



Envisioning Architecture

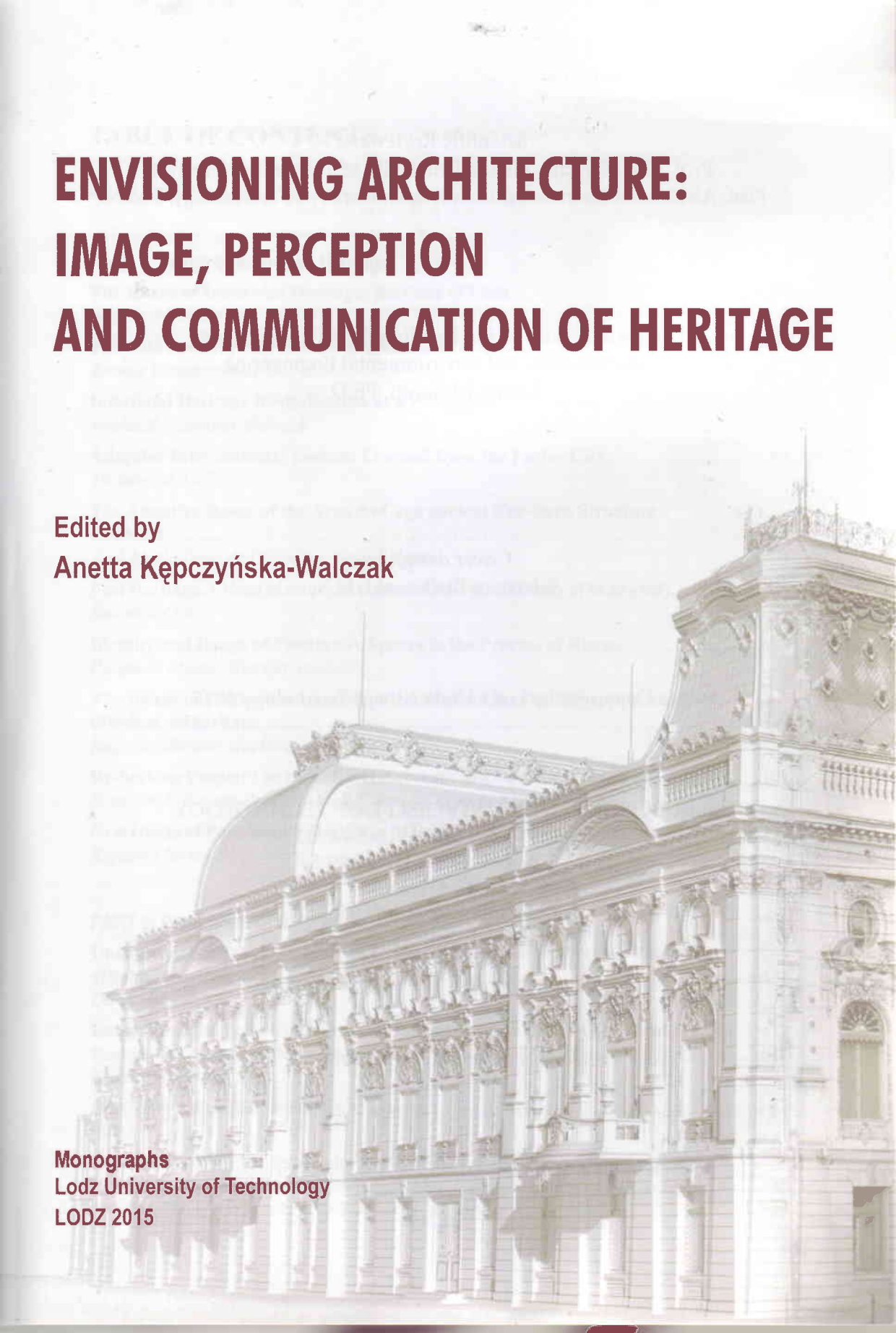
Image, Perception and Communication of Heritage

