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Oxymorons of the virtual museum. Experimentation through the representation

Gli ossimori del museo virtuale, sperimentazioni attraverso la rappresentazione

The contribution deals with the subject of the virtual museum specifying its rapid transformations in an age where information, especially in the field of digital technologies, constantly change making the adopted information systems rapidly obsoleted. The acceleration caused by technological advances, the speed of the network, combined with the changing needs of contemporary society, urge the museums to interact with the audience through cultural sharing by multimedia platforms. The goal of this article is to approach the subject from the point of view of the representation, investigating the oxymoron between the traditional museum, housed in a limited exhibition system, and the virtual museum extended in unlimited web spaces, proposing the application to the case study of the Castelli Ceramics Museum.

Il contributo affronta la tematica del museo virtuale specificandone le sue rapide trasformazioni in un'epoca in cui l'informazione, soprattutto nell'ambito delle tecnologie digitali, subisce dei continui mutamenti rendendo rapidamente superati i sistemi informativi adottati.
L'accelerazione indotta dai progressi tecnologici, dalla velocità della rete, unita alle mutate esigenze della società contemporanea, spinge le istituzioni museali a interagire con il pubblico rendendolo partecipe alla condivisione culturale attraverso piattaforme multimediali.
L'obiettivo è di affrontare l'argomento dal punto di vista della rappresentazione, indagando il fenomeno da cui si è generato l'ossimoro tra il museo tradizionale, contenuto in un limitato sistema espositivo e il museo virtuale esteso negli illimitati spazi del web, proponendone l'applicazione al caso di studio del Museo delle Ceramiche di Castelli.

key words: Virtual Museums; Representation; Communication; Enhancement; Cultural Heritage.

***parole chiave**: Museo virtuale; Rappresentazione; Comunicazione; Valorizzazione; Patrimonio culturale.*

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1. INTRODUCTION. CONSIDERATIONS ON INTERACTIVE SHARING OF MUSEUMS

The third digital revolution [1] begun in recent decades, quickly moves towards the use of devices and increasingly specialized software in virtual interactive rendering, allowing more and more realistic simulation of digital spaces equivalent to those concrete. In this sense, the digital interactivity application to museum environments, commonly experienced in physicality and for this sometimes limited by logistical constraints, such as the reachability or the lack of attractiveness of the traditional exhibiting system, has expanded its cultural potential opening to the web. Therefore, the museum dimension in the digital age improves the appearance of sharing, strengthening the formerly established concept of the place of production and diffusion of the culture rather than works container. In the transformation from container to art and knowledge content, from object-oriented - for the storage of products which hosts and in which the subject is directed by physical preparation, to subject-oriented - in which is the viewer the one who chooses how to navigate in the exploration - should be reviewed the visitor-user's role that requires to assimilate the information according to his own interests with different levels of depth, becoming a knowledge actor and spectator. Thus the contemporary museum emerges as a cultural learning place or rather 'non-place' that focuses on research into the possible variations and popular mode of its assets. An experimental laboratory with implementable projects that follow the contemporary speed of information helping a growing audience to use it and interact with it.
This is, among other, the experiment carried out by the ancient and very modern Amsterdam Rijksmuseum that allows a trip of Dutch art history from the Middle Ages to the twentieth century, in which the virtual user can access to works exhibited through a recording, examining them in detail, being able to record them on computer or print them without copyright limitations, unless they are employed for commercial purposes. The museum, which offers these possibilities of its regeneration, both material and virtual, derived from the 2013 restoration projects, has also set up a prize, the Rijksmuseum Award, intended for those who are using an image from exhibitions, apply it creatively to a product, thus having the chance to be selected for its marketing within the bookshop and online, then getting comments and shares on social networks.
A real comparison between the museum institution and its users that, as shown by the analysis conducted by major museums, approaching several reasons: from the casual user that looks superficially, the scholar who focuses requesting detailed information, to the teacher requiring confidential and applicable knowledge for educational purposes. The common link is shared and with it the demand for display and be able to download the information, appropriating it and storing them on your PC [2] (Fig. 1).

