

ECOMAP project

“Good practices Report on Smart Tourism”

Archeology and Advanced Technology management solutions

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Abstract/Executive Summary

The main purpose of this report is exchanging and archiving best practices, competences and knowledge about the blue sector relating to the archaeology conservation and advanced technologies in environmental and cultural fields application brought through different initiatives by ECOMAP project and related FORUMs. This report explains precisely the contribution given by all relevant speakers and researchers on the one hand in the archaeology heritage of the Italian and Croatian coastal side and on the other hand the application, replication and improvement given by advanced technologies (ICT & 4.0 tools) in cultural and environmental panorama. ECOMAP project and these specific actions of awareness-raising and capacity-building is aimed at supporting port cities and encourage them to develop innovative and inclusive solutions for sustainable and accessible tourism, which makes use of digital technologies and which strengthens the function of heritage and cultural industry and creativity as tourist goods. All relevant speakers at the FORUMs and regional working groups on Blue Innovation have dealt with different topics in which smart tourism create its core within the ECOMAP project:

- Accessibility: accessible to travelers with special needs, regardless of age, economic or social situation or possible disabilities. Easily accessible by different means of transport and equipped with a functional and efficient internal transport network;
- Sustainability: actively committed to preserving and improving the environment and natural resources while maintaining a balance between economic development and socio-cultural development;
- Digitization: offering an innovative system of information, products, services, spaces and experiences related to tourism and hospitality, designed on the basis of consumer needs through ICT-based digital solutions and tools;
- Cultural heritage and creativity: making full use of their cultural heritage and the creative industry, for a rich tourist experience.

These abovementioned topics have been discussed in the FORUMs with partnership facilitation and co-participation of sectoral stakeholders, and some best practices are explained hereinafter.

Chapter 1 - Archeology and Industrial Archeology: insights and best practices from the Adriatic Sea

In regards of WP5.3 contribution to the Smart Tourism set of actions, a specific module of REMTECH EXPO 2020 FORUM (November) has been addressed to “Protection and Sustainable Development of the territory”, in which many best practices have been presented and disseminated:

Sergio Calò from Venetian Cluster introduced the specific topic sharing some suggestions and information about the sub marine cultural heritage of the Gulf of Venice. The relator brought some examples of existing modalities, specific information of historical wrecks and generally of the cultural underwater findings (in Laguna del Mort and Venetian Brigantino into the Lido of Jesolo and many others), that can be easily reproduced virtually. Converting the underwater heritage by giving a virtual nature, so a new life (creative industry with immersive small museums) is extremely relevant nowadays. That can be replicate everywhere and ensure some turistic alternatives with new content to be discover. Here below best practice’s explanation:

Archaeological Findings in The Gulf of Venice



- An amazing collection of Underwater Findings has been discovered through the years in the Gulf of Venice by many researchers.
- Through Virtual/Immersive realities, these discoveries can be replicate and known by people who cannot diving, for touristic purposes.

other wrecks

- Of Glass, transport ship of green glass of the 16th century from the Middle-East
- Of "Ceppe", vessel dated between 1600 – 1700
- Of "Cannoni", warship sunk in 1698 in Malamocco
- Of "Algae", ship loaded with amphoras sunk nearby Caorle
- Of Laguna of Mort in Eraclea, two warships from 1850
- And the Venetian Brigantino nearby Jesolo at a depth of 10 meters.



the Wreck of Brigantino "Margareth"

the MOSE works has brought to light this wreck sunk in 1853 in the Malamocco Port. That was emerged from the underwater, but then in 2008 has been sub-merged again for preserving the original structure.

the Wrecks of "San Marco in Boccalama"

Two 14th century galleys found during the excavations of the canal of petroli, on the edge of the island of San Marco. The seabed perfectly preserve them.