Lodz University of Technology 2015

ENVISIONING ARCHITECTURE: IMAGE, PERCEPTION AND COMMUNICATION OF HERITAGE

Edited by
Anetta Kępczyńska-Walczak

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PART 3

COMMUNICATION OF HERITAGE



INNOVATIVE TOOLS FOR KNOWLEDGE AND MANAGEMENT OF THE ITALIAN CULTURAL HERITAGE: SICAR/WEB AND SIGEC/WEB

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Introduction

The first step in a valorisation project as well as in a management plan is developing a knowledge scheme. Many efforts are usually spent in collecting data in order to reconstruct the history of a site and its transformations, in studying traditional techniques, in investigating materials and methods used in previous restoration works. One of the most common problems is storing and manipulating the huge amount of these heterogeneous data: historical information from documents and bibliography; all data influenced by previous restoration projects; physical and chemical analysis; legal measures regarding the cultural property; financial and administrative aspects of the restoration project. Unfortunately, all this enormous data usually remains fragmented, therefore historical, technical and legal data, and diagnostics do not really contribute to an integrated and multidisciplinary approach to the definition of design choices. Even if common to all types of cultural heritage, this set of problems is particularly pronounced in architectural patrimony specifically investigated in this paper. The results are based on the research conducted from 2010 onwards by the Department of Civil-Environmental Engineering and Architecture of the University of Cagliari (DICAAR) and the Superintendency for the Architectural and Landscape Heritage of Cagliari and Oristano (SBAPSAE), on two Italian information systems, both provided by the Italian Ministry for Cultural Heritage and Tourism (MiBACT): SIGeCweb and SICaRweb¹.

The main purpose was to identify strengths and weakness of these important tools by testing their functionalities on different typologies of monuments and contributing to the implementation of specific vocabularies.

¹ The present paper is the result of the study carried out by the authors in a very strict collaboration. However, Donatella R. Fiorino is the author of the paragraphs signed with (DRF) and Marzia Loddo is the author of the paragraphs signed with (ML). The titles that are not signed have to be referred to both the authors.

This work has highlights the necessity of a close collaboration between the two systems in order to improve and enhance the functionalities, which would allow a wider sharing and dissemination of knowledge on Italian monuments. In fact, SIGeCweb and SICaRweb can be considered as complimentary, since the first one is dedicated to the identification, description and cataloguing of the national heritage, while the second stores information on the sites and allows their monitoring.

Italian information systems for cultural heritage

In Italy, over the past 30 years, many open source and internet-based information system were been designed. The first purpose was the cataloguing of national monuments, but quickly the problem shifted to the management of information relating not only to cataloguing but also to management of cultural heritage in general – environmental, architectural, historical, artistic, library, archival, and so on – and to document restoration sites.

However, each system was realised by different cabinets with specific field of application, never been able to neatly connect complex and heterogeneous information necessary to the complete knowledge of a historical architecture².

Also the SIGeCweb and SICaRweb were conceived for precise purposes, but their use, much more than the others suggested the chance of their interoperability as an opportunity for sharing data each other and with the other systems.

SIGeCweb (ML)

The Central Institute for Catalogue and Documentation (ICCD) was created in 1975 alongside the institution of the Italian Ministry for Cultural Heritage and Environmental Activities – today’s Italian Ministry for Cultural Heritage and Tourism (MiBACT). The ICCD’s goal is to manage the general Catalogue of the archaeological, architectural, historical, artistic and ethno-anthropological national heritage.

Around the 1980s the first software was used for translating the traditional cataloguing information (that was on paper) into a new computerized standard. From these experiences, SIGeCweb (General information system for cataloguing) was constituted in 2004, with the intention of reforming, modernising and updating the previous system.