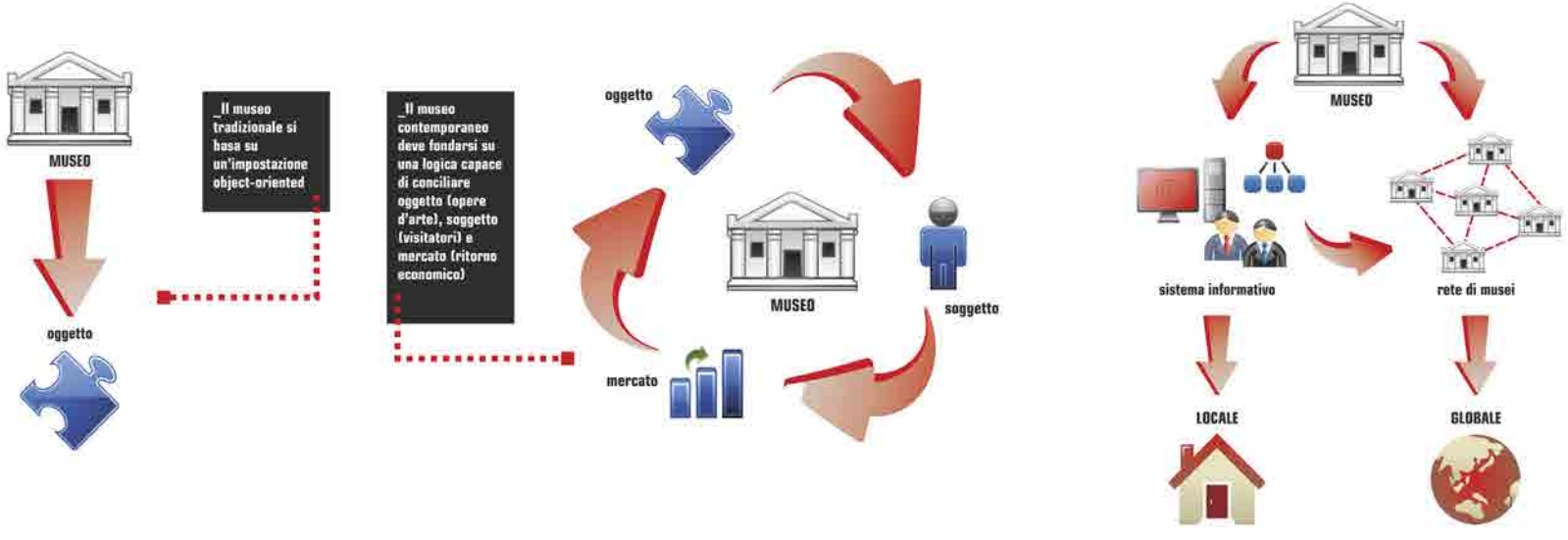

Fig 1. Paradigms between the traditional museum and the contemporary museum and its share from local to global.

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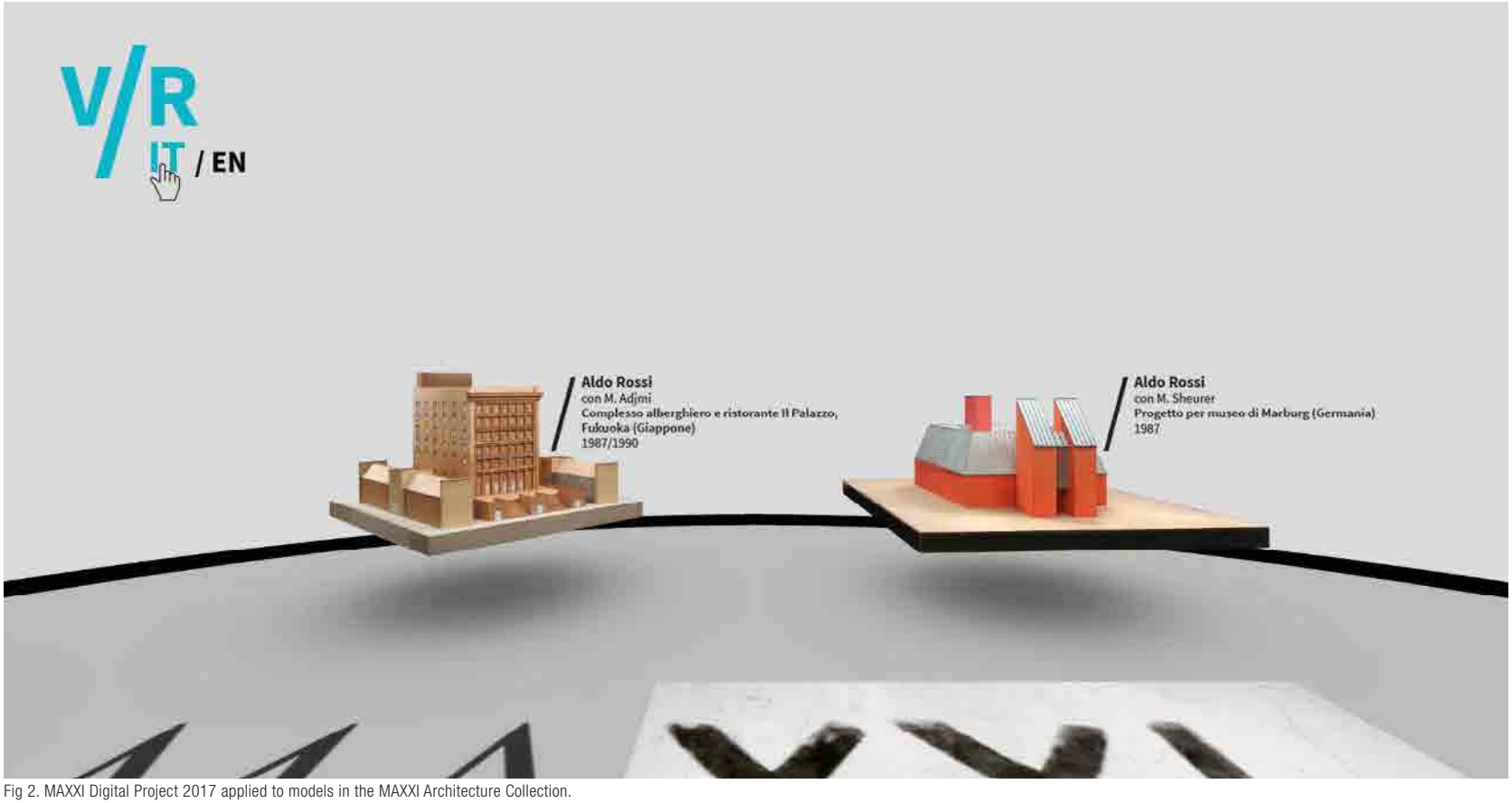

Fig 2. MAXXI Digital Project 2017 applied to models in the MAXXI Architecture Collection.

In this direction also it places the experience applied to the Brussels' Museums that install Museum Talks among the interactive offerings, a multimedia platform that contains short recordings and comments in which they express their impressions about the museum and its contents. Through mp3 audio guides, consideration on the city's museums can be left listening to the comments of other users, artists, musicians, famous personalities and ordinary people who tell their opinion on the subjects and the works on display [3].
A similar communication purposes and cultural understanding of museum content large scale are the comments provided by the Palais de Tokyo in Paris, where is asked to contemporary art personalities, artists, filmmakers or critics to describe their itineraries and comments in order to share with the public the perceptions felt during the exhibitions. Similarly in Italy, MAXXI Zoom offers educational insights through tabs downloadable in pdf, provides documentation on the artists and the works on display, allowing you to reflect and express their feelings.
To engage audiences to discover the contemporary a new MAXXI Digital 2017 project is in progress, which allows the visitor to continue the actual exhibition through a virtual tour, with the opportunity to immerse yourself in some of the models in the architecture collection. Through visors such as the Oculus Rift

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Fig 3. Mimic diagram of processing steps of majolica.

