SCIRES IT
SCIentific RESearch and Information Technology
Ricerca Scientifica e Tecnologie dell'Informazione
Vol 5, Issue 2 (2015), 151-168
e-ISSN 2239-4303, DOI 10.2423/i22394303v5n2p151

A PILOT PROJECT WITH GOOGLE INDOOR STREET VIEW: A 360° TOUR OF "PAOLO ORSI" MUSEUM (SYRACUSE, ITALY)

*Elisa Bonacini**

*University of Catania; IEMEST (Istituto Euro Mediterraneo di Scienze e Tecnologie), Palermo, Italy.

Abstract

The aim of this paper is to offer a preview of the pilot project in progress at the "Paolo Orsi" Regional Archaeological Museum of Syracuse, in Sicily (Italy). Thanks to a free partnership with Google Business Photos/Street View Indoor, we managed to map the entire museum, the only archaeological museum in South Italy that can be visited online on a 360° tour on a Google platform. Also a dozen archaeological finds have been selected which can be clicked as points of interest from the museum windows and explored, taking 360° virtual tours. They are provided with descriptive sheets, and could be also available in audio mode. In this way, the "Paolo Orsi" Museum is also an unicum on Google map with 360° virtual tours with integration of captions and full description of artworks. The aim of the project is, finally, is to begin to bridge the gap of Sicilian Cultural Heritage's visibility on the web.

Keywords

Virtual Heritage, Digital Heritage, Digital Museum, Virtual Museum, Virtual tour, Italian cultural heritage

1. Google cultural policies: the state of art

As Farman (2010) argued, the transformation of Google search engine into a giant globalized economic system, as mentioned elsewhere (Bonacini 2014, references therein), has definitely helped to turn the modern world into a *virtual globe*.

In addition, ICT has deeply transformed our world, our society and our culture, thus triggering a massive re-thinking of cultural policies (Matarasso 2010).

In modern culture, which has become a real *e-culture* (Alsina 2010; Manovich 2011), Google has played a key role for many years.

Among the six global industries identified by media scholar Vaidhyanathan (2010), where Google has been able to change the rules of the game[1], we can also include that of Digital and Virtual Heritage (Bonacini 2014).

When Vaidhyanathan published his book *Googlization of Everything*, the *Google Cultural Institute* hadn't been launched yet. Among the various forms, including Googlization of Everything [*Googlization of Us*, seen as the universalization of surveillance and infrastructural imperialism; *Googlization of the World*, seen as a global public sphere; *Googlization of Knowledge*, especially referred to global accessibility of books with the *Google Books Library Project*[2]; *Googlization of Memory*, in the field of education and research] we can add *Googlization of World Cultural Heritage*.

We already talked about Google's role in the cultural sector, by presenting many Italian cultural heritage's enhancement projects (Bonacini 2013, 2014a, 2014b) through Google softwares (Maps[3], Street View[4], Earth[5],

[1] The six global industries are: advertising, software, geographic tools, e-mailing, media tools, publishing and information in general.

[2] Vaidhyanathan 2010: 149-173; Bonacini 2014a: 36-37.
[3] http://maps.google.it/maps?hl=it&ab=nl.
[4] http://maps.google.com/intl/it/help/maps/streetview/.
[5] http://earth.google.com/. "When a user interacts with a software application that presents cultural content, this content often does not have definite finite boundaries. For instance, a user of Google Earth is likely to find somewhat different information every time she is accessing the application. Google could have updated some of the satellite photographs or added new Street Views; new 3D building models were developed; new layers and new information on already existing layers could have become available. Moreover, at any time a user can load more geospatial data created by others users and companies by either clicking on *Add Content* in the Places panel, or directly opening a KLM

SketchUp[6]), therefore a brief summary and some update notes here are enough.

All Google Maps technologies have been made culturally available through projects as *Street View Gallery* (2009)[7], *Art Project* (2011)[8] and *World Wonders Project* (2012)[9], all carried out in partnership with UNESCO, the World Museum Fund and the Getty Images database.

Street View, "an interesting hybrid between photography and interfaces for space navigation" (Manovich 2008), is a Maps option through which ten of thousands sites have been already visited through 360° tours.

Soon after the Art Project's launch, followed by the above mentioned projects, Google introduced to the world the *Google Cultural Institute*, a virtual repository of all other global projects, such as Art Project[10] and World Wonders Project[11], "technologies that make the world's culture accessible to anyone, anywhere".

As for knowledge and culture, Google's mission is to organize the world's information and to make it universally accessible and useful. The Cultural Institute aims to build a global repository in order to make it accessible to all and to preserve important digital cultural materials as inspiration to the future generations.

In recent years, Google's role in digital communication of cultural heritage has become more and more effective, due to deep collaboration between the search engine and the most important national and international cultural institutions, museums, national ministries around the world. Partnerships between Google and the most important international institutions for conservation and enhancement of cultural heritage are very crucial to cultural communication. Projects like Google Art Project and Google Word Wonders Project were born thanks to such forms of partnership.

Amongst the latest innovations Google makes available to museums around the world, we had already talked about *Google Open Gallery*[12], a very useful tool to create - for free and directly on this specific platform - virtual art exhibitions or new museums' websites (Bonacini 2014a).

The newer free tool Google announced, useful to bring online cultural treasures from around the world, making them accessible to all, is a free *Android App* for museums which had already enjoyed Art project (museums can launch these apps without any in-house technical expertise just because of their previous partnership with Google). Launched on December 2014 with 11 museums partners adopting this new software (in Italy, France, Netherlands and Nigeria; Museo d'Arte Orientale, Galleria of Arte Moderna and Palazzo Madama in Torino, as in Figure 1, and Museo d'Arte in Gallarate to name the Italian museums), it can be now downloaded by 88 free museums' app worldwide from Google Play store[13].

Museums can build themselves mobile applications that take advantage of Google technology such as Street View Indoor to offer 360° tours and YouTube online videos, to make their collections or their exhibits available to anyone with a smartphone. The apps may also offer photos and audio tours of the exhibits, along with social-sharing features (posting on Google+, Facebook and other SNS, or emailing).

Fig. 1: Palazzo Madama app by Google.

As for 3D Google projects, in addition to SketchUp's graphic rendering potential for urban landscapes reconstruction (it is useful to

file. Google Earth is an example of a new interactive 'document' which does not have its content all predefined. Its content changes and grows over time" (Manovich 2008).

[6] http://www.sketchup.com/.

[7] https://www.google.com/maps/views/streetview?gl=us.

[8] https://www.google.com/maps/views/streetview/art-project?gl=it.

[9] https://www.google.com/maps/views/streetview/world-wonders-project?gl=it.

[10] https://www.google.com/culturalinstitute/project/art-project.

[11] www.google.com/intl/it/culturalinstitute/worldwonders/.

[12] http://www.google.com/opengallery.

[13] https://play.google.com/store/search?q=org.culturalspot&c=apps.

remember here the *NoiLaquila*[14] project), a few years ago Google started working on enjoyment and enhancement of digital 3D monuments and works of art.

Among the best projects from the Cultural Institute we can mention *La France en relief*[15], realized in 2012 thanks to a partnership with la Maison de l'Histoire de la France. A special exhibition at the Grand Palais took place with 3D models of seven handmade models of beautifully detailed relief maps of French fortified towns. 3D digital versions can be downloaded and viewed using Google Earth.

As for *Versailles 3D*[16], realized between 2012 and 2013 thanks to a partnership with Versailles teams, where Google worked on the Palace History Gallery opening, developing digital assets, like 3D models in Google Earth plus educational videos, as shown in Figure 2, interactive games for kids, to make the visit interactive and educational.

Fig. 2: Some screenshot from a 3D reconstruction educational video by Versailles 3D project.

A pilot initiative has been recently launched by Culture Institute in partnership with six cultural institutions in the world: California Academy of Science in San Francisco, Museo d'Arte Orientale in Turin, the Israel Museum in Jerusalem, the Kunsthistorische Museum in Vienna, the Los Angeles County Museum of Art and the Dallas Museum of Art. All of them were already included among the 586 collections of the world already on the Art Project library.

