Valorizing design culture through digital technologies

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Abstract
The paper describes different projects that refer to unique task: the valorization of Milanese design archives. The main idea is to create a digital archive that links heterogeneous data – sketches, technical drawings, images, physical models – referring to a single product to foster an overall view of the design process and creative thought performed by various designers. Some wooden models of renowned industrial products made by Giovanni Sacchi have been chosen as case studies and all the related material has been retrieved, digitised and catalogued following the current Italian standards. The Regional archiving system (SIRBeC) offers a great basis to build scenarios of access for the exploitation of data. The activity then focused on Achille Castiglioni Studio to create a mobile application to divulge images, small movies and description of the famous Italian designer work to a wider audience and to involve visitors into an enhanced learning experience.

Keywords: Digital Archives. Industrial Design. Mobile application. Location based services.

1 Introduction
Industrial design is certainly a result of the excellence of Made in Italy and is being pointed as one of the leading sectors of the Italian economy, where many interests are focused not only in terms of production and turnover but also for exploitation and promotion. Furthermore industrial design can be intended as cultural heritage, witness of the industrial production and of the creative thought and meets nowadays the need to be shared with a wider audience, conveying not only the intrinsic value of the product but also the system of values in which that product was generated. By the way teaching at the design School of Politecnico di Milano involve a constant recall to Milan design tradition as far as product formal analysis is concerned as well as methodology and design flow that designers had used creating objects and artifacts.

Many institutions have been creating culture for years around industrial design, promoting exhibitions and debates on the topic and offering spaces to showcase the culture of making. Triennale di Milano maybe represents the best outcome of this process with Triennale Design Museum that is together showcase, point of interest for visitors and tourists and means of learning for future designers. The exhibition of industrial
products is certainly the starting point for making culture on industrial design but it is also useful to analyze the context in which the product was created. In fact if it is true that the product of design is, in some ways, a work of art is equally important to analyze the mental process that generated it. The acquisition by public institution, such as Regione Lombardia, of important collections and archives of designers makes today available a great number of documents, models, prototypes and drawings that can tell the story of a product: just to name a few, the Studio Museo Achille Castiglioni (SMAC), filled with drawings, models and objects that inspired shapes and ideas, or the collection of wooden models of Giovanni Sacchi, that is testimony of the most significant products of Italian design.

The path, linear or less, which led from the first ideas to the final product remains today in the memory of those who collaborated with the great masters of design and is witnessed by the production of sketches, drawings, models and more or less detailed prototypes: on this richness of documentation it’s possible to build a structured analysis of the design process, intended as useful advancement of the knowledge on design, learning tool for future designers and subject to dissemination to the wide public.

From these assumptions stems the main idea of this article that aims at presenting and discussing different ways of exploiting up to date but OTS (off-the-shelf) digital technologies to spread and valorize design culture.

Two pilot projects are described: the first addresses the identification, digitization and cataloguing of all documents, drawings, models and prototypes related to selected and renowned industrial design products, while the second relies on the same approach in creating a mobile location based service that guides visitors to discover Achille Castiglioni’s projects in downtown Milan.

The article is structured as follows: we briefly describe the state of the art related to digitization and cataloguing and to mobile location based services; we then describe two pilot projects analyzing aims, methodology, results and drawing some remarks and finally we discuss the two projects as a continuum.

2 State of the art
2.1 Digitisation and cataloguing

Thanks to the continuous progresses of digital technologies, digitization is today a common practice that can be easily carried out even by not experts with an OTS flat scanner or digital camera: great amounts of data are continuously generated, stored and shared thanks to even more capacious hard disks, clouds and even faster internet connections.

The issues that institutions are now addressing are increasingly no more related to how to digitise but to what and why to digitise. It’s undeniable that when we come to digitise documents conserved by cultural heritage institutions, the quality of the data and their
preservation in the time has great importance but some other issues are emerging: how to catalog the data to make them findable, what format to use to guarantee accessibility by different platforms, what metadata to associate to make them readable by different systems and also how to make them available to the public.

Europe is very active in this field and several projects have addressed the topics: just to name a few Minerva, Michael, Michael Plus, Athena (ANGELAKI et al, 2010) and Europeana (EUROPEAN COMMISSION, 2009).