In regards of WP5.3 contribution to the Smart Tourism set of actions, a specific module of JOINT COMMUNICATION EVENT INTERREG ITALY-CROATIA held online on 24.06.2021 has given contribution to the archaeological tour in the Croatian Coastal side as well as for the Italian coastal archaeology. Representatives from the Municipality of Podstrana has explained some of the main archaeological findings in this area, in particular megalithic stone blocks of the original Pituntij fortifications in the wall surrounding the graveyard of St. Martin and also fragments of the Roman mosaic. Here below best practice's explanation:

Archaeological Findings in Podstrana

- The Municipality of Podstrana is one of the most developed municipalities in Croatia, situated in the Split-Dalmatia County with 6 km of marine coastal area and around 10.000 inhabitants
- The palette of the landscapes of Podstrana is truly remarkable: the mountain peaks and the southern slopes of Perun hill, the seacoast and the banks of the river Zrnovnica
- Throughout history, this area of stone, sea and sun, has been changing the outlook and the structure of this locality and its inhabitants who have left many interesting traces of their existence.



Archaeological Findings in Podstrana

- Megalithic stone blocks of the original Pituntij fortifications in the wall surrounding the graveyard of St. Martin.
- Tumulus Pišćenica
- The fragment of the Roman mosaic on the old graveyard of St. Martin
- Illyrian castle – today's old Podstrana
- stone bowl from the Roman well in St Martin
- the remains of the Roman stone mill for olives on the graveyard of St. Martin
- stone beam of the ancient wine and olive press
- the reconstruction of Lucius Artorius Castus (respectable Roman figure from I /III century B. C.) epitaph



Lucius Artorius Castus - King Arthur

The largest concentration of Roman findings is in the vicinity of the church of St. Martin. In the area of Podstrana, many tombstone inscriptions were found, and the two most significant ones were built into the fence wall of the church of St. Martin. These are fragments of inscriptions mentioning the high Roman official Lucius Artorius Castus (according to many historical researches King Arthur).

The early mediaeval legend of King Arthur most likely originates from the life of one Roman from Podstrana, an eminent military commander and governor of the province of Liburnia, buried in a lavish grave in the Roman Pituntium, today the village of St Martin. The original tombstone bearing the name of Lucius Artorius Castus and a list of his important military and political functions is today kept in the Church of St Martin.



The remains of the late antique architecture found in the seabed in the vicinity of Church of St. Martin in Podstrana

- In the early Middle Ages, the castle of St. Martin is mentioned in the conflict between the Venetian doge Petar Tradonik and the Croatian duke Mislav in the 9th century. Doge Petar Tradonik wanted to subjugate the entire area of the Roman province of Dalmatia. With this intention, he came with warships near the city of Split, but due to the resistance he was forced to make peace with duke Mislav. Peace was made in 839 in the duke's castle of St. Martin in Podstrana. Thus, after this historical event, Podstrana became one of the oldest known places in the vicinity of city of Split.
- In the vicinity of the church of St. Martin, along with today's pier, as well as below it, in part of its foundations, the remains of an architectural construction - the wall - are visible. It is an underwater structure that extends in a total length of about 20 meters, about 35 cm wide. Given the typology of construction and the fragments of archaeological material that are located next to it, most likely a structure built between the 2nd and 4th century. Thus, it is an extremely valuable archaeological finding that was most likely part of the construction of a late antique farm building, the remains of which can be traced further on land.



In regards of WP5.3 contribution to the Smart Tourism set of actions and to the archaeological best practice and knowledge between Croatian and Italian Coasts, a specific module of EVENT FORUM called “Reducing waste of freshwater, plastics and contamination in coastal areas improves the marine environmental status” held in Fermo (Marche) by OGS on 3rd April 2022, the Upper Adriatic Technology Park of Pordenone has presented a specific topic dealing with “Maritime routes of the Venetian Republic”, interesting for identifying wrecks and galleys in the Adriatic Sea. Here below best practice’s explanation:

Maritime routes of the Venetian Republic

ECOMAP | Polo Tecnologico Alto Adriatico |
Diego Santalana
Fermo, 03/04/2022

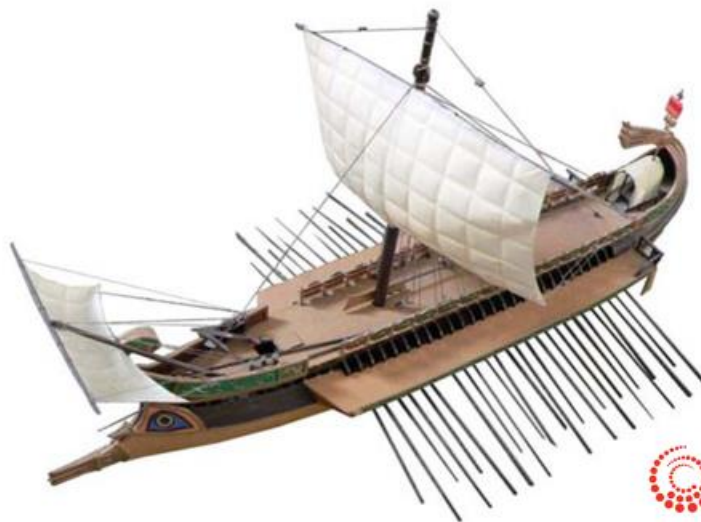
European Regional Development Fund

After the fall of the Roman Empire the Mediterranean trade had not a complete halt.



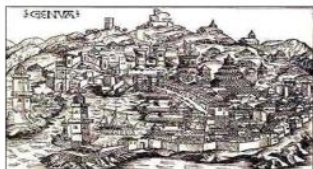
The international politics of the Emperor Justinian, who ruled also on many Italian regions, pushed Italian merchants to set sail along the Mediterranean: 1) Italy was not very far from the East; 2) coastal shipping allowed them to touch many ports during their voyage and, last but not the least, the Italian city-states were very active in trading.

These new Italian commercial relations were a new beginning for a Mediterranean globalization and gave new life to a politics of international exchanges which had been greatly reduced in the period of the decline and fall of the Roman Empire.



Merchants from Genoa and Venice soon became leaders in Eastern trade and they created their own quarters and forts on the seashores of the Balkans, Anatolia, Syria and Egypt to secure their trade.

Little by little the Venetian succeeded in overcoming their rivals in the East, while the Genoese turned above all towards the West. In this way, Venice became one of the most important European markets where to find goods coming from the East and from Muslim countries.



Genoa



Venice

The premises for the great fortune of the history of the Republic of Venice are closely linked to the great maritime and commercial organization that the government of the Serenissima was able to give in the context of a precise sharing and coincidence between the ruling class and the mercantile patriciate, a unique context in which it interests private individuals and family members coincided extraordinarily with the same interests of the citizen "Res Publica" and of its entire social structure.

Even before the Republic was interested in the control and expansion of its borders beyond the line of the lagoon to the mainland, Venetian ships and merchants were important presences in the Adriatic Sea, in the Mediterranean Sea and in the smaller seas connected to it.



Dalmatian coast

A presence whose strategic importance is testified by the repeated struggles for the control of these seas against the Genoese rivals and by the scientific organization of the mude system that from the early '300s the mude direct on the Eastern Mediterranean routes annual convoys that arrive to be made up of 10 (Mude of Romania, towards Tana) up to 19 galleys (Mude of Cyprus and Armenia, towards Laiazzo) for a total calculated on a century and a half of 752 Venetian "public" ships.

To these must be added the hundreds of private boats which, with functions of connection to the officially scheduled ports of call, carried trade along the coasts of the entire Adriatic and Mediterranean regions.