Until April 2015 all of the artworks was only represented through high-resolution photos. Google has feautured the possibility to in-browse almost 300 3D photos of objects made with a camera from these six museums (all rendered in WebGL, so it is not necessary a plug-in to browse them).

242 of these 3D objects consist of scans of animal skulls (pieces of nature, not works of art) from the California Academy of Science collection[17], as the example here in Figure 3.

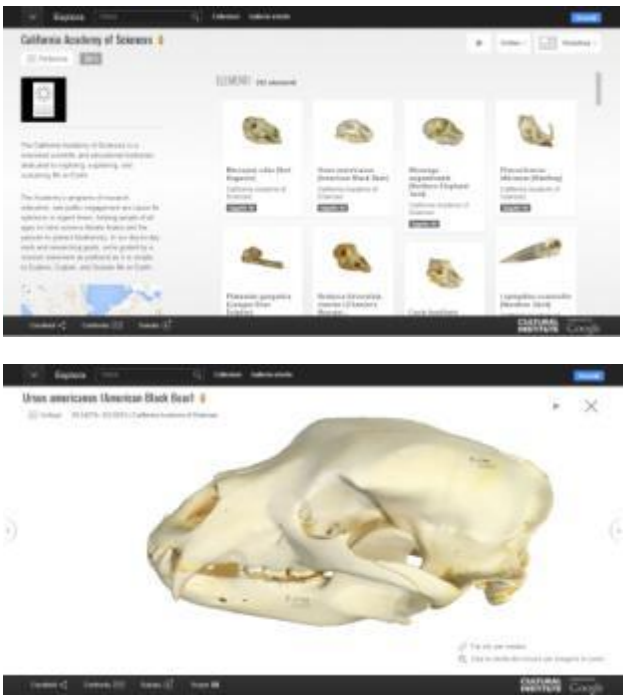

Fig. 3: The California Academy of Science 3D collection on Art Project and a 3D American black bear skull.

22 objects of art come from Museo d'Arte Orientale[18] (the only Italian cultural institution to join the project until now, here in Figure 4), 11 from the Israel Museum (Figure 5)[19], 13 from the Kunsthistorische Museum[20], 8 from the Los

[14] The use of Google SketchUp has led to the design of threedimensional reconstruction of the historic center of L'Aquila city (www.noilaquila.it), devastated after the earthquake in April 2009 and never reconstructed (Bonacini 2013:55-56; Bonacini 2014a: 35-36).

[15] https://www.google.com/intl/en/culturalinstitute/about/francerelief/.

[16] https://www.google.com/intl/en/culturalinstitute/about/versailles/; http://www.versailles3d.com/en.

[17] https://www.google.com/culturalinstitute/collection/california-academy-of-sciences?f.media_type=3d.

[18] https://www.google.com/culturalinstitute/collection/museo-d-arte-orientale?f.media_type=3d.

[19] https://www.google.com/culturalinstitute/collection/the-israel-museum-jerusalem?f.media_type=3d.

[20] https://www.google.com/culturalinstitute/collection/kunsthistorisches-museum-vienna-museum-of-fine-arts?f.media_type=3d.

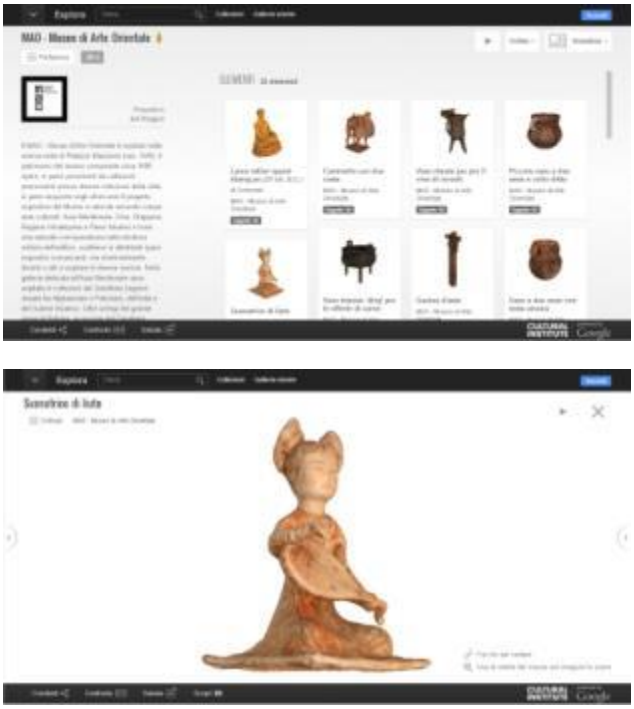

Fig. 4: The Museo d'Arte Orientale 3D collection on Art Project and a 3D terracotta statue, Tang Dinasty, VII-VIII A.D.

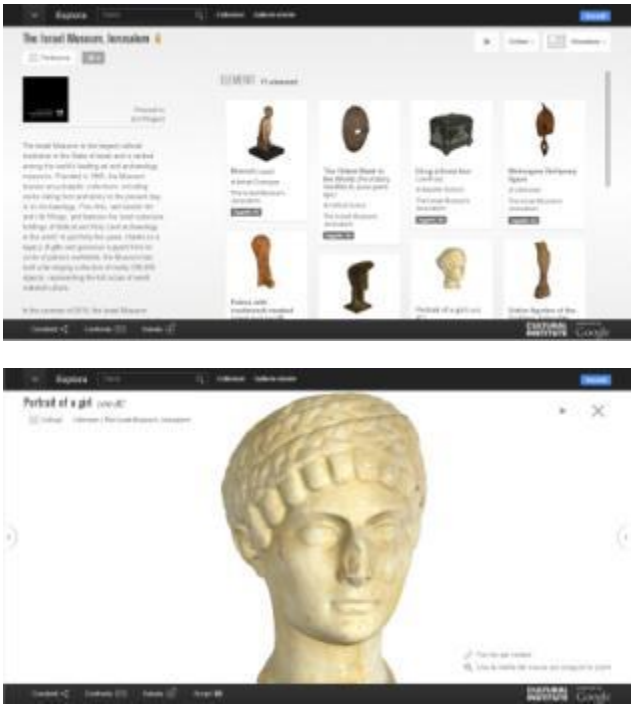

Fig. 5: The Israel Museum 3D collection on Art Project and a 3D marble Roman portrait of a girl, 110 A.D.

Angeles County Museum of Art[21] and 7 from the Dallas Museum of Art[22].

These 3D objects are available to users to be rotated and zoomed, allowing them to connect in a closer and more personal way with them.

The aim of this new Google's project is to build the most important and largest database of 3D scan art of works worldwide.

Till this last Google's project all of the artworks on Google's platforms such as Art Project were only represented through high-resolution but static photos, linked as points of interest (POIs). Captions are always really short and synthetic.

2. *Business Photos e Indoor for museums*

Other Google softwares, as *Google Business Photos*[23] and *Google Indoor Maps*, are showing us their usefulness in the cultural sector.

Specifically, the pilot project here presented has been conducted with Business Photos and its Indoor Maps mode.

Normally panoramic photographs are indeed taken at street level through Google-cars, Google-trikes (sort of tricycles) and Google trekkers (real backpacks), fitted with 360° shooting equipment, as shown in Figure 6.

Fig. 6: Google cars, Google trike and a Google trekker.

Business Photos is designed to help remote users to explore shops and commercial activities (hotel, restaurant etc.) as if they were on site. Since Business Photos has been integrated with Google Maps and Street View, panoramic and 360° navigable photos are shown in Google searches, Google Maps and Google+ Local and can be directly posted on commercial websites and social media profiles.

The quality of these tours' collimation and viewing is often better than many others Street View tours: it's the photographic documentation itself to be acquired otherwise, with fixed and non-moving stations (preventing collimation defects or image blurring resulting from stresses

[21] https://www.google.com/culturalinstitute/collection/los-angeles-county-museum-of-art?f.media_type=3d.
[22] https://www.google.com/culturalinstitute/collection/dallas-museum-of-art?f.media_type=3d.
[23] http://maps.google.it/help/maps/businessphotos/.

due both to instrumentation and people movements in time of shooting).