At national level, in Italy, ICCD (Istituto Centrale per il Catalogo e la Documentazione) defines norms to correctly digitise images (AUER; CAVALLINI; GIFFI, 1998) and records to catalog the digitised data. At even more local level, local governments, such as Regione Lombardia, transpose and implement these norms into regional cataloguing systems: SIRBeC (Sistema Informativo Regionale dei Beni Culturali della Regione Lombardia) is the cataloguing system for cultural heritage of Regione Lombardia (DEGIARDE, 2007), that we will describe better in chapter 3.

Other projects are more focused on how to relate heterogeneous data (images, models, maps, videos) such as the Perseus Project (CRANE, 1996), started in 1985 with the purpose to construct an “hypertext” (images, maps, Greek texts and videos related to locations and artifacts) for the study of the “ancient world and beyond” (MARCHIONNI, 2000).

Furthermore the availability of digital data to the wide public is another important issue: Google is in the forefront with project like Google Books which makes a great amount of books available on-line or the newer Google Art Project that uses the “Street View Technology” to make people virtually navigate in museums’ rooms and access high resolution images of selected paintings.

### 2. 2 Mobile technology

The digitisation of documentation related to design or cultural heritage institutions can be useful to allow the access to a broad audience, taking advantage of the great progress of information and communication technologies (ICTs) that are modifying the way in which people create, deliver, accumulate, and use data: digital libraries nowadays are enhancing the traditional ones, giving access to the information they preserve in a ubiquitous way, through the web and mobile devices.

Mobile devices are changing the way people access information and according to Gartner within two years (by 2013) people will access internet mainly through mobile technology (GARTNER, 2010).

New tools such as GPS receiver, accelerometer and gyroscope allow richer experiences for smartphones’ users, paving the way to innovative and attractive applications in cultural heritage field. These technologies are increasingly being exploited by galleries, libraries, archives and museums – GLAMs – and are expected to be widely adopted in
cultural heritage field within two-three years and the same time of adoption is predictable for augmented reality applications (JOHNSON et al., 2010).

The last fifty years have seen a strong evolution of handhelds technologies in cultural heritage filed, that started offering standard contents on standard devices and now deliver custom contents on different platforms with custom functionality (TALLON, 2008). Mobile technology offers to users the possibility to connect with other users, to explore and represent data, and to create personal and shareable contents (GAMMON; BURCH, 2008). Mobile experiences such as mobile gaming and mobile social networking are also introducing new ways to relate with data and contents, paving the way to fascinating opportunities and new models of relation between users and data and between users themselves.

The two projects we present rely on the experiences briefly described above, and apply this knowledge to the field of design, trying to define one possible way to take advantage of digital technology to valorize the design culture.

3 From sketch to the product

3.1 Aims of the project

The project started with the assignment to Politecnico di Milano of the digitisation of some of the 312 wooden models of the large collection of the modeller Giovanni Sacchi, property of Regione Lombardia and now in custody at Triennale di Milano. These models are stored but not exposed to the public because of lack of space, and the digitisation was intended as a way to show them. From this first step, stemmed the idea to implement the project, collecting and digitising also drawings, photos, transparencies and models related to the identified products, looking for them at the design offices and at the companies involved in the process of development and production. The intent aims at reconstructing the development of these selected industrial products, designed by famed architects and designers, through a process of digitization and cataloguing of all the related material to make them available to a broad public and to preserve the originals. The aim is to allow browsing among the digitised data that refer to a single design product, providing information related to the process of development as well as to the single document.

This goal will be achieved through two main steps: the first is the digitization and cataloguing of the material, and the second is the creation of various technological applications to foster interactive systems of data visualization or to implement new ways of interaction with design archives in the city of Milan. In addition to this main purpose we can also list others of equal importance that we aim to achieve in the project development.

First of all the collection and rearrangement of all the documents that relate to the design process of the products, that often are forgotten in warehouses and drawers, bringing
them to light. The second is the digitisation of all this material, using the suitable technology, to create a digital copy useful for dissemination and conservation of the originals. The third objective is the cataloguing of the documents into the database for cultural heritage of Regione Lombardia, SIRBeC, that is a very useful tool to maintain a record of them and a great basis for the creation of a consultation system. The last aim, and perhaps the most challenging, is the definition of an innovative way of browsing among these digital data, taking advantage of new technologies to allow an immersive experience of consultation or an unusual method to spread all the documents and data through a location based application.