The system was designed with the aim of optimizing the processes connected to the cataloguing of cultural heritage, guaranteeing, through specific procedures, data quality and their conformity with national standards. By this means, the homogeneity of information, which is a prerequisite for their proper use and

² In particular, the MiBACT has developed several Information Systems related to specific needs of safeguard and monitoring. For instance, the SITAP (Environmental Landscape Geographic Information System) has been developed for the management of environmental and landscape safeguard; the Risk Chart allows the consultation of restrictive decrees on immovable properties issued as per Italian laws and evaluates the vulnerability degree depending on geographic location and specific environmental and human aggression; the SIUSA, unifies information system for the public and private archival heritage.

sharing, is guaranteed. The SIGeCweb provides a system with specific components for the management of different types of alphanumeric, multimedia and geographic information, needed for the identification of the cultural heritage and its correct documentation.

The access to SIGeCweb services is through a browser and it is not influenced by any hardware or software configuration. The system is designed to allow users to associate functions to the profiles and roles for each organization/body or user, by differentiating the actions that each will have at his or her disposal to carry out their specific activities in the management of catalogued data.

All data pass through a scientific and formal control procedures that guarantees the intellectual rights, privacy and the necessary measures for the property safety in order to meet the needs of different users: more general or specialized.

SICaRweb (DRF)

SICaRweb, Information System for the Cataloguing of Restoration Sites, was first created in 2003 within the larger Optocantieri project and was the natural evolution of another GIS, named Akira GIS server, created in 2002 within the context of the Pisa Leaning Tower restoration and then further developed by ARTPAST and Re.Arte (Restoration work on the net projects) supervised by some Superintendencies³.

SICaRweb is an open source and internet-based system designed to integrate, manage, manipulate, store, analyse, edit, share and display all types of data gathered during restoration analysis and intervention, otherwise scattered and difficult to be found. All this data can be mapped, since the system is able to merge cartography, statistical analysis and database technology. It can be integrated with the artwork iconometry representation and a group of different information can be organized into reserved documents, which facilitate the process of data acquisition during every restoration process⁴.

The SICaRweb can support, as a reference system, both bitmap graphic images and vectorial ones; it can import and export using a standard format all the vectorial and alphanumeric data; it can read hypertexts from the desktop and from any other network database.

Also, the system works and elaborates on line all the data (for instance deterioration maps or diagnostic analyses). All the inserted data can be immediately shared by lecturers and restorers involved in a restoration process. It has been developed to be completely accessible via web, either for data-entry or displaying. In this way, it also permits to implement the system directly through the net.

Each site/monument is considered as a work group. To join the group it is necessary to have an account and is possible to enter using a username and a password provided by the administrator.

³ The description of the quoted projects can be found at www.artpast.iccd.beniculturali.it.

⁴ Baracchini C. "SICAR: A web-based 2D/3D GIS...". 2003.

Analysis and implementation test of the systems: the case study of Cagliari

Since 2012 SICaRweb and SIGeCweb web was tested within the university teaching methods, thanks to the quoted agreement between the DICAAR and the SBAPSAE of Cagliari and Oristano. Two restoration workshops and some thesis were carried out within this agreement.

The experimental activity consisted in using two systems for cataloguing and monitoring different types of architectural heritage: from monuments to common and serial assets in order to highlight their potential and possible problems. For this experiment the city of Cagliari was chosen, the capital of Sardinia, with particular accent to the northern the northern area, which includes the ancient urban door of San Pancrazio.

In fact, the San Pancrazio area has always been a vibrant part of Cagliari. Main entrance to the northern quarter, it was modified and enlarged over the centuries and today is still a vital area (Fig. 1). It welcomes the medieval tower of San Pancrazio and also, the Citadel's museum complex one of the most important places for the city that preserve essential pieces of the Mediterranean culture.

The existence of a fortified nucleus in the city of Cagliari was first mentioned in 1217, with reference to today's quarter of *Castello*, founded by the Pisans on the hill, which had probably housed the castrum of the Roman Carales.

In 1323, the Aragonese started to modernise the primitive Pisan curtain walls, characterised in the northern part by the imposing towers of San Pancrazio (1305). However, the real changes took place in the first half of the 16th century, when in order to strengthen the northern sector of the city – which could be easily attacked because of the land morphology – viceroy Joan Dusay created a new bastion. This was widely criticised from a technical-operational point of view so, later on was filled with soil and fell into disuse until 1824. Under the Savoy Reign (1720-1861) a second floor was built onto the pre-existing perimeter bastion walls, in order to house a prison hospital.