Business Photos began to be used for 360° tours in museums galleries: currently 20 museums, mostly scientifical and technological, have requested this service; among them the Museo dell'Automobile in Turin (Figure 7) and the historical museum of the city of Lecce MUST[24] can be counted.

Fig. 7: A 360° tour inside Museo dell'Automobile on Google Map and Google+.

Google Indoor Maps is useful to geolocate and browse inside buildings in mobile version too. This service helps to improve the chance to move into the buildings through their floors and locate sections, laboratories, stairs and services.

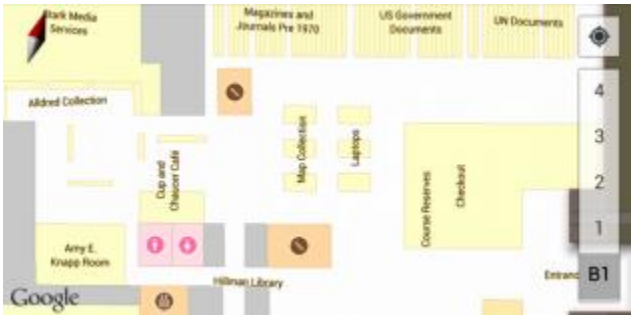

Fig. 8: The browsing plan of the Hillman Library at University of Pittsburgh, Pennsylvania.

You can find Indoor maps of some cultural institutions like museums, galleries and libraries in USA, Europe (Austria, Belgium, Denmark, France, Germany, Spain, Sweden, Switzerland), Japan and Australia. Figure 8 represents an example of how you can browse inside plans of a library.

[24]Here is the museums list on Google Business Photo: http://exampletours.com/category/art-culture/museum-art/.

For Italy, Indoor Maps service has been only joined by the Museo di Scienza e Tecnologia "Leonardo da Vinci" in Milan[25]: you can browse and enter museum' plan and levels and turn-by-turn directions, as shown in Figure 9.

Fig. 9: The browsing plan and a detail of first level of the Museo "Leonardo da Vinci".

3. Sicilian cultural heritage and Google

Compared to Italian museums and cultural sites, Sicilian cultural heritage struggles to be present on these Google's platforms, as it should.

It is not so difficult to explain where the gap between the island and its mother country comes from.

Sicily has the status of independent region, therefore it has an exclusive competence in the field of regional cultural heritage.

This is the reason why Sicilian heritage has released from any convention the Italian Ministry of Cultural Heritage and Tourism (MiBACT) has signed since 2009 with Google (Bonacini 2014).

The Regional Department of Culture and Sicilian Identity has never bothered to solve this really huge gap about its cultural heritage and landscapes.

Despite of that, Sicily has the highest number of UNESCO heritage sites (7[26]/51 in total) and of UNESCO intangible cultural heritage (3[27]/6) in Italy and in the world.

[25]Here is the museums list on Google Indoor Maps: https://support.google.com/gmm/answer/1685827.

[26] 1997: Valley of Temples in Agrigento; 1997: Villa del Casale; 2000: Eolian Islands; 2002: Late Baroque Towns of the Val di Noto (South-Eastern Sicily); 2005: Syracuse and the rock necropolisof Pantalica; 2013: Mount Etna; 2015: Arab-Norman sites, Palermo and the Cathedral Churches of Cefalù and Monreale.

[27] 2008: Opera dei Pupi, Sicilian puppet theatre; 2013: Mediterranean diet (transnational); 2014: Traditional agricultural practice of cultivating the 'vite ad alberello' (head-trained bush vines) of the community of Pantelleria.

In *Street View Gallery*[28], which now has contributed a great number of users from all over the world, thousands are the spherical, browsable and geolocated photos of Italian places and sites.

However, tightening the selection to "Landmarks of Italy"[29], as shown in Figure 10, Sicily has only 9 spherical photos, showing the beaches of the Aeolian (7), Favignana (1) and Marettimo (1) islands.

Fig. 10: "Landmarks of Italy" browsable 360° tours in Street View Gallery.

Among *Art Project*'s 605 museum collections, with more than 12.000 artists and more than 200.000 photos of artworks[30] - defined by Adamczyk (2015), as "a still-growing digital repository of artworks from Museums, Libraries, and Archives around the globe" - 47 are Italian (especially relevant to Rome, Turin, Venice and Milan); one of these, certainly not the best artistic production, is a Sicilian contemporary collection, relevant to the International Festival of Street Artists of Giardini Naxos (Me)[31], here visible in Figure 11.

No other Sicilian museum or collection has been included in Art Project.

On the *Street View Gallery*, 21 sites are all over inscribed on the *World Wonders Project*[32]: for Italy, Pompeii and the historic center of Florence are inscribed in this still restricted list.

Many more sites can be visited virtually from the same project linked on Cultural Institute's website[33]: 172 sites in the world, 22 in Italy and 2 of them, finally, in Sicily, as in Figure 12. Till last year the Unesco site of baroque towns of the Val di Noto[34] was the only one in Sicily (there are three Street View landscape of Noto, Ragusa and Modica[35]); currently another Unesco site, Mount Etna, has been added (with three views on craters)[36].

Fig. 11: 47 Italian museum galleries on Google's Art Project.

Fig. 12: 22 Italian sites on Google's World Wonders Project.

Google wanted to organize its *Google Camp* 2014 and 2015 editions by selecting as exceptional locations for their managers and VIP guests two of the most beautiful and evocative archaeological sites in the world, Selinunte in 2014[37] and Agrigento[38] in 2015.

Nevertheless beauties and heritage of Sicily, ironically, are not on Google's platforms.

[28] https://www.google.com/maps/views/streetview?gl=us.
[29] https://www.google.com/maps/views/streetview/italy-highlights?gl=us.
[30] https://www.google.com/maps/views/streetview/art-project?gl=it.
[31] https://www.google.com/culturalinstitute/collection/emergence?projectId=art-project.
[32] https://www.google.com/maps/views/streetview/world-wonders-project?gl=it.
[33] www.google.com/intl/it/culturalinstitute/worldwonders/.
[34] https://www.google.com/culturalinstitute/entity/%2Fm%2F0wzm77s?projectId=world-wonders&hl=it.
[35] The other baroque cities (Caltagirone, Catania, Militello in Val di Catania, Modica, Palazzolo Acreide e Scicli) are documented only by photos from Getty Images Database.
[36] https://www.google.com/culturalinstitute/entity/%2Fm%2F016pdb?projectId=world-wonders&hl=it#.
[37] http://www.businessinsider.com/google-exclusive-conference-the-camp-2014-8?IR=T.
[38] http://www.independent.co.uk/news/world/europe/google-hires-greek-ruins-on-sicily-for-topsecret-strategy-camp-10414634.html.

4. Birth of the pilot project

This project was born in collaboration with Mr. Gianfranco Guccione, a certified Google Business Photo photographer. He proposed to realize the Street View mapping of a museum and an archaeological site in Sicily, considering the possibility of creating "augmented" virtual tours (3D virtual tours of objects displayed in museum's windows and virtual aerial tours, with the addition of text and audio descriptions).

Such project would "increase" fruition and enhancement of cultural heritage.

While I was working in 2014 as a freelance consultant at the General Direction of the Regional Department for Cultural Heritage and Sicilian Identity, it was decided to choose as a sample of this project two cultural regional institutions, the "Paolo Orsi" Regional Archaeological Museum in Syracuse (UNESCO site with Pantalica since 2005) and the Valley of the Temples in Agrigento (the first UNESCO Sicilian site since 1997).

The project, approved by the European Coordination of Google Business Photo, was then structured as a research fellow project at the University of Catania and carried out in close collaboration with the staff of the "Paolo Orsi" Museum and Mr. Guccione, who put its time, skills and creativity at the service of the community, with the ultimate goal of solving the Sicilian cultural heritage gap on the web.

The first part of the project at the "Paolo Orsi" Museum, which we will discuss, is about to be completed. The second part at Valley of the Temples in Agrigento is going to start.