3. 2 Methodology

3. 2. 1 Choice of the objects

The work we describe had been applied on a subset of 6 out of the 312 wooden models of the collection of Giovanni Sacchi (Fig.1). The idea was to apply the identified methodology to a representative sample in order to verify the approach on heterogeneous materials coming from different designers and different companies; disparate procedures, different formats, to represent the idea and transform it in a successful product. The choice of these products has been decided with Triennale di Milano and is based upon two different motivations: first the ease retrieval of documentation concerning the products and on the other hand the value that they acquired in the history of industrial design. Among the industrial products modelled by Giovanni Sacchi, we have chosen those for which a quite large amount of documents is available and useful to retrace the path of product development. In particular, it is important to find documentation related to the assignment given by companies to designers, objects used for inspiration, the first definition sketches of the product and all the drawings that were created with increasing level of detail until the final technical drawings. Furthermore we look for intermediate models and prototypes.

The objects we identified are:

1. Gibigiana Lamp, by Flos, designed by Achille Castiglioni (1980)
2. Tama Lamp, by Valenti, designed by Isao Hosoe (1970-1975)
3. 4870 chair, by Kartell, designed by Anna Castelli Ferrieri (1984)
4. 4822/44 Stool, by Kartell, designed by Anna Castelli Ferrieri (1977-1979)
5. Trattoopen marker, by Fila, designed by Design Group Italia (1975-1976)
3. 2. 2 Process and approach

The project has been structured through three main sequential steps to be followed for all the design products and in particular:

1. Retrieval of documentation from the designers (or from the owner of the designer’s archive) and from the companies that still produce or produced the product.
2. Digitisation of all the retrieved material following different methods according to the characteristics of the documents.
3. Cataloguing of the digitised material into the Regione Lombardia cataloguing system for cultural heritage SIRBeC.

To these three main steps we can add the fourth activity that is the implementation of an interactive system of exploitation and visualisation of the data, which had been applied only to SMAC and is described in the third section. The first step is the retrieval that, as stated before, is limited to the documents that reveal the process of development of the design project and, at this moment in time, it doesn’t take into account all the documentation that relates to the commercial product (i.e. advertising, showrooms...): indeed the aim is to allow the reconstruction of the mental process that generated the final industrial products and this kind of documents is not relevant and if needed can be attached later. The digitization step requires the definition of different approaches because of the heterogeneous material that need to be acquired (Fig. 2). We are speaking...
About large and small size drawings, photos, slides and transparencies, models and prototypes that need different technologies to obtain a digital copy.

With the due flexibility, the approaches we use are:

- digital photography for wide size drawings (technical, posters and sketches...)
- scanning of small size sketches and documents, slides and transparencies
- digital photography for models and prototypes
- 3D laser scanning of Giovanni Sacchi wooden models
- 360° photography of one significant prototype.

The digitisation follows the current Italian standards defined by ICCD (AUER; CAVALLINI; GIFFI, 1998), overtaking the top level A, required for large prints and conservation as an high-quality digital copy of the original. The specification of the parameters of digitisation will be given later while describing in detail the above mentioned approaches. Furthermore, in order to assure a correct colour calibration and a useful dimensional reference every document is digitised with Kodak gray-scale and colour targets. The third step requires that all the digitised material is catalogued according to current cataloguing standards and stored into the database for cultural heritage of Regione Lombardia, SIRBeC, which provides different records for any typology of document to be catalogued, distinguishing between drawings, photos, models and final prototype. The scheme below summarizes the described steps and the different approaches to digitisation and to cataloguing.

### 3.2.3 Amount of documents acquired

We limit the description of the acquired material amount only to the Gibigiana lamp, in order to highlight tasks carried out at Studio Museo Achille Castiglioni to validate an enhancing workflow that could be extended to other designer archives; the acquisition process had been described in detail in other work (CECONELLO; SPALLAZZO, 2010). Anyway this case study count the greatest amount of available documents between the identified products, and due to its heterogeneous material, allowed applying different procedures to a wide sample of formats with different features.
Figure 2: The four phases of the project
Source: The authors
Images courtesy of Studio Museo Achille Castiglioni

Gibigiana is the well-known lamp, designed by Achille Castiglioni for Flos in 1980 and still in production. Gibigiana is a table lamp that allows concentrating an adjustable lecture light thanks to a movable mirror. The choice of this lamp as case study is encouraged by the presence of a great amount of heterogeneous documents and material of different type that describe the process of development. Studio Museo Achille Castiglioni, stores original drawings of different size, slides and intermediate models, while Triennale di Milano preserves a precious wooden model of the lamp realized by the model maker Giovanni Sacchi, worthily considered today as a work of art and property of Regione Lombardia. The exact amount of drawings, slides and models is described in the table below.
Table 1: Digitised documents for Gibigiana lamp