Fig. 1. San Pancrazio area
Source: Google maps, 2011.

The area was subsequently expanded and modified over the years until 2005 when the former bastion and the prison hospital became the San Pancrazio Space, currently used as one of the exhibition sites of the Superintendency of Cagliari (BAPSAE).

Strengths and weaknesses in the application to monuments and minor architecture (DRF)

The first activity involved the digitization of the traditional paper sheets related to the monuments heritage, which are listed sites according to Italian law, through the SIGeCweb. This activity was conducted by the collaboration of professionals in the field appointed by the Superintendence (arch, p. Laconi). Besides some problems inherent to the system, the main difficulties encountered were the management of vocabularies that needed to be integrated with terms related to local features (materials, places, techniques, authors).

Once implemented SIGeCweb, as general register of monuments, some samples for testing the SICaRweb were chosen.

The first two tests conducted on monuments were on the Byzantine basilica of San Saturnino and the medieval architectural complex of San Domenico in Cagliari. Those tests were important for obtaining, through the implementation of the system, an efficient synthesis of knowledge. Also, it returned excellent results as the use of connection tools, which enables establishing virtual connections between sheets and graphics polygon. It allowed to order the historical archival documents, contextualize it in relation to the monument's plan and in respect of its restorations history. The cross reading of the data, allows users to access and consult the iconographic and photographic material online: filtered by location, date and connected with materials, diagnostic and stratigraphic analysis, if any. The coordinated reading ensures a high level of accessibility to assets. Not only for the data quality, but also for the ability to find the information according to an individual research criterion.

Therefore, the experiment conducted on the documentation of serial assets it was important for testing the ability of the system to deal with more assets belonging to the same category, which is scientifically useful to cross thematic data through selective information queries.

Again, we identified two case studies: the historic walls of the city of Cagliari and a portion of the system of coastal towers in Sardinia. In the first case the Cagliari-Walls group was created, on example of the existing Pisa-Walls group ⁵, with the goal of creating a single system to collect the many ongoing projects, divided by origin and field of research.

A similar application was experienced on coastal towers. The data came from the restoration project of nine coastal towers. The data store in SICaRweb demonstrated the importance of data availability on the system in order to facilitate the monitoring of construction site.

⁵ The testing for computerize the Pisan walls heritage – conducted by the Superintendency of Pisa – will allow to compare data and structures related to the same cultural context. In fact, the walled system of Cagliari comes from the Pisan domination period.

The positive results of these tests suggested using SICaRweb also in analysis, planning and management of city centres. For this field has been particularly useful the research already conducted on other geographic information systems. We transfer on SICaRweb many vocabularies related to the description of artefacts and their decay, for instance, or the parameters for the risk management (inspired by vulnerability sheets contained in Risk Chart).

The information system was adapted to represent also data coming from the urban stratigraphy. The ability to govern the information of built environment leads to the management of complex urban systems and, therefore, to a tool for planning and programming the interventions in view of the Management Plan of the sites included in the UNESCO World Heritage List.

Therefore, SICaRweb is not a rigid container of information to be filled through a rigid compilation. It differs substantially from other databases aimed at cataloguing monuments. In fact, the administrator can compose the mosaic of knowledge according to themes and routes fully customizable, depending on the focus of analysed assets and investigation fields. For this reason, the accurate use requires a technical training on the system.

Results on San Pancrazio area (ML)

a. The catalogue of buildings: application of SIGeCweb

Starting with the use of SIGeCweb tools, some buildings in the quarter of *Castello* were chosen and catalogue sheets were filled out using the A-Architecture 3.0 sheet available on the information system. In fact, it provides specific forms structured for each typology of cultural assets (A-Architecture, D-Design, F-Photography and so on). Every sheet has different record based on different kind of items. Within the structure records and topics are named with acronyms (CD-Codes, OG-Subject, ect.) so that it is very important to accurately know them in order to fill out the forms and read them properly⁶.