5. The "Paolo Orsi" Archaeological Museum

The "Paolo Orsi" Archaeological Museum of Syracuse is one of the most important and rich archaeological museums in Italy and, together with the "Antonino Salinas" Regional Archaeological Museum in Palermo, is the most important Sicilian archaeological museum.

Born with a royal decree as National Archaeological Museum in 1878, well-placed inside an historical palace in front of the Cathedral in the Ortigia island (now home of the Superintendence of Cultural Heritageof Syracuse), was directed by the archaeologist Paolo Orsi from 1895 to 1934.

The archaeological collection has been enlarged by over seventy years of archaeological research throughout the central-eastern Sicily, until they decided to move the collection to a new museum space, shown in Figure 13, in the garden of villa Landolina (out of Ortigia, in a focal point of a territory of great archeological importance, including the Neapolis Park with its Greek theatre, the altar of Hieron, the Roman amphiteather and the immense area of the Catacombs of San Giovanni).

Designed by the architect Franco Minissi, the new museum was built between 1967 and 1986 and inaugurated in January 1988.

Fig. 13: The "Paolo Orsi" Museum.

It contains artefacts from the prehistoric, Greek, Roman and Christian periods found in archaeological excavations in Syracuse and in other Sicilian sites.

The museum space is divided in three levels (floor 1, 2 and basement), distributed around a central space (Area 1) which is dedicated to the history of the museum and temporary exihibitions.

As you can see in Figure 14, first level is divided in three sectors (A – C) and testifies the history of central-eastern Sicily from prehistoric ages to the Greek one.

Preceded by a section which displays the geological features of the Mediterranean Sea and the Iblean zone, the first sector (A) on the first floor is entirely dedicated to the prehistoric age (Upper Palaeolithic-Iron Age) with a display of rocks and fossils of various animals found in Sicily land and dated up to the Quaternary age.

Sector B is dedicated to the Greek colonies in Sicily from the Ionic and Doric period: it is divided into two sub-sector: B1 for all the other colonies, B2 only for the origin of Syracuse. They include

the most important finds from sanctuaries, necropolis and urban excavations.

In Sector C there are displayed archaeological finds from all the colonies of Syracuse: Eloro and Akrai, the oldest, Kasmenai and Camarina, the most important and wealthy. There are also finds from other towns of eastern Sicily, such as Gela and Agrigento, the largest colonies of south-eastern Sicily.

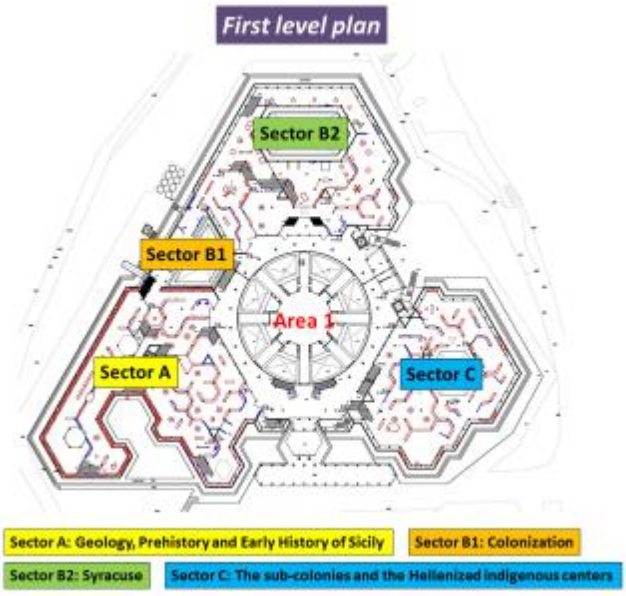

Fig. 14: The "Paolo Orsi" Museum first level plan.

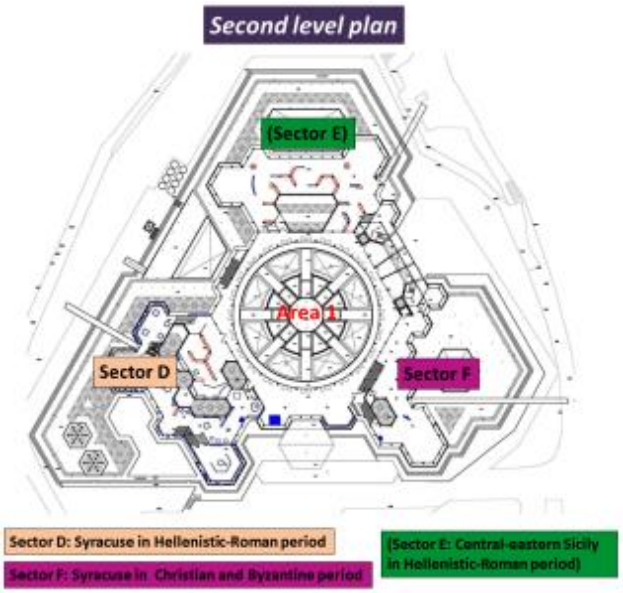

Fig. 15: The "Paolo Orsi" Museum second level plan.

As shown in Figure 15, on the the upper floor, sectors D and F were inaugurated in 2006 and contain finds from the Hellenistic-Roman and Christian periods. Section E, which will open next year with findings from sites in central-eastern Sicily, as Centuripe, Morgantina, Tindari and so on.

Moreover, a precious and unique collection of coins and medals from archaic to the medieval age is located in the basement, opened in 2010 (this sector, for security reason, hasn't been photographed).

6. The pilot project

A large photographic survey began with the aim of mapping all areas of the first and second levels open to visitors.

We worked with the full cooperation of the staff of the Museum, in particular director Dr. Gioconda Lamagna and Dr. Giuseppina Monterosso, who provided all the information and all the material requested to take the project forward.

Mr. Guccione has used a mobile station made up by a reflex camera with fisheye type camera lens, tripods with panoramic head, for a total of 3.924 shots to get about 327 360° virtual tours, all connected by arrows to browse in the halls.

We present here some pictures, alternating some photos from the backstage shooting and some screenshots of the virtual online tour.

Because of the peculiarity of the light in the different museum's sectors, it was necessary to adjust the brightness each time. The windows in the winding path often reflect one another and precautions were taken to avoid, as far as possible, those refractions from natural light.

With regard to the first level, we started from the Sector A entrance, as in Figure 16; all the internal path between the windows and the partition panels has been photographed continuing through the Sectors B1 and B2 and finishing up the route in Sector C.

At the second level, upstairs, the two Sectors D and F have been mapped.

Once loaded on Google's software Business Photos, the pack of images were geolocated in Google Maps Street View, mounted avoiding defects of sight between the images.

The 360° virtual tour makes it possible browsing the entire museum and its collection, placed online, for the first level, at the link https://goo.gl/maps/oagnd8urP1H2 and at https://goo.gl/maps/vrpDfuPPgwM2 for the second one, connected each other by arrows.

Fig. 16: Backstage shooting at the entrance of Sector A at the first level plan.

Fig. 17: The virtual entrance to the Sector A at the first plan.

Fig. 18: The 360° virtual tour in front of ceramics and carved doors graves relevant to the facies of Castelluccio.

Fig. 19: The 360° virtual tour in front of the ceramics and the statue of Kouros from Lentini.

Coming from Sector A (Figure 17), after turning around a couple of casts of dwarf elephants from Spinagallo cave (from Syracuse), a remote user can see the displayed artifacts, starting with Neolithic artefacts of a civilization phase called *Stentinello* (VI millennium B.C.), going on to documents from Eneolithic age, to reach the exhibition space dedicated to the Bronze age: Ancient Bronze age (called *facies of Castelluccio*), Middle Bronze age (*facies of Thapsos*), Late Bronze age (*facies of Pantalica*) and Final Bronze age (*facies of Finocchito*), where he could admire the carved doors of Castelluccio's graves, shown in Figure 18, and the large clay containers from Thapsos and Pantalica necropolis. At the end of this exhibition area the findings from the necropolis of Villasmundo, with ceramics imported from Greece, document the thresholds of Greek colonization.

In the Sector B1, dedicated to the colonization, remote users can admire findings from the first cities founded by the Greeks in eastern Sicily (Naxos, Zancle, Leontinoi, Katane, Megara Hyblaea) with some of the most important Greek ceramics and sculptures, as the naked sculptures of young men coming from Leontinoi, here in Figure 19, and Megara Hyblaea.