<table>
<thead>
<tr>
<th>Nº</th>
<th>Description</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Technical drawings</td>
<td>A1 – A0</td>
</tr>
<tr>
<td>25</td>
<td>Technical drawings</td>
<td>A3 – A4</td>
</tr>
<tr>
<td>64</td>
<td>Sketches</td>
<td>A3 – A4</td>
</tr>
<tr>
<td>6</td>
<td>Slides</td>
<td>24x36 mm</td>
</tr>
<tr>
<td>7</td>
<td>Slides</td>
<td>6x6 cm</td>
</tr>
<tr>
<td>4</td>
<td>Colour transp.</td>
<td>10x12 cm</td>
</tr>
<tr>
<td>4</td>
<td>Colour transp.</td>
<td>13x18 cm</td>
</tr>
<tr>
<td>18</td>
<td>Models</td>
<td>Various</td>
</tr>
<tr>
<td>1</td>
<td>Wooden model - Sacchi</td>
<td>Real size</td>
</tr>
<tr>
<td>2</td>
<td>Prototypes</td>
<td>Real size</td>
</tr>
</tbody>
</table>

Source: The authors

3.3 Digitisation. Details and parameters

3.3.1 Large size documents

The wide size technical drawings (A0 and A1 formats) have been acquired with a digital camera Canon Eos 5D MarkII (5616 x 3744 pixels), in RAW format, with a resulting horizontal and vertical resolution of minimum 240 dpi. The choice of digital photography is due to two different motivation: the first is of economical order, in fact the relatively small amount of documents to be digitised, does not justify the purchase of a large high resolution scanner; secondly the originals to be digitised are frequently technical drawings that doesn’t require a very high resolution as needed for example for precious ancient big size maps or similar. The previous experience of the involved Photo Lab at INDACO department (GAIANI; BELTRAMINI, 2003) has played a relevant role in the definition of the photo set that has been professionally designed to guarantee a correct and diffuse illumination and a perfect perpendicular angle between the drawings and the camera. The high efficiency production of digital images has also been guaranteed by the well designed workflow that allowed reducing idle times. Gibigiana’s 43 big size documents have been acquired in approximately 4 hours, with an average time of acquisition of 5 minutes.

3.3.2 Small size drawings

Most of the documents associated to Gibigiana Lamp are small size drawings and sketches, usually not bigger than A3 paper size. This type of documents has been digitised with a flatbed scanner in not-compressed TIFF format at a range of resolution from 300 dpi to 600 dpi, according to the real dimension of the original and to the complexity of the drawing. Gray-scale and colour targets and a frequent colour calibration of the scanner have guaranteed high quality images and an accurate correspondence between the originals and the digital copies. The small size originals of Gibigiana lamp have been digitised mainly at Studio Museo Achille Castiglioni to minimize the risks that might arouse from the moving of the originals to the Photo Lab. The time
of digitisation of the small size drawings is very hard to be calculated because the acquisition has been conducted in different moments.

3. 3. 3 Slides and transparencies

Only among the documents related to Gibigiana lamp we have retrieved 21 slides and transparencies that have been acquired at very high resolution with a flatbed scanner in not compressed TIFF format. The resolution chosen for the slides 6x6 and 24x36 is 4800 dpi while the transparencies (usually 10x12 cm and 13x18 cm) have been acquired at 2400 dpi.

3. 3. 4 Models and prototypes

The aim of the digitisation of the models and prototypes is to reconstruct the process of development of the product from the first ideas to the final one. The 3D scanning is without any doubt the best way to digitise a physical model but the process is still long and quite expensive: for this reason we have decided to limit the 3D scanning only to the precious wooden models of Giovanni Sacchi and to digitise all the other through digital photography. In particular all the intermediate models have been photographed with a digital camera in a devoted photo set while the final prototypes have been photographed from different angles to obtain a 360° degree Quick Time VR image. The above mentioned wooden maquettes of Giovanni Sacchi have instead been digitised at Virtual Prototyping and Reverse Modeling Lab at INDACO department as a 3D model with a laser scanner Minolta Vivid 910 and the clouds of points acquired have been processed to obtain a correct polygonal mesh. The models have been successively texturized with the correct image to enhance the realism: the model of Gibigiana Lamp is a fully wooden model while the other models have also insertions of plastic components and electrical wires. The obtained models have successively been exported as VRML (standard format for 3D) to allow a fast visualization with a common web browser with free plug-in.