An example of A-Architecture 3.0 sheet is given in Fig. 2 of San Pancrazio Space where, next to each acronym, data regarding some aspects of the building was compiled.

b. The documentation and management of restoration sites: application of SICaRweb

As stated before, SICaRweb consists of two parts: alphanumeric and geometric data. The first step was to create the geometric data by inserting a plan of Cagliari, called Union (Quadro d'unione), where buildings of interest were pinpointed.

⁶ Some of the most important abbreviations in SIGeCweb are: CD-Codes, which identify assets; Og-Subject, that indicate both terminology and typology; LC-Localization Geographical and Administrative, that pinpoint geographical and administrative information on assets located in the Italian territory or in foreign countries (e.g. cultural assets pertaining to Italian embassies abroad). Also, GP Georeferencing, through which the cultural asset is geographically located; RE-Historical News, that is a chronological list of all relevant information about the catalogued asset; FTA-Photographic Documentation; CO-Conservation, which focuses on the state of preservation; RS-Restoring, that indicates dates and types of restorations; DO-Document source, Bibliography.



CD - CODICI	
TSK - Tipo scheda	A
NCT - CODICE UNIVOCO	
NCTR - Codice regione	20
NCTN - Numero catalogo generale	00000111
ESC - Ente schedatore	S10
ECP - Ente competente	S10
OG - OGGETTO	
OGT - OGGETTO	
OGTD - Definizione tipologica	Spazio espositivo
OGTN - Denominazione	Spazio San Pancrazio
OGA - ALTRA DENOMINAZIONE	
OGAG - Genere denominazione	storica
OGAD - Denominazione	Baluardo del Vicerè Dusay
LC - LOCALIZZAZIONE GEOGRAFICO-AMMINISTRATIVA	
PVC - LOCALIZZAZIONE GEOGRAFICO-AMMINISTRATIVA	
PVCS - Stato	ITALIA
PVCR - Regione	Sardegna
PVCP - Provincia	CA
PVCC - Comune	Cagliari

Fig. 2. A-Architecture 3.0 sheet of San Pancrazio Space

Source: SIGeCweb .

The second step was to create alphanumeric data by filling different sheets. Every time a user did that procedure, a connection was created between geometric data – the Union – and alphanumeric data – conservation/diagnostic, material, historical, photographic sheets. In this way all the information about the buildings of interest were organized through different types of sheets and linked to the geometric 2D map. An example is given in Fig. 3.

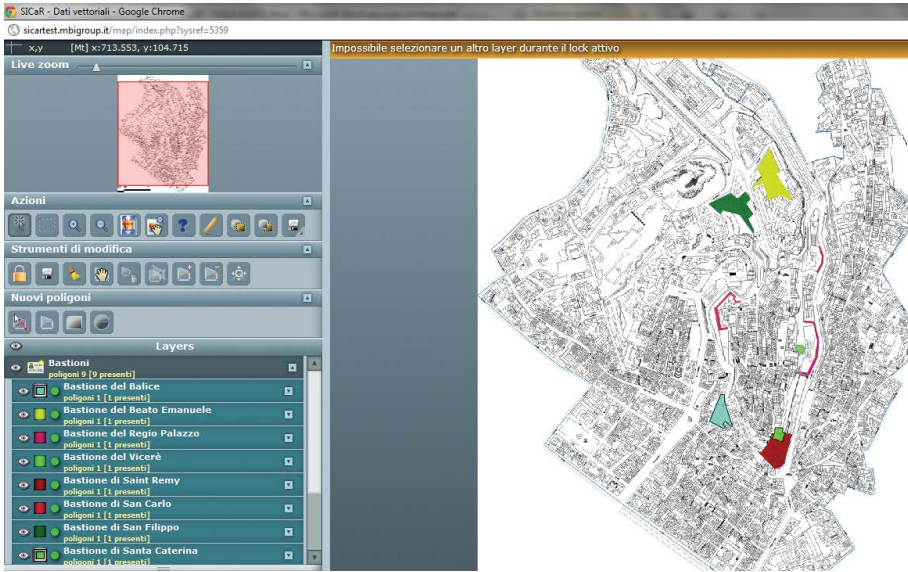


Fig. 3. Union – Map of the historical quarter of Cagliari
 Source: SICaRweb – Cagliari Wall.