The B2 Sector introduces the visitor to the archaeological findings from the city of Syracuse, from its foundation to classical age.

Here the most important spaces are those dedicated to the statuary and to the terracotta findings from urban excavations during the last decades (Piazza Duomo, Ortigia and Piazza della Vittoria, here in the backstage shooting in Figure 20), to the urban and extraurban necropolis (Fusco, Giardino Spagna, etc.) with a series of rich funerary kits and, finally, to the architecture of archaic and classical temples (as Athenaion, Ionic temple, Olympeion and Apollonion).

Figures 21-24 show the backstage shooting and the 360° virtual tour in the section of Athenaion and Ionic temples in Ortigia island.

Sector C, as we have just sayed, is dedicated to the colonies founded by Syracuse - Eloro (about 670 B.C.), Akrai (664 B.C.), Kasmenai (644 B.C.) and Camarina (598 B.C.) -, and to the largest colonies of south-eastern Sicily, Gela (689 B.C.) and Agrigento (580 B.C.), as well as to finds from other centres of eastern Sicily, like Monte San Mauro, Grammichele and Francavilla di Sicilia.

Camarina is the most important Siracusan sub-colony, with its vast necropolis of classical

age full of wonderful ceramics and with the large remains of its temples (a piece of art, for example, is a clay acroterion in shape of a knight, here presented in Figure 25).

Archaeological finds from the cities of Gela and Agrigento (ceramics, terracotta findings, architectural remains of temples, findings from sanctuaries and necropolis, such as the well-restored terracotta sarcophagi from Gela, as exposed in Figure 26) are of a great quality.

Fig. 20: Backstage shooting in the Sector B2: Greek terracotta findings from excavations at Piazza della Vittoria, Syracuse.

Fig. 21: Backstage shooting in the Sector B2: the Athenaion temple sector, Syracuse.

Fig. 22: The 360° virtual tour of the Athenaion temple sector, Syracuse.

Fig. 23: Backstage shooting in the Sector B2: the Athenaion and Ionic temple plastic models, Syracuse.

Fig. 24: The 360° virtual tour of the Athenaion and Ionic temple plastic models, Syracuse.

Fig. 25: Backstage shooting in the Sector C: the knight acroterion from Camarina.

Fig. 26: Backstage shooting in the Sector C: the terracotta sarcophagi from Gela.

Among the indigenous settlements, hellenized during the centuries, it's worth mentioning Monte

Fig. 27: Backstage shooting in the Sector D: statuary from Syracuse in Hellenistic and Roman age.

Fig. 28: Backstage shooting in the Sector D: *Head of Asclepius*, from the Amphitheater of Syracuse.

Fig. 29: Backstage shooting in the Sector D: the *Venus Landolina*.

Fig. 30: The 360° virtual tour of the *Venus Landolina*.

San Mauro di Caltagirone (famous for its small altars decorated with boars), Grammichele (an enthroned goddess is one of the museum's masterpieces) and Francavilla di Sicilia (well-known for its large deposit of pinakes, small terracotta squares in relief, dedicated to the worship of Demeter and Kore).

Sector D on the second level contains finds from the Hellenistic age to the Roman period, including statuary, as shown in Figure 27, beautiful portraits of Roman age, architectural pieces, ceramics, mosaics, cinerary urns and various handcrafts.

They document the multiple aspects of life in Syracuse and come from urban necropolis from III-II century B.C.

In this sector are masterpieces like the *Head of Asclepius*, here shown during the backstage shooting in Figure 28, and the wonderful statue of the *Venus Anadiomene*, also called *Venus Landolina* from the location of its discovery in 1804, in Figures 29 and 30.

In Sector F finds from the various catacombs in the city are exposed, documenting life in the Christian era. Here, as shown in Figures 31 and 32, is the *Sarcophagus of Adelphia*, a Christian marble sarcophagus found in the *Rotunda of Adelphia* inside the Catacombs of San Giovanni, just near the museum.

This is the most celebrated masterpiece in the museum toghether with the *Venus Landolina*.

Fig. 31: Backstage shooting in the Sector F: the marble *Sarcophagus of Adelphia*, from the Catacombs of San Giovanni.

Fig. 32: The 360° virtual tour in the Sector F: a zoomed view of the *Sarcophagus of Adelphia*.

The remote user can browse the museum in all the areas listed above, moving with the directional arrows, between sectors and levels.

The project provided the opportunity to carry out 360° virtual tours of some exposed archaeological finds, like an "augmented" virtual tour, certainly innovative compared to what has been previously seen on Google's platforms.

Google Art Project, infact, allows you to view POIs along the path in a museum, but captions are short and photos static, as we can see in two examples on Art Project collections such as from Galleria degli Uffizi in Firenze, here in Figure 33 (where the user can see *The birth of Venus* by Sandro Botticelli in gigapixel resolution since February 2011), and The Acropolis Museum in Athens, in Figure 34.

In Figures 35 and 36 we present a couple of examples of some collimation defects or image blurring a remote user could find browsing the virtual tour of both the museums.

As we say at the beginning, the quality of the tours' collimation and viewing in our project is better because the photographic documentation itself has been acquired with fixed stations, entering Paolo Orsi Museum's galleries.

As for the displaying on Google Maps of the 360° virtual tour of the objects, we must specify that Google Maps so far does not support the integration of menus, captions, photos, video, info inside the Street View virtual tour technology. Infact, is only allowed navigation in 360°, ie a virtual walk.

We tried to find an answer in order to show on Google Maps all the hard work made by information, captions, maps, levels and 360° virtual tour of objects. Thanks to customized i-frame Mr. Guccione made these virtual tours possible with their captions and the maps with different levels and clickable POIs, adding them to the existing virtual tour of the Museum, already on Google Maps, through a link containing the Google mapping of the Museum on Google+.

In this way the virtual tour of the Museum on Google Maps - made with Google standards - is "augmented" by another virtual walk much more complete and exhaustive, located (via link) on the Google Maps board of the Museum, where you can view all additional items (virtual tour of the objects, maps, captions, info).

Both the virtual tour of the museum and the virtual tours of the objects will be placed by links also on the Museum's website, with a third-level domain on the Regional Department for Cultural Heritage and Sicilian Identity portal (http://www.regione.sicilia.it/beniculturali/museopaoloorsi/).

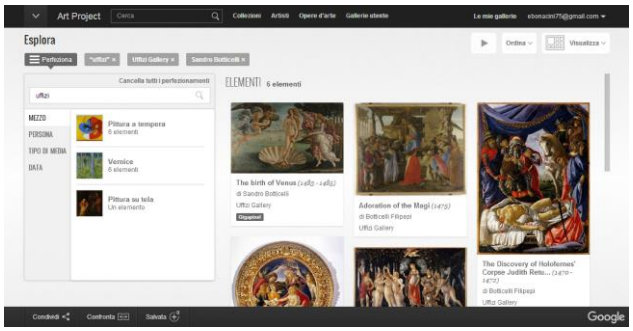

Fig. 33: The Galleria degli Uffizi collection on Art Project.

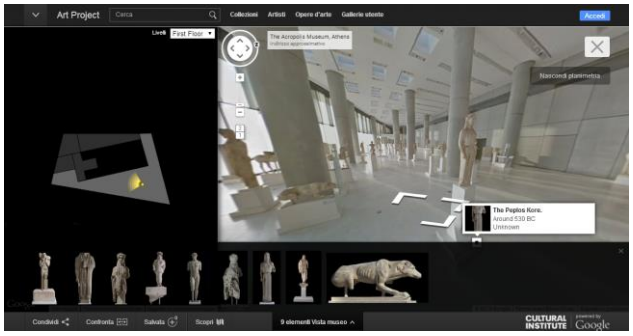

Fig. 34: The Acropolis Museum of Athens on Art Project.