3. 4 Cataloguing of digital data

The process of digitisation is maybe the most important part of the project but is also useful that all the digital data acquired are catalogued to be easily retrieved and visualized by potential users. Every image has been indexed according to original labelling system of the studios and companies. The informative system of Regione Lombardia (SIRBeC) is the basis of this process and allows the description of each digital image according to the typology. SIRBeC (Sistema Informativo Regionale dei Beni Culturali della Regione Lombardia) is the cataloguing system for cultural heritage of Regione Lombardia (DEGIARDE, 2007) that allows the creation and management of databases, the description of the digitised documents and the visualization of the stored information on-site and on-line. In particular the digital data acquired respond to two
typologies: works of art (paintings, drawings, sculptures, fabrics and furniture) and photographs (photos, slides and transparencies). All the drawings, the intermediate models, and the final prototypes have been catalogued according to the record OA (Opera d’Arte – Works of Art) that describes all the handmade production with an artistic value, while photos, slides and transparencies have been catalogued with the record F (Photographs). The SIRBeC system provides also a record Design (DES R.L.) that describes the overall project behind an industrial design product, the related documents, the subsequent restyled editions and the information about the author. This record has been recently created by Regione Lombardia and the project represents a good opportunity to test it. The documents related to Gibigiana had been filed in the regional database with 180 records all linked to the record of the product itself (Design record). The records created are linked together to allow browsing between them, following step by step the process of development of the design project or selecting the images according to the desired criteria. Through the browsing of all the acquired material it is now possible to follow the development of the design path related to the product and to explore its evolution, or identify rethinking of the author, particularly in the large amount of sketches. The cataloguing is a long process that requires long amount of time to be completed and in particular the creation of the 180 records related to the first object required about 90 hours of works of a trained person.

Figure 3: Sample of drawings acquired
Source: The authors
Courtesy of Studio Museo Achille Castiglioni, Isao Hosoe Design, Museo Kartell
3. 5 Design Digital archive: results and remarks

The methodology adopted allowed to obtain high quality digital outputs (Fig.3) in a short period of time and the Regional archiving system (SIRBeC) offers a great basis to build scenarios of access to digital images, 3D models and to connected descriptions. The 180 records created for Gibigiana Lamp now allow to browse into the database, following the process of development of the product or to browse searching by typology or following other criteria. Sometimes it’s even possible to detect Castiglioni’s attitude to draw on existing object and his ability to integrate them into a coherent and harmonious shape that makes him a bricoleur designer (LEVI-STRAUSS, 1962), half way between artist and designer. By the way the user could identify hints and recalls to other objects that the designer would have developed later in his career. This opportunity is useful not only for researchers and scholars that are conducting researches on Castiglioni’s work but also for future designers who can profit by a mind-on and hands-on approach towards the culture of design project. A similar result had been obtained for other designers/companies production and the large amount of documents make people understand the designer thought and the effort needed to produce a successful object, not only for its shape and appearance but also the technical requisites and solutions to produce it easily with the lower cost. It’s important to remark that the project we discuss is not only a digitization and cataloguing project: the final aim is the reconstruction of the process of development of a famed design product, bringing to light the cultural contents of the drawings, models and photos. They conserve in fact a great knowledge in terms of creativity, technical ability, process and communication that is worth to be rediscovered and disseminated. Following the current European Copyright Directive (EUROPEAN COMMISSION, 2001), the digital images would be partially published on line on the regional portal Lombardia Beni Culturali and on the Italian portal Cultura Italia (CAFFO, 2008) that refers to the Europeana European system.

As already stated the project could be extended to other archives in the Milan area to create a digital design repository for the on-line/off-line consultation, allowing to browse through the digital images with technological and innovative devices: the ambition is to create a pioneering system of consultation through the use of handhelds (smart phones, booklets and slate pc), table pc and the exploitation of augmented reality as a tool to enhance the comprehension of the digital data and to involve the visitors into an immersive experience.
4 Delivering contents in mobility: LfAC

In this section we describe a further step that had been developed only for the Studio Museo Achille Castiglioni (SMAC): LfAC - Looking for Achille Castiglioni – is a mobile application which drives users to discover the renowned architect and designer’s projects in downtown Milan, linking them to SMAC’s collection. The application stems from the collaborations between the authors and Studio Museo Achille Castiglioni and it is aimed at valorizing both the works necessarily not exposed in the museum - architectures, temporary exhibitions, layouts - and the entire archive.