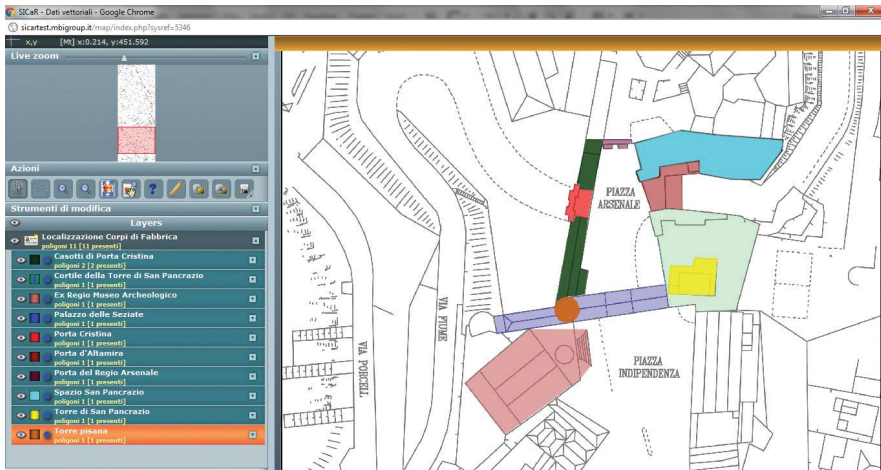


Fig. 4. San Pancrazio Space highlight, in light blue, in the Union
 Source: SICaRweb – Cagliari-Walls.

The geometric and alphanumeric data can be infinite. For historical building of San Pancrazio Space, for instance, researchers started with its geographic location in the Union (Fig. 4), then different geometric data with all floor plans of the building were created.

In this way, it was much easier to highlight the restoration phases for each floor. As the Fig. 5 shows, it was possible to draw the conservation intervention on the wall and link it to the conservation sheet where it was fully described. Since there were more interventions than one, to each layer, a different colour was associated with a proper sheet (an example in Fig. 6).

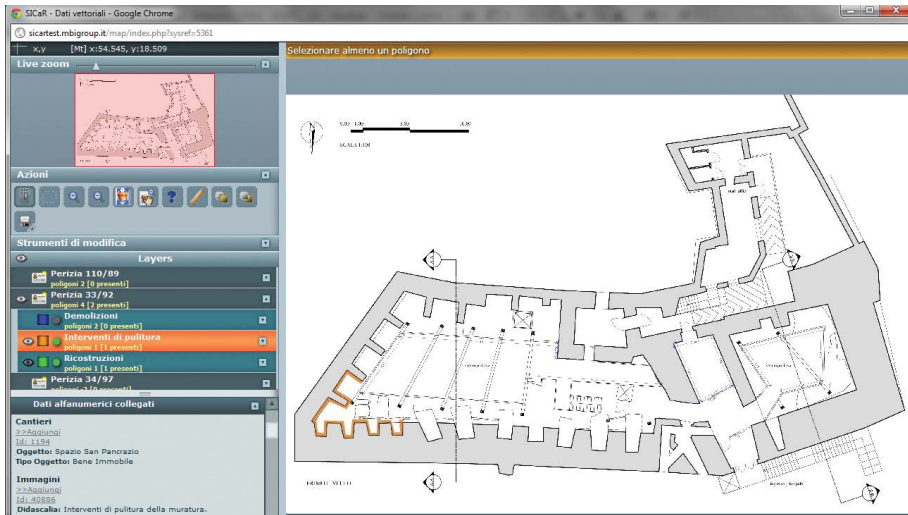



Fig. 5. San Pancrazio Space plan
Source: SICaRweb – Cagliari-Walls.

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Nome del Campo Valore del Campo Opz.