Fig. 4. Processing stages and reproduction of drawings, from the drawing to the final product on majolica.

you can see the works from every angle deepening the details explained by a narrator (Fig. 2).
The digital technology applied to new methods of diffusion and sharing of information is so rapidly evolving having the common goal of centralize the visitor compared to the museum, that comes out from itself to project in intangible and democratic dimensions.
Annulment of the barriers between the physical reality and the reconfigured, prepared through immersive interfaces, allows you to explore environments where reality and simulation overlap and merge into a unicum in which the museum becomes global, explorable in perception as in concrete.

2. METHODOLOGY. CASE STUDY APPLICATION

Based on these premises, a project for a virtual museum organization, to integrate the exhibition structure of the ancient majolica of Castelli, has developed. The project was prepared on the occasion of the earthquake that hit the Abruzzo region in 2009, temporarily blocking the visit to the collections preserved in the exhibition structure.
The application to a case study that would allow to boost the disclosure of the heritage museum, housed in the small village in Abruzzo to the Gran Sasso slopes, known since the Middle Ages as one of the main centres of artistic production of ceramics, has been the inputs research [4].
The proposal concerns the application of advanced computerized models, aimed at the enhancement of places and traditions of master craftsmen as the families of Pompeii, the Gentile, the Grue that since the Renaissance have configured styles of decorative painting on ceramics, handed down from father to son that have then acquired great notoriety in Europe [5].
Retracing the historical phases of the production of ceramic art of Castelli, the peculiarities referred to the individual steps of the process, decoration and final completion of the works were summarized in specific schemas (Fig. 3).
For ease of understanding, graphic taxonomies illustrating the machining of tiles are shown, from clay extraction that at the beginning were brought out in the area, to modelling, drying, first firing, glazing, decorating and second firing, displayed with illustrations from the classic manuals. The survey examines the use of colours and the proposed subjects, often landscapes with figures inspired by paintings and frescoes by famous artists, reproduced through the technique of 'spolveri'. Add realistic scenes, mythological environments and faces (Fig. 4).
A similar process has been carried out for the analysis of the produced forms and the major artists, authors of majolica from Castelli, reported in a time-line that synthetically shows the characters in different periods (Fig. 5).
From the sixteenth to the nineteenth century with ups and downs the production continues without interruption, through successful moments in which they

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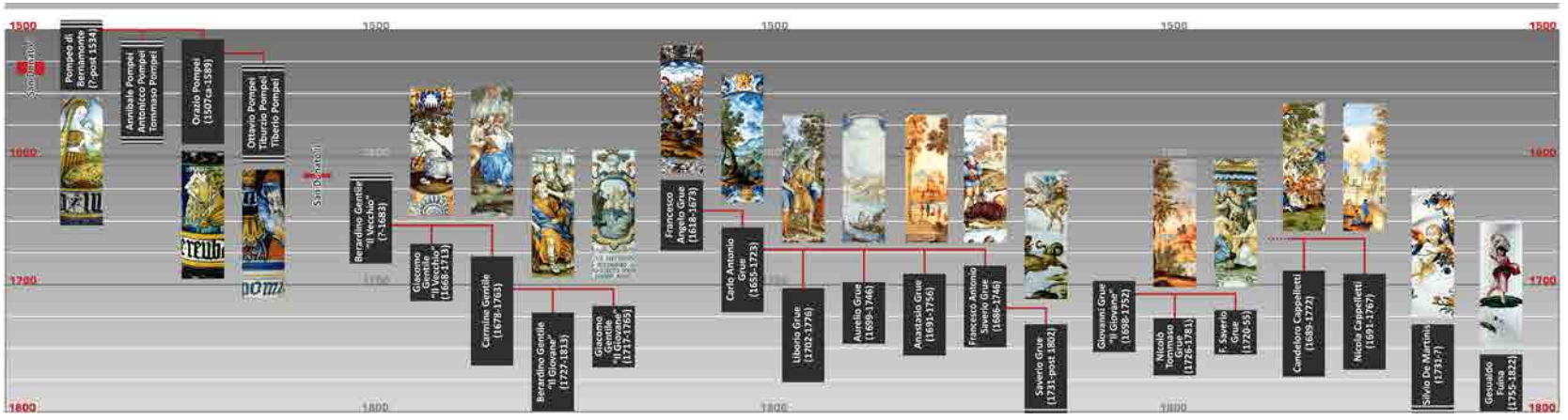

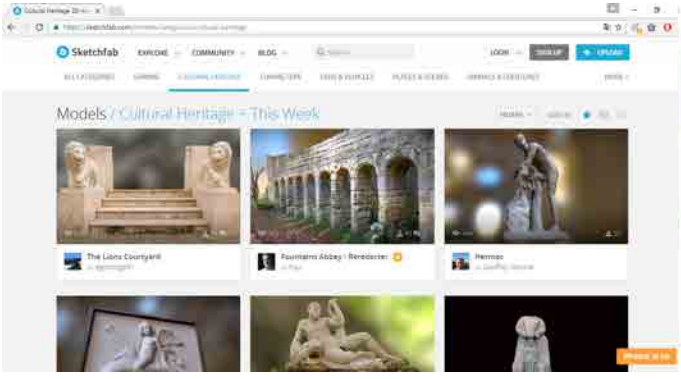

Fig. 5. Time line of the main families of artists, creators of ceramic of Castelli, centuries XVI-XIX.