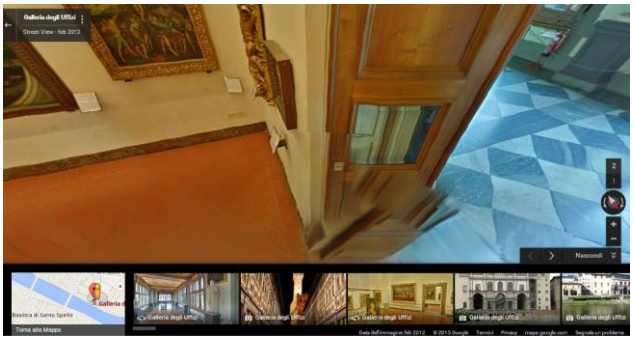

Fig. 35. Collimation defects along the virtual tour of the Galleria degli Uffizi on Art Project.

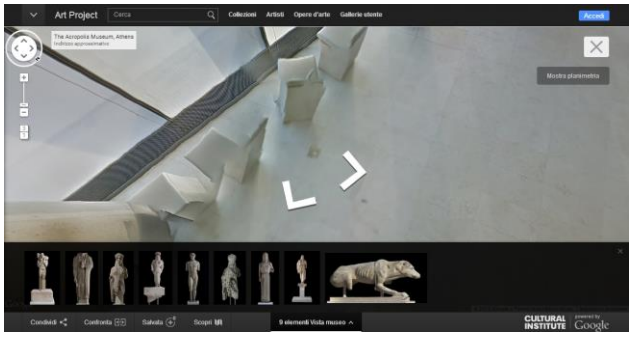

Fig 36. Collimation defects along the virtual tour of the the Acropolis Museum of Athens on Art Project.

The Museum staff has selected 12 objects along the path between the two levels, which can be linked as POIs placed directly on the Museum level maps and equipped by labels with a caption and a descriptive text.

Keeping fixed on tripods the reflex camera with a quadrangolar lens, the objects have been photographed flipping them on a graduated portable rolling disk. Each 360° object virtual tour took a number of about 88 shots, for a total of 1.062 shots.

The photos were mounted with specific softwares. In this way the remote user, clicking on the menu's list or on the POIs on the interactive map of the Museum, can admire the selected object in all its sides, by dragging the mouse on the right or on the left and zoom in-out.

Here we present some images of backstage, some of selected objects shown on the map of the museum and, finally, some screenshots of 3D virtual tours of the objects themselves online, signed as POIs on the interactive map.

From Sector A a foot-cup of the 15th century B.C. (Early Bronze Age) has been selected, relevant to the *facies of Rodì-Tindari* and coming from a set of burial objects in Vallelunga, in the province of Caltanissetta.

For Sector B1 (Greek colonies), you can admire a magnificent red-figured wedding lebes, attributed to Painter of Siracusa 47099, dated to 360-340 B.C. from Lentinoi (Figures 37-39). The main scene on the A side represents the goddess Persefone sitting with a servant in front; on the B side there is a woman sitting on a rock and a naked young athlete.

Numerous findings have been selected by the museum staff from Sector B2 to document the phase of colonization in Syracuse and its wealth between the 6th and 4th centuries B.C.: a proto-corinthyan *oinochoe*, dated to 670 B.C., from the excavations in Piazza Duomo; a plastic vase in the form of a lion, of Corinthian manufacture, dated 610-590 B.C. and an Attic black-figured calix-crater, made by the Antimene Painter in 520 B.C. (here in Figures 40-42), both coming from the Garden Spain Necropolis; an Attic black-figured Panathenaic amphora, dated to the middle of the 6th century B.C. from excavations in Viale Paolo Orsi; a terracotta bidder statuette, dated to the 4th century B.C., from the votive deposit in Piazza della Vittoria.

For the Sector C (sub-colonies of Syracuse and Hellenized indigenous centers) they have selected two Attic red-figured, examples of the richness and quality of imported products in the western colonies, and a bronze statue of local production.

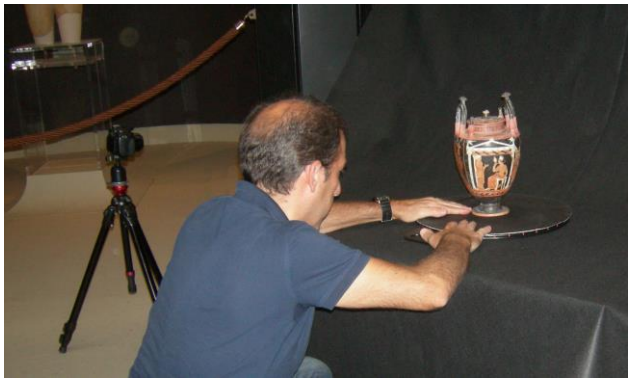

Fig. 37: Backstage shooting in the Sector B1: preparing of the set for the wedding lebes from Lentini.

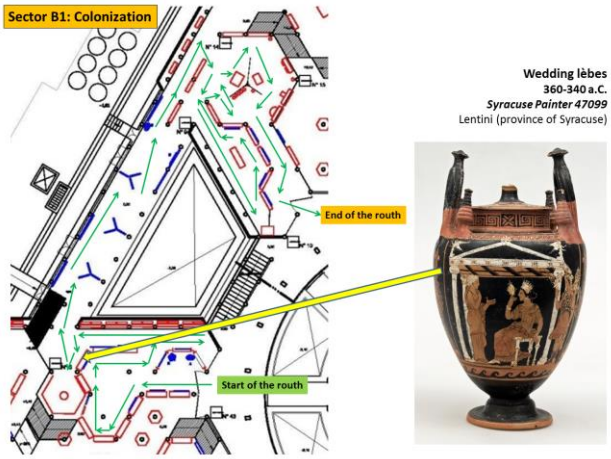

Fig. 38: Position of the wedding lebes in the museum's plan.

Fig. 39: The 360° virtual tour of the wedding lebes.

From Camarina comes a beautiful red-figured bell-shaped krater, produced in the workshop of the Athenian painter Polignoto, around 440-430 B.C., decorated on the A side with the Delphic triad (Apollo, Artemis and their mother Latona)

Fig. 40: Backstage shooting in the Sector B2: the calix crater from Syracuse.

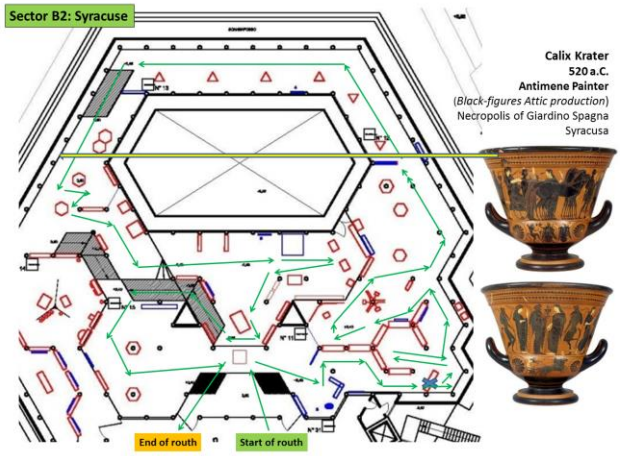

Fig. 41: Position of the calix crater in the museum's plan.

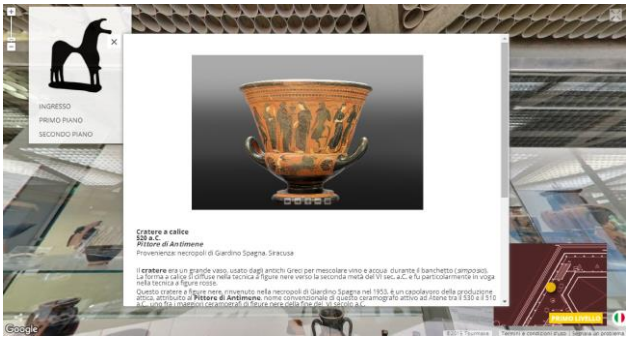

Fig. 42: The 360° virtual tour of the calix crater.

along with the boy Ganymede and Hermes, and side B decorated by three cloaked young men.

From the richest necropolis of Capo Soprano near Gela comes an Attic red-figured *lekythos*, dated to 470 B.C. and realized according to the manner of the London painter E342, decorated with a scene of everyday life: a woman is depicted in the act of putting in a large basket wrapped spindles of wool, resting on a table that lays ahead.

