrated use of the territorial resources of UNESCO sites, i.e., as tools for linking territorial resources, can help to define a direction of development for the territory that offer great potential for relatively little cost, with this factor being of considerable importance in a period characterised by severe economic crisis.

The ability to interconnect territorial resources through ICTs provides the means to increase local competitiveness in an increasingly globalised context (Sturiale, 2013), transforming the territory into a Smart territory and the heritage into smart heritage, and defining the direction of development and enhancement of the *useless*

*hidden and sublimated* that is just waiting to become *useful* and *revealed*. In this regard, the study proposes the adoption of a new approach to territory and cultural heritage of a smart type.

In particular, this study promotes an enhancement project for the South-East Cultural District through the implementation of a new technology platform that is based on the integrated and hierarchical use of the QR codes which have been generated for the District's UNESCO sites.

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