Fig. 6. Images related to digital systems explored in the network. Sketchfab and UB Virtual Site Museum Buffalo University, from http://www.vrlab.buffalo.edu/project_vmuseum/vmuseum.html.

develop varied workmanship and periods of decline that occur with the advent of industrial production. In the twentieth century there was a return to tradition by creating the Royal School of Ceramics Francesco Antonio Grue that in the mid-70s is transferred to its current location becoming The State Art Institute for Ceramics. The Art Museum of Castelli Ceramics is instead set in the '80s with the intent to promote the culture and the art of majolica.

The current intervention reconfirms the basic objectives, proposing them in the logic of global development that exceeds the limits of the territory, which must also be supported, in order to promote it through a multimedia and interactive project that will improve the quality of interaction and acquisition information during the direct use inside the rooms of the museum and, at the same time, expand it beyond its physical boundaries. The opportunity to stimulate long-term influx of visitors from the outside, through online content management systems [6] or with social networks, should also raise, along with collections, image and knowledge of the same territory. The solutions are not enforceable nature, are intended as indications of proactive nature in relation to what is the state of art of current technology. In other words it is suggested the proposal of a technological meta-project set-up, in which the existing structures are directly involved in the use of applications of Augmented Reality, Virtual Reality and holographic projection, developed following the serious games online [7]. These interventions, supported from the on-line information networks, can be an important promotional opportunity, tending to rebuild the social and economic system not only of the museum itself, but of the entire surrounding territory and its school. The transition in cyber space environment becomes opportunity for comparison between the different museums, schools and universities, entering into a cultural diffusion system in which it is easier to find ideas for the promotion and enhancement of the territory, as to support with services for tourist use of the area. For decades it was thought to archive the cultural heritage in complex databases, crystallizing this

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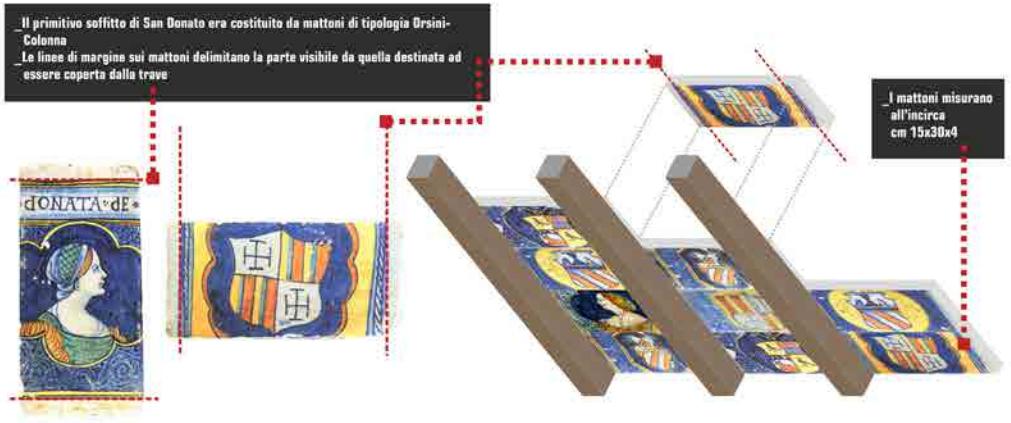
Fig. 7. San Donato Church, ceiling decorated with majolica tiles.

Fig. 8. Constructive ceiling diagram of San Donato, decorated with ceramic tiles of the XVI century.



in cards or digital catalogs, without interconnection between them, because such data adopt technologically different platforms, effectively creating an impediment to the sharing and dissemination of such information. These cataloguing in museums are in any case a potential for the public involvement, in the case study it is therefore proposed a camera and three-dimensional digitization of each individual artefact, through acquisition methodologies laser scanner or photomodeling, to be included on a browsable worldwide platform online, as "Sketchfab" (https://sketchfab.com/), which allows the complete artefacts manipulation and their interactive sharing, even between different social networks, via simple link or QR Code (Fig. 6).

It is appropriate, in this phase, to add written information and insights relating to published books, any restoration hypotheses and hypertext materials such as movies or additional images, in order to clear the content. However, the visualization and the interactive manipulation of the object in an aseptic 3D virtual space, in particular if it concerns independent elements such as plates or ceramic art products, could lose attractiveness because of its decontextualize component. The solution to this problem is provided by the interactive virtual reality systems, supported by VR viewer, now in full increase not only off-line but directly in the web. These systems adopted in the museum environment [8] develop the best continuous availability of information, the connection ubiquity, the possibility of sharing the data and the perceptual identification of the spaces. This integrative formula of Virtual Museum reconfigures in 3D not only the displayed objects, in our case the majolica collection, but the entire building in which it is contained.

The Franciscan convent of Santa Maria degli Angeli can itself be reproduced in detail, along with the frescoes of the cloister, with the architectural structure and textural information of its finishes. The data for 3D modelling also derive, as in the case of objects, from 3D scans and photomodelling, only to be geometrically retopologized and installed on Unreal Engine [9] for exploration RTR (Real Time Rendering). It is not excluded, considering the infinite web space available and the goal of enhancing the area, a reconfiguration of adjacent virtual spaces like the Church of San Donato,

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with its tiled ceiling (Figures 7-8), and the Art Ceramics Institute, place of formation of the new generations of ceramists and exhibition venue of a ceramic Monumental Nativity and an International Collection of Contemporary Ceramics. This operation also allows us to edit the installations, facilities, access to camera angles impossible to achieve in real size, to exhibit objects that have no place in the real exposition, perhaps because they are being restored or preserved in warehouses. Therefore, the Castelli museum becomes an extension of the existing museum network, and not the barren imitation of the same, but a laboratory for experimenting new forms of museum tour. In addition to this type of intervention design, which uses the web space to interact on a real space, some renovations of the museum tour in situ, using many of the emerging technologies referred to earlier, are proposed.