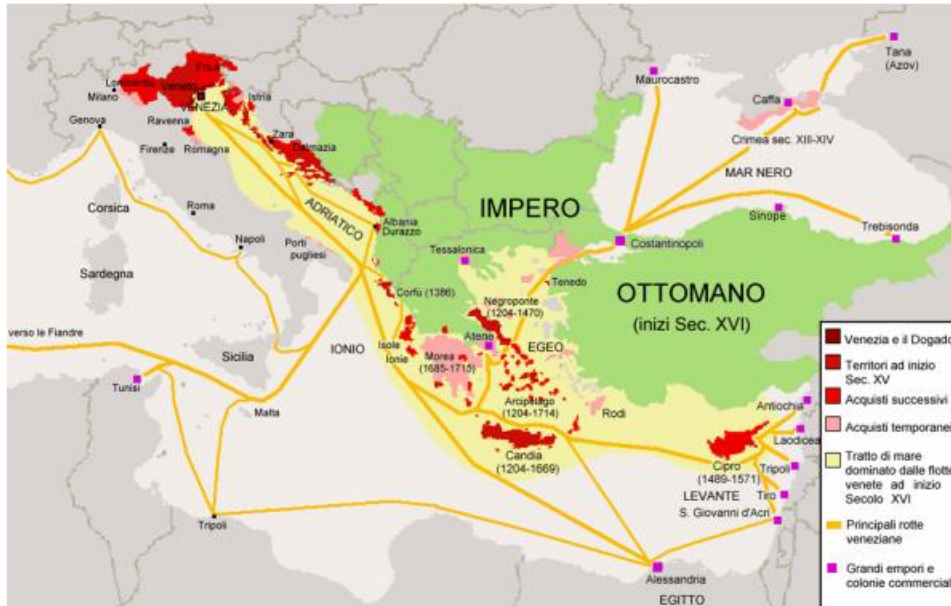


Even in the most ancient Middle Ages, fleets sailed in East and West to be in contact with trades.



These places and itineraries saw the passage of Marco Polo in the direction of the mythical Catai, entire families of nobles kept their relatives there, thousands of sailors aboard their galleys spent a long part of their hard activity there. Byzantine Greeks, Armenians, Slavs, Arabs, Mongols and gradually Turks were their local interlocutors in a continuous game of alliances and oppression dictated by the skills and weight of the highest bidder of the moment.

How much remains today of these glories and the Mude of the Levant? As for our days, the traces of that maritime and commercial system emerge from history which extended as far up in the Black Sea as far as Georgia, Ukraine, Moldova, Romania, Bulgaria, as well as down in the Mediterranean Sea through Syria, Lebanon, Jordan, Israel, Egypt. with connections along the coast of North Africa to Libya, Tunisia, Algeria, Morocco?



Not much in our memory of distant seas; but certainly something very interesting if we look at the architectural vestiges, old castles or port structures that even here, even today, remind us of the greatness of Venice.

What today fascinates traveling along the eastern coasts of the Adriatic, between the islands and the Ionian shores, and the Aegean, has an immediate translation into civil or military architecture that immediately refers to Venice and its symbols.

What perhaps even more captivating is being able to get lost in the fantasy of almost exotic names of distant ports and cities such as Korcula, Ragusa, Trebizond, Tana, Alessandretta, Laiazzo, S. Giovanni d'Acari, Samarkand, places that we struggle to place today in the maps, but where at the beginning, in contact with the most varied populations, languages and religions, and projected towards the silk road, the merchants and the city of Venice built the foundations of their fortunes.

Few, outside the circle of scholars or enthusiasts, focus these localities in the geographical space of the Adriatic, the Black Sea, the Sea of Azov, ancient Armenia, the Turkish, Syrian, Lebanese, Israeli, Egyptian coasts of the White Sea.

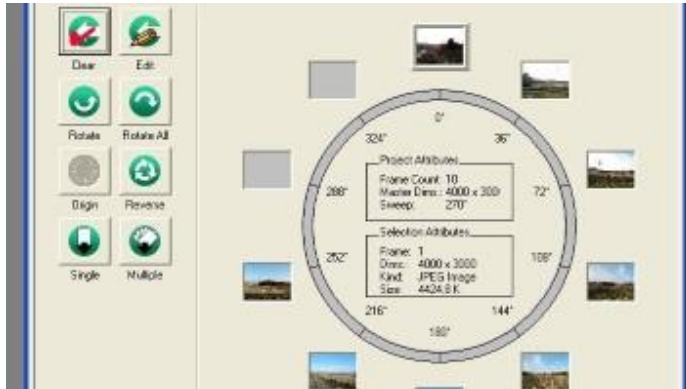
Even fewer are those who connect them to the distant and glorious history of the Republic of Venice.