4. 1 Aims and constraints

Achille Castiglioni is one of the most prominent Italian designers and architects with his 60 years long career which has brought more than 300 industrial products, countless interior design projects and several architectures. At his death in 2002 his heirs and collaborators decided to convert the design agency into a museum, conserving integrally the rooms and the archive: in 2006 Studio Museo Achille Castiglioni opened to the public with the mission of conserving, digitizing and showing the collection. Despite its littleness, SMAC is today a well established institution which reached recently 20.000 visitors since the opening: daily tours guide visitors through the four rooms explaining Castiglioni’s work and letting people touch and interact with products.

Although the long duration of the tour (1 hour) and the high qualification of the guides, most part of the archive is not able to be seen and several projects (e.g. architectures and interior design projects) are inevitably not shown in the museum. Another constraint is that numerous works are no longer visible because dismantled to make room for new layouts or simply because they were temporary exhibitions.

The main aim of LfAC is to valorize the less known works of Castiglioni – architectures, temporary exhibitions, layouts – taking people directly where they are/were and exploiting digitised documents of the archive to improve the knowledge about his projects. Given the aim and several constraints, a location based service seemed to be the most suitable solution to create an outdoor tour, able to guide visitors towards the right locations, delivering museum’s contents directly to their personal devices.

4. 2 Choice of technology

Oomen (OOMEN; BRINKERINK; VAN TOOR, 2011) proposes a clustering of location based services grouping them into five classes according to their main features: location aware display of content, contributing content by end-users, QR codes, augmented reality applications and location based games. The categorization highlights five different models of interaction between users and cultural heritage and can be helpful to frame LfAC application.
Among the different categories of locative services described above, we decided to create a location based display of contents for several reasons. In particular we chose not to use QR codes, first of all, because it was very time consuming to obtain the authorization to fix or hang a code to every building involved in the tour and secondly because we decided not to give visitors a paper map of the city, integrating it directly into the mobile application.

Hybrid reality browsers could be very helpful in reconstructing dismantled exhibitions and buildings but at the moment we decided not to employ 3D models but only multimedia data taken from museum’s archive. Furthermore augmented reality browsers such as Layar, Wikitude and Junaio are often very imprecise in guiding users towards the points of interest, not avoiding the necessity of a paper map. All these considerations oriented us toward a location based display of contents and among the available off the shelf solutions we chose 7scenes platform: without proposing a detailed benchmarking of mobile platforms we briefly describes the features that made 7scenes suitable for LfAC.

4. 3 The platform

7scenes is a mobile storytelling platform designed by the homonymous spin-off of the Dutch no profit Waag Society. It stems from renowned experiences such as Frequency 1550 (AKKERMANN; ADMIRAAL; HUIZENGA, 2009) and Game Atelier and is today a well known and stable software, useful to create mobile tours and mobile gaming experiences in the urban space. 7scenes allows to link photos, videos, sounds, notes, rewards and tasks to a location on the map structuring the story/game while other features, such as the slideshow, are being implemented. The contents linked to a specific point, thanks to GPS, are automatically activated on users’ device when they step there, relating directly location and information. The platform is flexible and allows producers to create different mobile experiences: from the Sightseeing model that leave users free to choose the points of interest without a defined path, to the StoryLine model which takes people on a defined succession of points, till more complex game models such as Adventure, a role-playing experience, or Collect&Trade. In addition to the mentioned flexibility of the platform, another feature of 7scenes that made it suitable for our project is the capability of tracking visitors’ path in the city and to have detailed feedback from users: this peculiarity could be indeed very useful to understand their behavior and to plan possible modification on the tour. Another feature that weighed in favour of 7scenes is its ease of use that allows even to not expert users to create a mobile tour, thanks to the friendly web interface which doesn’t require programming abilities. Of course the platform has also some critical aspects, that we will discuss hereinafter, but at-large it resulted to be a satisfactory choice.
4. 4 Choice of locations and contents’ creation

About 70 projects, developed between 1947 and 1999 and referred to 30 different locations have been identified through a deep analysis of literature and review of the findings with museum’s curators and Castiglioni’s heirs. Positioning them on the map we discarded seven locations because not within walking distance from the downtown and we started to work on the remaining, analyzing documents, articles, photos, mockups and all the available material at museum’s archive.