3. MUSEUMS AND DIGITAL TECHNOCULTURE

The very timely term virtual museum, often used loosely to identify even a simple website that displays content, identifies actually an alternate mode to interact directly with the artwork or with the exhibition space, whether it be a real exploration of the museum, whether it be a virtual clone of that. One of the first and now most widely used method for a fruition system of digital museums is the famous Google Art Project (https://www.google.com/culturalinstitute/about/artproject/), where you can admire the artworks by some important museums in the world with an exceptional level of detail. The user, through the web interface, can navigate through panoramic photos 360°, having the chance to get close to the works on display to admire them in full detail with the additional capability of creating personalized collections for virtual sharing through the most popular social networks. The operation then allows you to plan what will be the path to follow in a possible future visit and similarly allows, if the museum has already been visited, to return there later. Art Project works very well for displaying 2D elements like pictures, but less in terms of three-dimensional perception of environments and all round sculptures. To solve this kind of problems related to the imaginative perception of the artwork, methods for

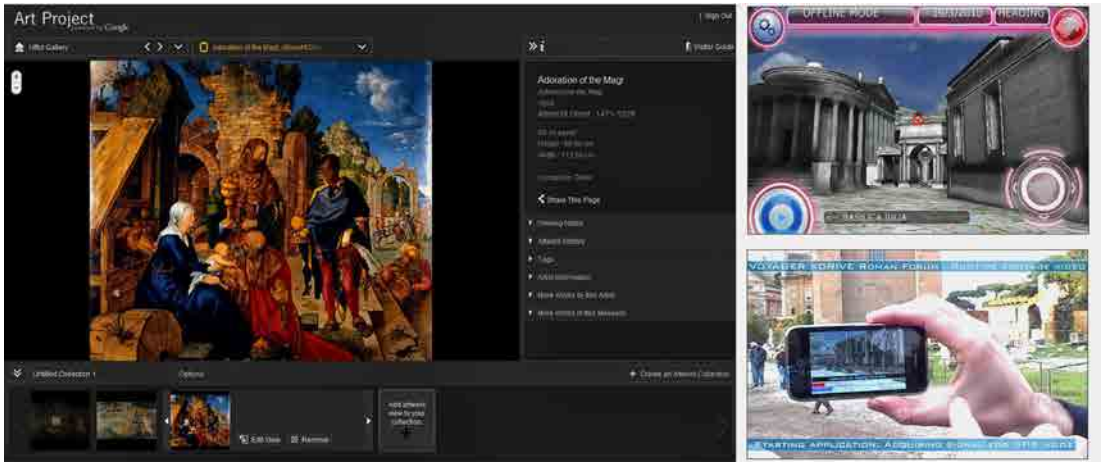

Fig. 9. Images related to virtual interfaces (Google Art Project) and Augmented Reality (Voyager Xdrive Roman Forum), by https://www.google.com/culturalinstitute/beta/?hl=it and https: // itunes. apple.com/it/app/voyager-xdrive-roman-forum/id348146229?mt=8.

the Augmented Reality (AR) and Virtual Reality (VR) are now available, through the use of mobile devices for some years adopted in teaching museum, or the use of IVR viewers. An illustrative example of this is the virtual gallery of Pure Form Museum (https://www.pureform.org/virtualGallery/), where virtual reproductions of sculptures from different European museums, reproduced by laser scanning and 3D photogrammetry, can be explored and manipulated. The virtual gallery is still only part of a more complex installation usable during physical examination of the various museums that virtually are joining this program. The visitor can then immerge himself in a simulated environment and interact with the sculptures through the use of a sophisticated haptic interface [10] coordinated with the use of Oculus Rift viewers, returning a tactile sensation very similar to that of a real contact with the artwork on display. As is clear The Museum Of Pure Form (Fig. 9) consists of two 'sections': a virtual gallery accessible by Web, which mainly provides an information service and educational divulging, and a virtual exhibition installed in the environments of the physical museum, accessible by wearing the appropriate instrumentation, which provides a sort of qualitative improvement of the visit experience. One of the most interesting examples of a museum project that actively involves the use of AR technology is the Natural History Museum in London (Fig. 10), which has in the principal place a complex equipped room for Augmented Reality. With the advantage of the Marker-based technology, animated 3D models of dinosaurs are linked to the real environment and can be viewed from workstations equipped with an appropriate tablet through which the user can get the feel of the real presence of prehistoric animals in the room. Nowadays there are more advanced systems that calculate the exact perspective superposition of a reconfigured model over ambient geometry or over a real space through a complex system of 'object recognition', such as the App Voyager Xdrive Roman Forum, that displays on your screen, with a photorealistic and real-time rendering, the park of the Roman Forum and of Palatine reconfigured three-dimensionally as in the

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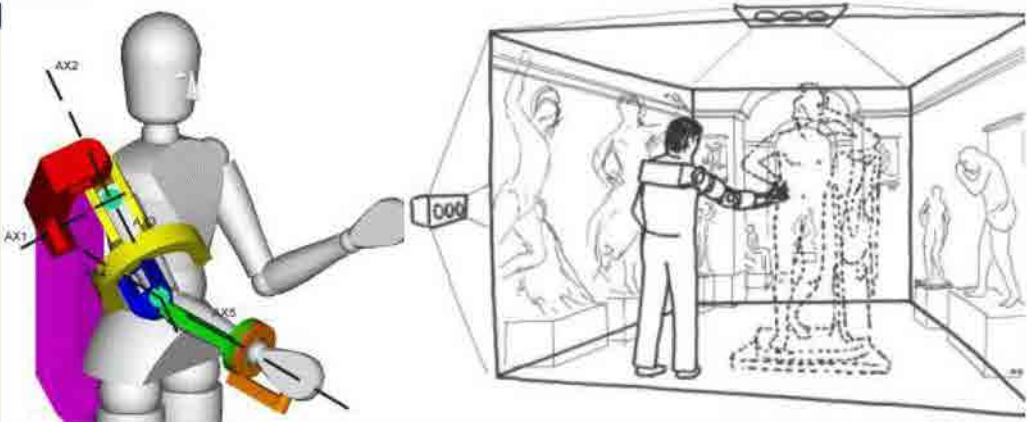

Fig. 10. The Museum of Pure Form, website online and functions of the perceptual holistic system in museum installations.