To study these relics of past ages and the communities who lived there is the basis on which **a special eco-museum can be created**: in this way history, restoration and tourism proceed together, on a common cultural background, shared by peoples coming from different countries.

Chapter 2 - Advanced Technologies and the Cultural Heritage

In regards of WP5.3 contribution to the Smart Tourism set of actions, a specific module of REMTECH EXPO 2020 FORUM (November) has been addressed to “Protection and Sustainable Development of the territory”, in which many best practices have been presented and disseminated, this below on advances technologies and the cultural heritage:

Antonio Giacomini, from Fluid Reality working on extensive and immersive realities (such as virtual environments) in collaboration with Trieste Contemporanea, brought up **four cases of virtual environments for the enhancement of the territory**. At the beginning of virtual reality, that has become officially available in the 90s, there were such modes that now are already evolving into new ones (virtual tours with single and multi-users). In Trieste area (2016, Freeway Trieste – Sistema ARGO, like an industrial Innovation Hub), one virtual tour (one of the first ones) with video content has been created to the general public disposal. This one may re-create, through a reserve area where people can enter in, parts of Port of Trieste. The second case study called “Germi di forma” showed by the interlocutor was a virtual tour with photo and video content available in Carà Museum (Muggia, Trieste). The third case study presented is an Immersive Museum through AR (Augmented reality) APPs (connected with the physical environment) in MIRA Morandini (San Giorgio in Nogaro, Udine). The last case study presented was BOTH WAYS – ESOF 2020 (real-physical-virtual space), that is a multi-user social VR virtual tour available in Trieste, Belgrade, Budapest, Cluj-Napoca and Rijeka.



The beginning

Panorama(QTVR)

Virtual environments for culture - Antonio Giacomini

 fluido
digital experiences



The evolution

Virtual tours
 - single-user
 - multi-user

Virtual environments for culture - Antonio Giacomini

 fluido
digital experiences



Case study #1 virtual tour with video content

Freeway Trieste - Sistema ARGO
(for Area Science Park)

Virtual environments for culture - Antonio Giacomini



Case study #2 virtual tour with photo content

Germi di forma - Museo Carà - Muggia (TS)

Virtual environments for culture - Antonio Giacomini





Case study #3 Location Based Experience

Museo Immersivo in Realtà Aumentata - MIRA Morandini - San Giorgio di Nogaro (UD)

Virtual environments for culture - Antonio Giacomini



Case study #4 Multiuser social VR virtual tour


BOTH WAYS - ESOF 2020 (Trieste, Belgrade, Budapest, Cluj-Napoca, Rijeka)

Virtual environments for culture - Antonio Giacomini



In regards of WP5.3 contribution to the Smart Tourism set of actions and sub-title on Advanced technologies and cultural heritage, a specific module of TIPICITA' IN BLU FORUM (MAY 2022) has been organized, in which many best practices have been presented and disseminated: Sergio Calo', Cluster Manager of the Cluster for Cultural and Creativity of FVG Region has presented the best practices from the FVG region in regards of the advanced technologies in culture and environment. Here below best practice's explanation: Creative Industries in FVG

Region has good statistics: 5179 ICC companies in 2019 and 5090 in 2020. The product value was around 1.849 million of euro in 2021 with 31.000 cultural & creative experts.