As an example of the quality of the local workshops' products, instead, the museum staff chose the small bronze athlete from the hellenized city of Adrano, dated to the first half of the 5th century B.C., named *Ephebus of Adrano* (Figures 43-45). Probably a young athlete, in full nudity, as well as ancient Greeks used for sports, he is making a libation to the gods for the victory achieved. The figure, a full merge bronze, it is generally thought to be a scaled-down copy of a large bronze original by Pythagoras (end of 6th - mid 5th century B.C.), the famous Greek sculptor from the island of Samos, also active in Magna Graecia. His name is among those which have been attributed to such works as the *Riace Bronzes*. This statue, although on a smaller scale, is a work of exceptional artistic quality and is one of the masterpieces of ancient Sicilian sculpture.

From Sector D (Hellenistic and Roman Syracuse) comes a masterpiece of local Hellenistic choroplastic production: a small terracotta boat from the Fusco necropolis in Syracuse, in the shape of a pistrix (sea monster).

Finally, the last selected object is a curious disk from Sector F: it is a marble disk, discovered by Paolo Orsi in the Catacombs of San Giovanni in 1894, decorated by a wreath of laurel leaves on one side; the other side was reused in the 4th century A.D. for the funerary inscription of Nassiane (Figures 46-48), woman who died at age 32 in God faith. This object has been selected both for the peculiar reuse and because it documents the religious syncretism of the early centuries of Christianity. The inscription, in fact, says: "*Oh friend, you see here the tomb of Nassiane, Christian, ripe, sweet, fond of her husband, who competed for virtue with Penelope. Here lies Nassiane,she lived well and blamelessly in God (?), 32 years and 10 months*".

This inscription documents such as epigraphic formulas affected by religious syncretism (syncretism generally means that a complex of phenomena and concepts derive from the meeting and fusion of different religious forms) between Pagans and Christians, for which a Christian like Nassiane could have competed in life with Penelope, the Greek hero Odysseus' wife and symbol of marital devotion.

As we said, to ease the individual path between the museum's sectors, the interactive map has been included where the remote user can identify sectors, plans and POIs with virtual 360° tours of the selected objects.

Fig. 43: Backstage shooting in the Sector B2: the calix crater from Syracuse.

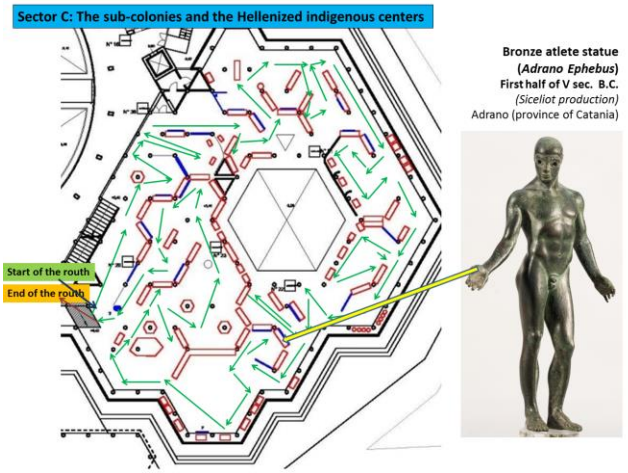

Fig. 44: Position of the calix crater in the museum's plan.

Fig. 45: The 360° virtual tour of the calix crater.

Fig. 46: Backstage shooting in the Sector F: the marble disk with Nassiane inscription.

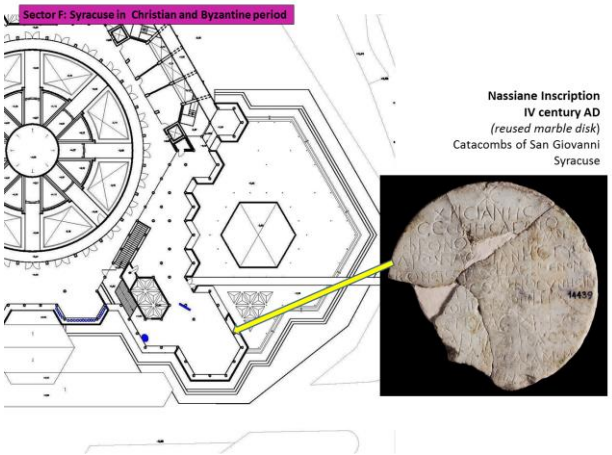

Fig. 47: Position of the Nassiane inscription in the museum's.

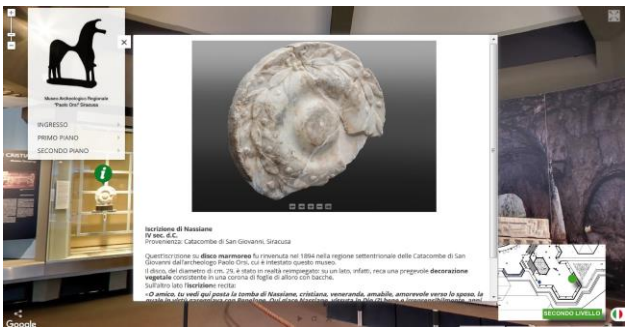

Fig. 48: The 360° virtual tour of the Nassiane inscription.

7. Conclusions

Digital accessibility and inclusion are now human rights as well as culture and freedom.

Today, new technologies offer considerable possibilities in terms of both conservation and dissemination and communication of cultural heritage.

As Polacci argued, "The major new feature introduced by the digitalization of images concerns the transformation of their status: they become documents in potential relationship with millions of other documents" (2015: 80).

An increasingly ask for a greater versatility in the presentation of museums' collections made

simple static websites insufficient in fulfilling the expectations of digital users for diverse audiences and for a wider inclusion.

For years museums and other cultural institutions are providing web and mobile access to their collections. This is a part of a wider effort both to increase public access to the world of art and culture and to improve visit experiences through multimedia solutions.

A great trend in the Cultural Heritage context is to improve cultural experiences by adopting technologies that support also the use of mobile devices, which can offer a closer combination of perception and knowledge.

According to some scholars (Kuflik, Stock, Zancanaro, Gorfinkel, Jbara, Kats, Sheidin & Kashtan, 2011), content and delivery must provide relevant information and allow visitors to get the level of detail and the perspectives, in which they are interested, at the same time.

As we argued at the beginning of this paper, Google is undoubtedly the most active entity in the world committed to preservation, dissemination and promotion of cultural heritage, well above any public institution, through an unparalleled campaign of digitization open to users' collaboration.

This could happen because Google itself has an incomparable capacity of economic investment. Even large international projects of digitization (such as *Europeana* itself)[39] are not able to compete with Google.

As we said at the beginning, also some specific softwares revealed their usefulnees. Google SketchUp, for example, has been very useful in 3D reconstruction of the landscape (such as the 3D model of Chichén Itzá, a Mayan city virtually rebuilt as well exposed by Volta, Levy & Brasweel, 2009), as well as Google Earth that "has dramatically democratized access to archaeological landscape information worldwide" (Thakuria, Padhan, Mohanty, Smith, 2013: 20), expecially in developing countries.

Therefore, after initial hesitation towards these Google's initiatives, now most of museums and cultural institutes in the world have seen in Google a partner that enables them to progress in the online visibility and in the several process of heritage digitization.

As Pezzini argued (2013), Google is perfectly realizing the *Imaginary Museum* theorized by Malraux[40]. But that's not all. He concluded that Google's initiatives such as Art Project so profoundly alters the relationship between the visitor and the museum that it is really difficult to include this platform in a conventional museum classification.

Polacci says that "The creation of Google Art Project has given impetus to a process already underway thanks to innovative techniques that radically change the ways artworks are seen. Street view technology, which opens the halls and galleries of a museum, immerses visitors in a simulated tour of the collections. We see the paintings of the chosen museum, the successive placement of the artworks, the transitions from one gallery to the next and their spatial layout" (2015: 74).