Fig. 11. Augmented Reality technology integrated in the tour of the National Museum of Natural History in London. VR in the Museum at Midnight project, from http://www.mastersofpie.com/museum-at-midnight-preserving-dippy-in-virtual-amber/.

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imperial period (Fig. 11). Applications for Augmented Reality in the field of Cultural Heritage may provide information not only to objects stored in museums, but also in relation to the surrounding area, therefore promoting a form of integrated knowledge between the museum, location and activities on territory required for economic and social development of the entire interest area.

4. METAPROJECTUAL SOLUTIONS OF CASTELLI CERAMICS MUSEUM

The convent of Santa Maria degli Angeli, located near the top of the village, houses since 1984 the Museum of Ceramics, gathering the works of the greatest exponents of an artistic knowledge that, as described, lasts from the Middle Ages to the present day and has made famous the name Castelli as ceramics town. The convent building is organized around a quadrangular cloister with perimetral frescoes. (Fig. 12) The current exhibition starts from the ground floor and serves thirty works of the master Giorgio Saturni, shown through a setup which reassembles an old ceramic workshop with various spaces dedicated to working stages, production of the clay and glazes, firing, glazing and painting. The exhibition proceeds upstairs developing chronologically: the first room, archaeological, presents ceramic fragments of prehistoric origin found in the area of Castelli; the second room contains the prestigious sixteenth century collection from the old workshop of Pompei, and tiles (200 units) of the primitive Cona of the Virgin, later converted to the seventeenth century church of San Donato also richly decorated, in the lining of the truss, with painted tiles shown in the next room (Fig. 13). The fourth and fifth room collect, however, a significant documentation of Istoriato castle with a series of works by painters belonged to the dynasties of potters: Grue, Gentili, Cappelletti and Fuina, who have succeeded in the production of precious majolica of Castelli. The corridor that runs around the

Fig. 12. Frescoed cloister of the convent of Santa Maria degli Angeli, which now houses the museum.

Fig. 13. Metaprojectual proposals related to the activation of new museum exhibitions for Castelli.

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cloister also includes a selection of 'spolveri' and eighteenth century sketches, preparatory drawings used by ceramists to transfer the drawing sinopias on the majolica, before the final decoration and the second firing. the exposition ends with a collection of Aligi Sassu ceramics [11] important presence for the enhancement of the museum that next to the protection and promotion of its prestigious past, includes the experiments of artists of the twentieth century, in movement toward the contemporary. These works should have found their final place in the neighbouring of Nostra Signora degli Angeli Church, annexed to the convent which houses the museum. The damage caused by the 2009 earthquake and the current shock of 2016, did not allow the implementation of this project, the structure is being restored and also requires an appropriate recovery for the enhancement and promotion of activities related to museum. Applying metaprojectual solutions, related to the computerization and virtualization of museum exhibitions related to ceramic productions of Castelli, would produce concrete benefit for the encouragement, both at local and national levels, to the use of physical heritage in the museum, together with cultural preservation of the artistic traditions handed down by the village artisans, supported also from teaching and learning of the school.

To this purpose, an innovative project construction is proposed, to be understood not as a simple material placement of windows, showcases and panels, but as an integrated organization focused on the use of new technologies in a space that is not only physical. The adoption of technological solutions can be integrated with each other, arranged through a centralized computer system, but independent of each other so as not to affect the function of the individual sections, has as its objective the provision of multi-sensory experience of the visit, the adaptability of paths and contents and encouragement in the active visitors participation. Starting from the entrance ticket may be equipped with a customized multimedia RFID code [12] running through the App on any mobile device, allowing the visitor a quick and easy use which selects the user language, and other options, according to the preferences of the selected content in the visit (Fig. 14). All route information can be uploaded in real time on a

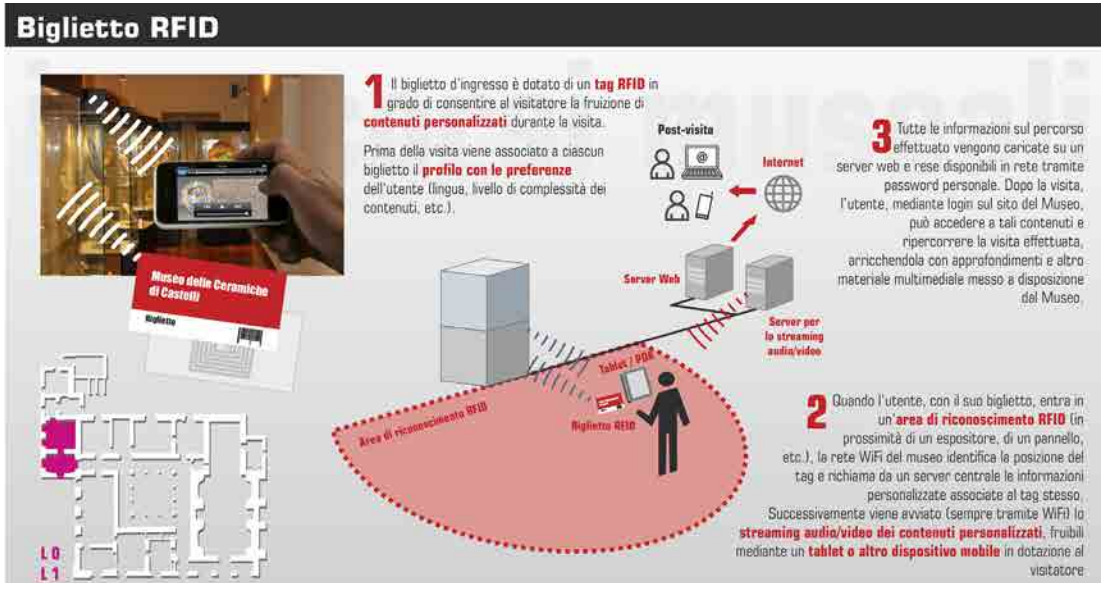

Fig. 14. Illustrative scheme of the RFID system integrated to the exhibition.