I numeri in Regione: le Creative Industries

Numero aziende afferenti ai settori considerati core sono nel 2019 **5.179** nel 2020 **5.090** di cui

	Architet. e design	Comunicazione	Audiovisivo e musica	Videogiochi e software	Editoria e Stampa	Perf. Arts e arti visive	Patr. Stor. e artistico	Totale Core
2021	1.717	610	230	712	1.225	583	13	5.090

Valore prodotto pari a **1.849 milioni di euro nel 2021 e 31 mila addetti**
 Il valore aggiunto ovvero il creative driven (es. impatto sul turismo, produzione locali, artigianato, etc..) equivale a circa la metà del settore Core.

CLUSTER CULTURA E CREATIVITA'

REGIONE FRIULI VENEZIA GIULIA
 Sergio Calò – Cluster Manager

Le tecnologie informatiche per il Patrimonio Culturale e Ambientale

20 Maggio 2022




Chi siamo e cosa facciamo



La nostra missione



Il Cluster sviluppa economicamente, culturalmente e socialmente il partenariato pubblico-privato e il territorio attraverso la realizzazione di progetti per il patrimonio culturale, ambientale e il turismo.

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Coordina e sostiene i partenariati multidisciplinari pubblico-privato (PPP), le imprese, i professionisti, le associazioni, gli enti pubblici e privati, gli istituti di ricerca e tutti i soggetti interessati a realizzare e promuovere progetti di innovazione, trasferimento tecnologico, azioni per lo sviluppo in Italia e all'estero.

FVG Cluster develops economically, culturally and socially the public-private partnership and territories through the realization of projects for cultural, environmental and touristic heritage. FVG Cluster coordinates and sustains multidisciplinary public-private partnership, enterprises, experts, associations and public and private entities, research institutions, and all those interested bodies that want to promote and realize innovative projects, technology transfer, development actions in Italy and abroad. Creative and Cultural Industries: the decisive contribution of Creative Industries capable of competing on the global scene is increasingly affirmed. This trend has merited within the European Commission specific lines of action and support aimed at favoring those innovative and technological processes (creativity, design, new business models and organization, etc.) capable of offering perspectives of intelligent specialization to other more sectors. traditional. Through the possible combination with the most horizontal of enabling technologies, ICT, IoT, Natotech, Biotech, the Region can leverage that concentration of knowledge and know-how that is the basis of the excellence that has characterized and characterize the region in cinema, in the literary, visual, musical arts, in the performing arts and design, in order to trigger innovation processes and support the competitiveness of the economy. This is an address that follows on from initiatives already implemented in the area and which see Friuli Venezia Giulia, for example, among the highest density realities of Creative Industries.

These are accompanied by skills for cultural heritage and technologies of culture: the cultural heritage of the FVG must be protected, preserved and enhanced, so as to make it an even more important asset for economic growth not only in the tourism sector, but, more in general, of the whole Region. The insistence on the territory of a frontier knowledge, technological and otherwise, about the restoration and conservation of the artistic, architectural, archaeological and cultural heritage is traditionally one of the Italian and regional excellences in the world. The specialization path will move in two directions: i) finalize knowledge and technologies for the restoration and conservation of cultural heritage in products and services; ii) to develop technologies, processes, products and services for the advanced use of the regional artistic, architectural, archaeological and cultural heritage.



Il contesto Europeo e La realtà Regionale

Le Industrie Creative e Culturali: sempre più si afferma il contributo decisivo delle Creative Industries capaci di competere sullo scenario globale. Tale tendenza ha meritato in sede di **Commissione Europea specifiche linee di azione e supporto** volte a favorire quei processi innovativi e tecnologici (creatività, design, nuovi modelli di business e organizzazione, etc.) in grado di offrire prospettive di specializzazione intelligente ad altri settori più tradizionali.

Attraverso la possibile combinazione con le più orizzontali delle tecnologie abilitanti, ICT, IoT, Natotech, Biotech, la Regione può fare leva su quel concentrato di conoscenza e know-how che è alla base delle eccellenze che hanno caratterizzato e caratterizzano la regione nel **cinema, nelle arti letterarie, visive, musicali, nelle arti performative e del design,** al fine di innescare processi di innovazione e sostenere la competitività dell'economia. È questo un indirizzo che fa seguito ad iniziative già messe in campo sul territorio e che vedono il Friuli Venezia Giulia, ad esempio, tra le realtà a più alta densità di Creative Industries.