Regarding the project here presented, which concerns one of the two selected sites, we can rightfully say that it is the first archaeological museum in the world - needless to say, the first museum in Sicily - entirely browsable on Google Maps platforms with a virtual tour in all exhibition halls and 360° virtual tours with integration of captions and description of artworks.

In that a way, we can give the user two levels of understanding, both for who lacks specific skills and for who wants to examine artworks in a more intimate perception and a closer knowledge: namely those that are intended by Polacci as the two models of "audiences", the "average visitor" and the "art expert" (2015: 74).

Furthermore, we allow user to recognize artworks individually, in contrast to what Art Project does[41].

[39]Guerrini & Maiello, 2010.

[40]"Ci ritroviamo così di fronte all'ultima e più radicale forma di realizzazione del Museo Immaginario teorizzato da Malraux, secondo il quale la riproducibilità tecnica – che ai tempi in cui egli scriveva era ben lontana da raggiungere la dimensione che oggi conosciamo – poteva da sola far esplodere le comunque limitanti frontiere del museo tradizionale, permettendo al fru-itore un accesso alle opere esistenti libero dalle costrizioni del singolo museo, fornendogli al tempo stesso degli strumenti di lavoro e di studio liberati dal pur sempre fugace contatto visivo che si realizza nella visita fisica, spesso fra l'altro sottoposta a interferenze di vario tipo, dall'affollamento dei luoghi alla scarsità del tempo a disposizione, alla quantità di opere "da vedere" in un'occasione forse irripetibile" (Pezzini 2013: 43).

[41]As argued Polacci, "Street view technology gives a broad view of the artworks, but doesn't allow us to recognize them individually. For some of the paintings, a small square takes us to a link that gives the artist's name and the title of the work and lets us enlarge its image. This is the only indication

In the near future we hope to allow 360° visualization of a greater number of objects, with their accompanying captions translated at least in English and in audio version. An higher number of objects, viewable in such a way, could also improve the ability to relate one artwork to the others along the virtual path.

Thanks to this project we hope that Google itself could realize how the time has come to "rejuvenate" the Google Maps Street View system, allowing enabled users to apply additional content on the maps.

The integration of Google web platforms with mobile devices through Street View and Google + services, can enable users to visualize multimedia facilities (3D virtual tour and captions) of selected objects even when they are walking inside the museum and looking at objects exposed in the windows.

Combined with Qr codes or sensor technologies, traditional captions allow those who are physically visiting the museum of increase their visit by accessing depth digital contents.

However, the wide interoperability between Google softwares, the development of new solutions and the integration of geo-referenced results in the page results on the search engine continues unabated: the "Paolo Orsi" Museum - and with the museum, the city of Syracuse and the whole of Sicily – will surely take advantage of this new tool for its visibility.

8. *Acknowledgments*

To Mr. Gianfranco Guccione (http://www.airworks.it/) goes my heartfelt and deep thanks for having proposed to me this project and having concluded it togehter, with the only aim of enhancing the Cultural Heritage in Sicily.

I would like to thank some people, because without them it would not be easy to achieve this result: Professor Mariarita Sgarlata, formerly Regional Minister of Cultural Heritage and Sicilian Identity; Dr. Sergio Gelardi, formerly General Director of Cultural Heritage, Dr. Gaetano Pennino, current General Director of Cultural Heritage; Dr. Enrico Carapezza, Area Manager for General Affairs of the Department of Cultural Heritage and Dr. Maria Pia Bottino, formerly member of the cabinet of Regional Minister of Cultural Heritage and Sicilian Identity.

I warmly thank the all staff of the "Paolo Orsi" Regional Archaeological Museum in Syracuse for the great availability and friendship shown to me and Mr. Guccione: Dr. Gioconda Lamagna, executive head of the Museum, Dr. Angela Maria Manenti, head of relations with the public, all the archaeologists Dr. Anita Crispino, Dr. Agostina Musumeci and especially Dr. Giuseppina Monterosso, tireless in supporting the project at any time and formerly member of the cabinet of Regional Minister of Cultural Heritage and Sicilian Identity.

Many thanks to Dr. Peter Shishkov, Google Business Photos/Street View Indoor European Coordinator, for supporting Mr. Guccione's initiative.

To the University of Catania, to the Chancellor prof. Giacomo Pignataro and to the Humanities Department Director prof. Giancarlo Magnano San Lio deserve my thanks for allowing me to work on this project.

My deepest gratitude goes to my friend prof. Annalisa Bonica for the patience she showed in correcting this article.

in indoor view mode that partially directs the visitor". (Polacci 2015: 78).

REFERENCES

Adamczyk, P. (2015). Google Cultural Institute: Hands-on. In *MW2015: Museums and the Web 2015. Chicago, April 8-11*. Retrieved from http://mw2015.museumsandtheweb.com/proposal/google-cultural-institute-hands-on/.

Alsina, P. (2010). Presentation. *Digithum, The Humanities in the Digital Era*, 12, 1-2. Retrieved from http://journals.uoc.edu/index.php/digithum/article/viewFile/n12-alsina/n12-from-the-digitization-of-culture-to-digital-culture.

Bonacini, E. (2013). Communication and enhancement of Italian cultural heritage by Google. *Palabra Clave (La Plata),* 2(2), 49-63. Retrieved from http://www.palabraclave.fahce.unlp.edu.ar/article/view/PCv2n2a05/pdf.

Bonacini, E. (2014a). Google e il patrimonio culturale italiano. *SCIRES*, 4(1), 25-40. Retrieved from http://caspur-ciberpublishing.it/index.php/scires-it/article/download/10911/10116.

Bonacini, E. (2014b). *Dal Web alla App. Fruizione e valorizzazione digitale attraverso le nuove tecnologie e i social media*. Catania: Giuseppe Maimone Editore.

Farman, J. (2010). Mapping the digital empire: Google Earth and the process of postmodern cartography. *New Media &Society,* 12(6), 869-888.

Kuflik, T., Stock, O., Zancanaro, M., Gorfinkel, A., Jbara, S., Kats, S., Sheidin, J., & Kashtan, N. (2011). A visitor's guide in an active museum: Presentations, communications, and reflection. *Journal of Computing and Cultural Heritage*, 3(3), 1-25.

Guerrini, M., & Maiello, R., (2010). Si fa presto a dire "Biblioteche digitali": un confronto tra Google Book Search ed Europeana. *La bibliofilia*, 92(1), 77-93.

Manovich, L. (2008). *Software takes command* (unpublished edition). Retrieved from http://softwarestudies.com/softbook/manovich_softbook_11_20_2008.pdf.

Matarasso, F. (2010). Re-thinking Cultural Policy. In *CWE Conference, "Culture and the Policies of Change", Conference Reader, CultureWatchEurope Conference, Brussels, 6-7 September 2010* (pp. 66-76). Brussels: Council of Europe. Retrieved from https://www.coe.int/t/dg4/cultureheritage/cwe/Rethink_EN.pdf.

Pezzini, I. (2013). I nuovi musei immaginari. A partire da Google Art Project. *Reti, Saperi, Linguaggi*, 4(2-2), 40-43. Retrieved from http://www.coriscoedizioni.it/wp-content/uploads/2013/12/Pezzini.pdf.

Polacci, F. (2015). The Google Art Project: Democratisation of art or ideology of transparency? *THEMA, La revue des Musées de la civilisation*, 2, 73-84. Retrieved from http://thema.mcq.org/index.php/Thema/article/download/47/pdf.

Thakuria, T., Padhan, T., Mohanty, R.K., & Smith, M.L. (2013). Google Earth as an Archaeological Tool in the Developing World: An Example from India. *The SAA Archaeological Record*, 13(1), 20-24. Retrieved from http://www.sscnet.ucla.edu/anthro/faculty/smith/2013SmithGoogleEarth.pdf.

Vaidhyanathan, S. (2010). *The Googlization of Every-thing (and why we should worry)*. Berkeley-Los Angeles: University of California Press.

Volta, B., Levy, T.E., & Braswell, G.E. (2013). The virtual Chichén Itzá project: modelling an ancient Maya city in Google SketchUp. *Antiquity*, 83(321). Retrieved from http://www.antiquity.ac.uk/projgall/levy321/.