web server and put online with a personal password. After the visit, the user, via login on the site of the Museum, has access to such content and retrace his visit, enriching it with insights and putting more multimedia material provided by the museum. When the user, with his ticket, enters an area of RFID recognition (nearby a display, a panel, etc.), the museum of the WiFi network identifies the location of the tag from a central server and invokes the personalized information associated with the tag itself. Leveraging the local WiFi network as a positioning system inside of the museum spaces, so you can move between the various rooms guided by a system similar to that of GPS navigators, providing, time to time according to the user's location, the streaming audio / video custom content, enriched by experiences of augmented reality, 3D manipulation of digital models through gestural devices or download link external apps connected to the project. Applications made specifically for mobile devices, supplied directly from the museum or downloadable previously, can accompany and support you along the tour route. Through the GPS applications can be integrated to the geographic information system offering also interesting support services in planning routes on the adjacent territory to the village of Castelli, under the booking of hotels, bed & breakfasts, guided tours, restaurants, events and exhibitions in progress. In order to amplify the interactive experience of the tour, the gesture control systems, educational support of the frescoes in the cloister of the museum, could be an excellent integration to multimedia systems offered by the App: through a series of Microsoft Kinect [13] devices , installed in strategic locations and connected to a central server, the system is able to identify through Mocap techniques [14] the point indicated by the user by starting the multimedia content for the area of the

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Fig. 15. Using gestural interfaces integrated with MOCAP techniques for the computerization of fresco of the cloister.

fresco shown, viewable on mobile platform or devices given directly from the museum (HoloLens, Oculus Rift, Holographic Screens 3D, etc.) (Fig. 15).
To make the visitor feel part of the narrative experience even more interesting is important to introduce the playful component, through a series of serious games, with the aim to make participation more active: this feature helps the user's emotional involvement, and increasing its interest in the treated materials. The areas that are home to the exposure of the preparatory drawings, the 'spolveri', may have multimedia towers, or retina devices 4k touch screen, on which you can ensure the simultaneous exposure of all the 278 archive sheets, appreciate the not visible details to naked eye and offer the user a tactile and visual experience, preserving the original from light, wear and handling. Also you can place detailed information about majolica artifacts corresponding in support of each carton. (Fig. 16)
Another interesting solution to catalyze the attention on the 'spolveri' could be the use a virtual platform that provides the possibility to operate, just following the various phases of painting, directly on a digital facsimile in high resolution. At the conclusion of the tour, in the spaces of the Museum that reproduce a traditional workshop, a hologram of a true Castelli ceramist could explain the secrets of ceramic art. The craftsman, not physically present in the room, with 3D interactive movies projected onto holographic screens or developed with technical Vr by viewers (Oculus Rift or Hololens) interacts via an interface to voice commands with the visitor. Alternatively, it is possible to envisage a live streaming via workstations linked directly with the artisan shops of downtown Castelli or some classrooms of neighboring school of ceramics: in this case the visitor through the internet has the ability to interact directly and in real manner with the craftsman-ceramist or with the teacher. (Fig. 17) This system can be thought of not only in a museum-shop connection context, but in a broader approach to real ceramic crafts e-learning accessible on the network platform, according to a logic that sees the participation of different stakeholders and local-Learning, just as the State Art Institute for Ceramics, aimed at an integrated territorial promotion.

5. CONCLUSIONS

The analysed experiences indicate the potential contained in the transformations offered by interactive methods of divulging and sharing of cultural heritage, not yet ready for a detailed and full techno overlay to common practices, but predicting big changes in museums. It must be said that every technological change brings with it a series of doubts and fears about possible negative impact of information technology, as has already happened with the arrival of the internet which then far exceeded the expectations of development and sharing data, similar to use of smartphones and their App, on which we won't be able to give up today. It is estimated that to happen also for virtual immersion interactive systems, already in the late seventies anticipated from novels, sci-fi movies and the first scientific experiments, which have favored the acceptance and development in different sectors. Some problems are still to be overcome, which on one hand relate to the possible side effects due to the ability to adapt to the experience exploratory, among these the disorientation caused by the difficulty of cerebral correlation between the virtual simulated movements with extreme realism and the condition of static user, and the other the even higher price of the instruments. Consequences linked to the inevitable experimental phase of the first products for sale, in part already resolved and in the course of correction, either from a strictly technological point of view, both from the perception point of view continually evolving that relates with the habit to use these devices. As part of the fully immersive virtual platforms, it is interesting the virtual appliance of Microsoft HoloLens, based mainly on holograms and AR that promises to revolutionize the market, radical-