A queste si affiancano le competenze per i **Beni culturali e tecnologie della cultura:** il patrimonio culturale del FVG, deve essere tutelato, preservato e valorizzato, sì da renderlo un asset ancor più importante per la crescita economica non soltanto del settore turistico, ma, più in generale, di tutta la Regione. L'insistenza sul territorio di un sapere, tecnologico e non, di frontiera circa il restauro e la conservazione del **patrimonio artistico, architettonico, archeologico e culturale è tradizionalmente una delle eccellenze italiane e regionali nel mondo.** Il percorso di specializzazione muoverà in una duplice direzione: i) finalizzare in prodotti e servizi il sapere e le tecnologie per il restauro e la conservazione dei beni culturali; ii) sviluppare tecnologie, processi, prodotti e servizi per la fruizione avanzata del patrimonio artistico, architettonico, archeologico e culturale regionale.









The vision of the FVG CC Cluster is around these: inclusiveness, they are made up of professionals, associations, NGOs, research centers, micro, small and medium-sized companies, universities... etc; transversal, we are made up of multiple sectors, even different and apparently far from ICT to Literature, from Design to Restoration, from Clothing to Theater, etc. They perceive: increase economies, through innovation of products, services, technologies; increase prospects, expanding activities for new customers, in Italy and abroad; be inclusive and implement tools, technologies, activities and services for the vulnerable; connecting the different companies and professions of the Creative Industries with other companies in tourism, manufacturing, marine

technologies, the environment, agri-food, Smart Health; giving and receiving training to improve skills.


LA NOSTRA VISIONE


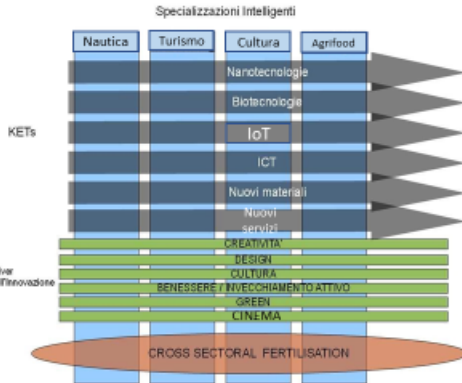
INCLUSIVI – siamo composti da professionisti, associazioni, ONG, centri di ricerca, aziende micro, piccole e medie, università... etc;







TRASVERSALI – siamo composti di molteplici settori anche diversi e apparentemente lontani dall'ICT alla Letteratura, dal Design al Restauro, dall'Abbigliamento al Teatro....etc.;

VOGLIAMO

- Aumentare le economie**, attraverso innovazione di prodotti, di servizi, di tecnologie;
- Aumentare le prospettive**, ampliando le attività per nuovi clienti, in Italia e all'estero;
- Essere inclusivi** e realizzare strumenti, tecnologie, attività e servizi per le fasce deboli;
- Connettere le diverse aziende e professioni** delle Creative Industries con le altre imprese del turismo, del manifatturiero, delle tecnologie del mare, dell'ambiente, dell'agroalimentare, dello Smart Health;

Dare e ricevere formazione per migliorare le competenze:


Le strategie di sviluppo

«Contenuti nei quali potersi riconoscere per le proprie competenze, progetti e necessità»










The development strategies deal with: 1) R&D of technologies, R&D of new materials and advanced technologies and the development of approaches and technologies; 2) creation of creative industrial system with the interconnection of research bodies, qualification of human resources, improvement of competitiveness, improvement of technological transfer and development of partnerships; 3) development of organizational models for cultural and creative industries with market-linkages through innovation in services, process innovation systems, development of organization architecture of the enterprise, improvement of the competitiveness of services; 4) development of new leverage and competitive areas for creative industries for entering in new markets, valorization of international collaborations to facilitate the demand, access to new funds and co-financing calls and contribute to the horizontal fertilization between different many sectors.