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INFORMAZIONI IMMAGINE

Sezione	Restauro/Diagnostica	
Data	10 agosto 1992	
Collocazione	In AS-BAPSAE CA-OR perizia 33/92 del 10 agosto 1992	
Nome File Originale	11-setti murari.jpg	
Didascalia		
Interventi di pulitura della muratura.		
Descrizione		

Dopo la rimozione della terra che riempiva questo livello di edificio, è interessante notare l'originaria soluzione costruttiva che si ritrovò perfettamente conservata al momento dello scavo. Questa consisteva in una struttura composta da setti paralleli che, collegati da volte, correvano lungo il perimetro del basolato.

COLLEGAMENTI CON ALTRE SCHEDE > CLOSE

CANTIERI >> Aggiungi

Id Cantiere: 1194	Note
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OGGETTO: Spazio San Pancrazio
Presentazione: Lo Spazio San Pancrazio è una sede espositiva della Soprintendenza B.A.P.P.S.A.E. per le Province di Cagliari e Oristano. L'intervento di recupero degli anni'90 ha messo in luce gli spazi ampi e maestosi. Nel rispetto delle salvaguardie dell'involucro murario si è costruita una struttura portante in acciaio che sostiene un solaio in legno. La nuova struttura, separata dalle mura antiche, permette di apprezzare gli elementi originali del Basolato. I locali sono articolati su tre livelli con una superficie utilizzabile di circa 376 metri quadrati a norma per l'accesso ai disabili. Una saletta al piano inferiore è utilizzata per le proiezioni. A partire dal 2009 lo Spazio è stato utilizzato principalmente dai Servizi Educativi del Museo e del Territorio.
 Lo Spazio rientra nel circuito di "Cagliari - Monumenti Aperti" e viene utilizzato per lo svolgimento di iniziative e conferenze per scuole, università e associazioni culturali.
Autore scheda: Marzia Loddò (Cagliari - Mura)
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Fig. 6. San Pancrazio Space conservation sheet of the intervention
Source: SICaRweb – Cagliari-Walls.

Analysis and comparison between SICaRweb and SIGeCweb

As the previous chapters showed, these two systems proved their usefulness for the management of cultural heritage.

On the one hand there is SIGeCweb, with specific regulations and terminology, rules and requirements to follow in order to acquire the necessary knowledge about assets and manage their documentation. The aim is to register data according to standardized and homogenous criteria, in order to exchange them more efficiently among different cultural institutions.

On the other hand there is SICaRweb, with the intent to document as precisely as possible the different phases that characterise restoration projects.

Both are collecting data in order to reconstruct the history of each site and its transformations over the years. However, if they could cooperate, they would be much more valuable and able to give complete information on cultural assets.

SIGeCweb, problems and future enhancements (ML)

The national catalogue information system, SIGeCweb, should be constantly updated, but unfortunately, that is not the case, due to slow data recording of the huge amount of Italian cultural assets. Before being visible, information are collected by the regional Superintendencies, that often possess the traditional cataloguing paper sheets data, not always consistent with the new SIGeCweb data. This causes problems like the doubling of the same asset in two or more entries. Time is needed to solve this kind of problems, but the adequate technology, too. In doing so, for instance, SIGeCweb has been improving its geolocalisation system. Visitors can insert the geographical coordinates X and Y (latitude/longitude) of a certain location and pinpoint it on a map. This makes it less probable to mistake and confuse the different assets.

Also, the information available on SIGeCweb is not sufficient to fully understand the situation of each analysed element. Often more specific references are needed, such as photographs, connections, or a more detailed description in order to have a clearer and more in-depth view.

SICaRweb , problems and future enhancements (DRF)

SICaRweb has its own method of asset recognition, which is not linked to SIGeCweb and its cataloguing standards. In other words SICaRweb creates one code for each asset, which does not correspond to the code provided by SIGeCweb, creating certain confusion. On the other hand, a structural deficiency was detected in the formulation of thematic maps related by specific cases: the data summary is provided through a list of values, but it is not possible to see automatically the selected items on the map. In addition, much work needs to be done for a further optimization of the unique keys query and more flexible vocabularies. Finally, the data validation is possible simply through the systematic control of the inserted data, without any control tool, and is therefore potentially much faster.