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ly transforming the way of people to interact with the real world. In contrast to Cave VR screens, HoloLens is a real computer in the form of viewer equipped with highly advanced sensors, is relatively light and above all do not need to the connection cable, thereby ensuring the maximum freedom of movement. Following the principles of augmented reality HoloLens blends places and contents with the actual environments, portions of space and virtual objects 3D, which can be interactively manipulated or digitally modified. In this regard, the reviews [15] are agreed in asserting the extreme realism of perception between the hologram and the real elements, the lack of side effects, discomfort or disorientation, with the ability to continue to simultaneously see the surrounding reality with a perfect overlap of the elements, even complex, digitally reconfigured. The device is also integrated with gestural interfaces recognition systems still based on Microsoft Mocap technology, very similar to those used in Kinect, also offering the ability to use voice commands to perform various actions and further enhancing the interactive experience. Among the negative notes it should be noted that the field of view of the device Microsoft is confined to a quarter of the total, equivalent to about 15 inches, beyond which the holograms are not visible and also the rest of the mask is partially opacified, which does not happen for fully virtual viewers that have an opening of 180° view, comparable to that of the human eye. Immersive devices, whether they are based on VR technology as the Oculus Rift or AR Holographic technology, such as the efficient HoloLens, have the common advantage of allowing a very high sensory involvement, important feature in the renewal dynamics of virtual museum. With regards to the cost factor, which is also expected to improve overtaking the investments made in the experimental phase to pass through to marketing, initially a niche and then a large-scale distribution object, as for other products that have brought down prices for the demands and

Fig. 16. Installation of platforms equipped with touch screens that digitally reproduce the 'spolveri' archives.

Fig. 17. Integration of video streaming holographic projection systems provided for informational and educational purposes.

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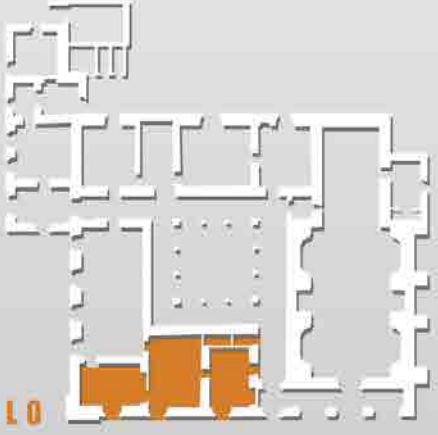
"Artigiano virtuale"



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market trends. Regarding the feasibility related to the case study of the Castelli ceramic museum as indicated in the text, the adoption of technological solutions integrated reciprocally can be prepared and organized in programmable application phases over a period estimated on the basis of requests of subsidies (through public sponsorships and private institutions) and obtained with the participation of several promoters of development and enhancement of the territory and of the cultural heritage, tangible and intangible, contained therein.

NOTES

Caterina Palestini wrote paragraphs 1 and 2; Alessandro Basso wrote paragraphs 3 and 4.

[1] See N. Gershenfeld in The Third Digital Revolution, 2015 in https://www.reserchgate.net/pubblication/282404133

[2] See R. Morselli, Condividere il patrimonio del Museo: Le sperimentazioni del Rijksmuseum di Amsterdam, in MU6 n. 30, year IX, l'Aquila 2014.

[3] See A.Muzii, I musei e i suoi pubblici esprimersi per imparare, idem

[4] The research was developed with the collaboration of Antonino Cigno, under the experimental dissertation in INTERLAB laboratory Castelli, college year 2010/2011, Tutor Caterina Palestini.

[5] See G. Corrieri, Il museo delle ceramiche di Castelli, Teramo 1998.

[6] A content management system (content management and sharing) an installed software on a server designed to facilitate the management of the content of websites, freeing the administrator from technical knowledge of programming. Technically a content management system is a server-side leaning on an existing database for storing content. It is divided into two parts: the administration section (back end), which is used to organize and oversee the production of content, and application section (front end), which uses the web user to enjoy content and applications of the Site .

[7] The Serious games are digital games that do not have solely or principally a purpose of entertainment, but they contain educational elements. Generally, serious games are educational and ideally serious things and playful instruments are balanced.

[8] See Ronchi Alfredo M, From real virtuality to Knowledge Society: knowledge, information, formats in the digital era, in e-Art Arte, società e democrazia nell'era della rete, Editori riuniti 2006, from 189 to 214 pp.

[9] The platform Unreal Engine 4 .x, created to develop products exclusively for the playful video entertainment has quickly become the leading interactive real time rendering platform. For its extremely high quality in terms of photorealism, today is used not only for the development of video games, well within the architectural exploration, museum education and generic Virtual E-Learning. In the latest versions it offers automatic display VR and the ability to define applications that rely on such technology.

[10The haptic interface is a control device for real or virtual objects that the user equipment returns a tactile feedback in relation to your actions.

[11] La The collection consists of 200 works was donated by Alfredo Paglione.

[12] The Radio-Frequency Identification is a technology for identification and / or automatic storage of information relating to objects, animals or people (automatic identifying and data capture, AIDC) based on the data storage capacity by a special electronic tags, tag calls (or even transponder or electronic keys and proximity), and on the ability of these to reply to the distance by special fixed or portable equipment, called reader (or even interrogation). This identification is made using radio frequency, through which a reader is able to communicate and / or update the information contained in the tag that is questioning; in fact, despite its name, a reader is not only able to read but also to write information.

[13] Crawford, Stephanie. How Microsoft Kinect Works. How Stuff Works. http://electronics.howstuffworks.com/microsoft-kinect.htm.

[14] The Mocap - Motion Capture - now applied on a large scale in video games, is a digital animation technique which moved to virtual characters movements of a person in real time. The user can therefore physically perform movements that his digital alter ego accomplishes simultaneously, for example, in another time or in another place.

[15] For the related argument see Paul McDougall in International Business Times, beta test of 05/06/2015 http://it.ibtimes.com/recensione-hololens-gli-occhiali-vr-di-microsoft-rivoluzioneranno-come-viviamo-e-lavoriamo-1401360; Francesco Sempriini in LaStampa.it, 23. 01.2015 beta test in http://www.lastampa.it/2015/01/22/tecnologia/come-funzionano-le-hololens-di-microsoft-ecco-la-prova-in-esclusiva-de-la-press-KuRldQzasgHVUX09VCJZTJ / page.html; Michelle Fitzsimmons in Techradar.com, review beta test of 05.12.2016 in http://www.techradar.com/reviews/wearables/microsoft-hololens-1281834/review.

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