This phase has been carried out by the authors together with museum’s curators to guarantee a fast and exhaustive documents’ retrieval and a continuous comparison between sources. From this first selection we had identified 23 points of interest upon which we started to work, looking for documents, articles, photos, mockups and all the available material at museum’s archive. This phase has been carried out by the authors together with museum’s curators to guarantee a fast and exhaustive documents’ retrieval and a continuous comparison between sources. The output was a great amount of documents and data to be processed and we were able to identify 15 points of interest, discarding those with poor documentation or without significant descriptive material (images, videos ...).

For each point of interest we created a brief audio description (about 3-4 minutes long) and processed all images and videos. The audio description have been written following the sources and then refined with reviews by museum’s curators and Castiglioni’s heirs. The final versions have been then translated from Italian to English and recorded by a professional speaker. At the same time we proceeded digitizing and elaborating photos and videos to obtain an iconographic narrative of the projects to be associated with the audio description. Images, videos and sounds have been successively mounted into 15 videos to be linked to the corresponding locations on the map. It’s useful to add that the entire process described has been developed in slightly more than one month with the efforts of six persons for a total of about 3 person/months work.

4. 5 Looking for Achille Castiglioni

Looking for Achille Castiglioni is a bilingual mobile location based tour which drives visitors towards 18 PoIs located in downtown Milan and mostly reachable stepping from Studio Museo Achille Castiglioni. The tour doesn’t provide a defined path to be followed and users are free to decide where to go, looking at the map on their mobile’s screen. Points of interest are highlighted on the map with colored place holders: blue identifies SMAC, yellow indicates architecture, purple stands for industrial design and green for interior design. With this simple trick we managed to allow visitors to identify easily possible locations they are interested in, guaranteeing absolute freedom of choice of the path (Fig. 4).

www.cetiqt.senai.br/redige
They can decide to follow one of the three thematic routes (architecture, design, interior) identified by colors, or to enjoy all the points of interests of a district or just follow the nearest PoI on the map. For each location visitors can activates a short video with an audio description of the building/project while images, photos, sketch and drawings run on mobile’s screen to add info. The complete tour lasts about one hour plus time needed to move between one PoI to another that obviously changes depending on the chosen path and on visitors. LfAC is not a self-standing app but one of the scenes available on 7scenes platform: to access LfAC visitors must download and install 7scenes application on their device and then search Looking for Achille Castiglioni (ITA/ENG) among the available scenes and start playing. 7scenes software is free of charge and it runs on iOS4 and Android and LfAC can be enjoyed by museum’s visitors but also by people who hadn’t visited SMAC. A flyer is distributed by museum’s employees at the end of the guided tour to give users instructions to install 7scenes and run LfAC.

4.6 Tests and use

The application has undergone several testing sessions during the development to identify minor problems and in order to guarantee a correct functioning. After the launch we also conducted user test to verify the accomplishment of the project’s aims: teams of volunteers are asked to fill a short evaluation survey after the tour, in order to understand how the application is perceived by visitors. Multiple choice questions aim at defining visitors’ profile while a ten questions Likert scale questionnaire tries to understand the perceived benefits in terms of enjoyment and learning. A detailed examination of the findings is beyond the aim of this article but it’s useful to summarize some results of the testing phase: the table below (table 2) shows the first result of the questionnaire even if the number of users is not still sufficient to consider data reliable.
Table 2: Likert scale survey results

<table>
<thead>
<tr>
<th></th>
<th>AVG</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>My knowledge on A. Castiglioni's work has increased</td>
<td>4,75</td>
<td>0,71</td>
</tr>
<tr>
<td>Location-based info are a value added</td>
<td>4,75</td>
<td>0,71</td>
</tr>
<tr>
<td>Audio and video have been up to my expectations</td>
<td>3,75</td>
<td>1,41</td>
</tr>
<tr>
<td>The archive images improved my understanding of the topics addressed</td>
<td>4,5</td>
<td>0,71</td>
</tr>
<tr>
<td>The duration of the audio and video was correct</td>
<td>3,5</td>
<td>2,12</td>
</tr>
<tr>
<td>It was easy to read the map and find points of interest</td>
<td>4</td>
<td>2,12</td>
</tr>
<tr>
<td>The tour showed me places in the city I didn't know</td>
<td>5</td>
<td>0,00</td>
</tr>
<tr>
<td>After the tour I want to visit Studio Museo Achille Castiglioni</td>
<td>4</td>
<td>1,41</td>
</tr>
<tr>
<td>I’m satisfied with the experience made</td>
<td>4,5</td>
<td>0,71</td>
</tr>
<tr>
<td>With the tour I learned having fun</td>
<td>4</td>
<td>2,12</td>
</tr>
</tbody>
</table>