Towards interoperability: the VIR interface (ML)

Starting in 2012, the Italian Ministry for Public Administration and Innovation has promoted a programme of digital innovation in the cultural sector. Within this project “Vincoli in Rete (VIR)” was created by the Superior Institute for Conservation and Restoration (Istituto Superiore per la Conservazione ed il Restauro). This tool allows, through one interface, to log into data contained in the following databases: “Carta del Rischio” (Risk Chart) information system at ISCR; “Beni Tutelati” information system, that manages the verification process concerning the “cultural value” of the considered assets, and SITAP, at the General Direction for Landscape, Arts, Architecture and Contemporary Arts (DGPBAAC); SIGeCweb information system (at ICCD).

Thanks to VIR it is now possible to manage one comprehensive and updated cultural asset database, using as the core of this interoperability the univocal code provided by the ICCD. In order to do that, a careful alignment of all assets available on the databases was needed, especially with regards to the different adopted terminology. The VIR system is currently being implemented, the focus is particularly on data accuracy: in order to facilitate the recognition of similar or identical assets found on different databases, some specific algorithms have been developed that consider both descriptive information (for example type and name of the assets) and the position on the map (for instance considering assets that overlap).

Conclusion

The invention and development of cataloguing systems and monitoring tools for the protection of cultural heritage led to the creation of many Information Systems. The specificity of each of them justified their existence, so much so that it would have not be possible to have a single tool that fulfils all their functions.

From what stated so far and from past and present experiences what emerges is that, while it cannot be possible give the multiplication of tools up – not copy – it is necessary that the applications working together become more and more integrated and interoperable. In fact, a high level of technological synergy makes information exchange and sharing possible.

The aim is to configure systems that have a global shared management. They should not be mere applications, but instead more complex networks that act as gateways to access information.

The Italian Ministry is operating to transform these databases (cataloguing our cultural assets) into useful and active tools, to encourage not only the diffusion of knowledge about our heritage – that is considered the moment that precedes all other actions – but also their management. Therefore, it is desirable that in the future SICaRweb, as well as other Italian information systems, are included on the VIR platform. In fact, on the one hand the ease access to data – otherwise scattered

among various platforms – would allow a more effective management and control of data, and therefore cultural heritage. On the other hand, it will incline experts from different backgrounds towards unexplored fields and people who are not expert to understand better understanding of the cultural heritage.

This monograph is a result of the 12th European Architectural Envisioning Association Conference Envisioning Architecture: Image, Perception and Communication of Heritage hosted by the Faculty of Civil Engineering, Architecture and Environmental Engineering at Lodz University of Technology, Poland, 23-26 September 2015.

Following the mission of the European Architectural Envisioning Association, the conference was meant to be a platform for communication and exchange of experience, experimentation, research and collaboration in the field of envisioning built heritage with the special focus on industrial heritage referring to "2015 a European Industrial and Technical Heritage Year".

The monograph consists of three parts, namely:

1. **THE IMAGE OF (INDUSTRIAL) HERITAGE.** In the light of the campaign for announcing 2015 the European Industrial and Technical Heritage Year and taking into consideration that the host city was one of the most important industrial centres of the 19th-century industrialisation in Europe, this part aims at exploring the role of industrial buildings and structures for the image of urban areas.

2. **PERCEPTION OF THE PAST.** This part covers problems related to the changing meaning of heritage, including contextual, holistic and phenomenological approaches plus a historic urban landscape protection. The envisioning of sensorial aspects; visible and invisible elements of a built environment; genius loci; social context; heritage interpretation as well as other associated topics are discussed in this section.

3. **COMMUNICATION OF HERITAGE.** This part is dedicated to different approaches to envisioning reflecting the specifics and requirements of research, design and education in the heritage domain. The question how to communicate the heritage issues to a society - including professionals and lay persons - has become the motto of this part.