Source: The authors

Thanks to 7scenes web platform we can also access the statistics of use and the paths followed by visitors and analyzing these data we can highlight two main points: the application hasn’t been very successful and visitors prefer to move among near points of interest, without walking towards the farthest ones.

4. 7 Remarks and future works

Regarding the very low use of the application we can list possible reasons. First is the digital divide: 7scenes platform runs on iOS4 and Android and requires high level smartphones with GPS and internet access, which means not more than 3% of Italian population (COMSCORE, 2011).

Second are the roaming rates: 75% of SMAC visitors are indeed foreigners. Borrowing mobile devices could be for sure an option to overcome these constraints but is not feasible for such a small museum and, in addition, an outdoor tour could increase the risks for the devices (not returned, stolen by third party, lost …). A third reason could be the lack of information: only museum’s visitors and few others know that LfAC is available and 7scenes application is quite well known in the Netherlands and in particular in Amsterdam but it is not so diffused in Italy. Another reason could be the lack of interest in the issues we deal with, a concern partially confirmed by the little willingness of visitors to step towards farthest PoIs. This last concern could also rise by the free format of the tour which has the merit to allow users to freely browse through the PoIs but could also be distracting and less exciting: a defined path with compulsory steps.
could be indeed more engaging, especially if it’s structured as a game with tasks and rewards (AKKERMAN; ADMIRAAL; HUIZENGA, 2009).

As already stated the number of questionnaires collected is not still sufficient to consider the results fully reliable but we can draw some useful suggestions. A first remark is that some visitors perceived the audio and video contributions not completely up to their expectations in terms of quality and duration (AVG. 3,75 and 3,5) partially justifying their poor motivation to walk towards the farthest points.

Visitors are instead quite concordant that LfAC increased their knowledge of the matter and they perceived learning in the real setting (situated learning) as a value added. In particular we can highlight that also people who had previously visited SMAC refer quite accordingly an increased knowledge on Castiglioni projects after LfAC tour, directly linked to the contextual nature of the information.

The application is then considered useful in fostering learning about the collection but it also resulted functional to make people discover unknown places in downtown Milan, even if a great part of volunteers was familiar with the centre of the city. Visitors are indeed encouraged to walk, reading the map and observing actively the city.

5 Conclusion

The two projects described in this article share a common fil rouge: the valorization of the design culture through digital technologies. They could be seen as a unique process which starts with documents retrieval and ends with the exploitation of data and the delivery to final users and patrons, going through a defined process of digitization, cataloguing, analysis and arrangement in “narrative” shape. There are, of course, several ways to valorize and spread design culture and to speak about design as cultural heritage (and some are described in the introduction), but we are convinced that the approach explained above, despite the limitations discussed, has great potentialities. First of all because it employs quite exclusively off-the-shelf technologies (a part from laser scanners) allowing public and private institutions as well as design agencies to go after the same process to obtain high quality data in a short amount of time, with few investments and following inter/national standards. Secondly the results of the different phases guarantee various “entry levels” for users with diverse knowledge of the matter: a novice user can approach the topic through a mobile application that interprets and describes data in a narrative way, design students can learn analyzing the process of development of industrial products and scholars and researchers can study data in depth, analysing the digital copies of original documents – drawings, models or photos - and examining the records. Furthermore the skills requested to follow the entire process are those that typically belong to designers (photo and video editing, 3D modeling, graphic design and scenario building) that very frequently constitute the core of institutions and agencies that deal with design and architecture.
Our intent is not to present the process described as the only reliable to valorize design culture but rather we intend it as a flexible main frame for linking diverse solutions according to cultural institutions needs and to the aim of digitization and dissemination projects. In the article we demonstrated that it is possible to exploit wisely digital technology to valorize design culture, using the same data to dialogue with organizations and conservators (digitization and cataloguing), with students and scholars (analysis) and with museums and final users (mobile technology). Future works will face and try to overcome the limitations described and will apply the entire process to single case studies.

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