Le strategie di sviluppo

Ricerca sviluppo e innovazione tecnologica

- Ricerca e sviluppo – di tecnologie** per la digitalizzazione e per la connessione di cose e persone, per la fruizione del patrimonio tangibile e intangibile (es. VR, AR, MR) la conservazione, la gestione, la promozione, protezione dei dati e dei diritti d'autore, co-creazione di opere, la realizzazione di nuovi servizi e sistemi di vendita anche in remoto, l'inclusività fisica, culturale e sociale, la visualizzazione in remoto e interattiva.
- Ricerca e sviluppo – Nuovi materiali e tecnologie avanzate** per il design, il restauro, la conservazione, gli edifici storici e artistici, e al patrimonio tangibile e intangibili, l'inclusività sociale e fisica, per la produzione sostenibile
- Sviluppo di approcci e tecnologie** volte a favorire la mitigazione e l'adattamento ai cambiamenti climatici in supporto allo sviluppo del Green Deal










Le strategie di sviluppo

Creazione di un sistema per le Creative Industries:

Interconnessione con le strutture di ricerca come le università, i poli scientifici e tecnologici, i Poli di formazione e l'acquisizione di competenze personali, nuovi addetti, conoscenza delle tecnologie e dei materiali innovativi.

Favorire la nuova imprenditoria e sviluppare i poli di innovazione

Contribuire alla qualificazione della formazione delle risorse umane.

Migliorare la competitività e l'innovazione del sistema produttivo tradizionale

Rafforzare e migliorare i sistemi di **reti di imprese e cluster**

Rafforzare e coordinare la ricerca scientifica applicata

Migliorare e diffondere il trasferimento tecnologico con la formazione e le attività dirette con le imprese

Sviluppo partenariati europei ed extra europei



Le strategie di sviluppo

Sviluppo dei modelli organizzativi - per le Creative Industries:

Approccio ai mercati, attraverso innovazione di servizi, prodotti processi, modelli di business e miglioramento di quelli esistenti con particolare attenzione alla sostenibilità e alle tematiche ambientali.

Innovazioni di processo, miglioramenti dei processi produttivi, filiera corta delle forniture tra aziende e PPP regionale per migliorare il vantaggio competitivo, attenzione alla sostenibilità, alla standardizzazione, all'inclusività.

Sviluppo della struttura organizzativa dell'impresa con l'obiettivo di migliorarne la gestione, anche attraverso l'inserimento nell'organizzazione di figure specialistiche manageriali come per esempio di temporary manager, export manager, innovation manager.

Migliorare la competitività nell'offerta di servizi per l'innovazione del sistema produttivo tradizionale, anche in connessione alle altre realtà produttive in campo di innovazione prodotto e tecnologie come per esempio le tecnologie abilitanti, (nano, bio, laser, etc).




Le strategie di sviluppo

Sviluppo di leve e ambiti competitivi per le Creative Industries:

- Ingresso in nuovi mercati e settori** o l'apertura verso nuovi settori merceologici in regione, in Italia e all'estero, con azioni di accompagnamento, formazione strutturata, aggregazione in filiere complementari, inserimenti in progetti internazionali (ICE, Invitalia, MISE, MAE).
- Valorizzare le collaborazioni internazionali per favorire la domanda**
- Accesso ai finanziamenti, cofinanziamenti anche favorendo l'accesso al capitale di rischio e di debito.**
- Valorizzare e favorire le collaborazioni internazionali**
- Favorire la **fertilizzazione orizzontale** tra cluster e settori diversi come ad esempio il turismo, la manifattura, le tecnologie del mare, l'ambiente, l'agroalimentare, lo Smart Health, etc..








Technologies for Cultural Heritage and Landscape are a stimulating opportunity for the development of many sectors related to Heritage:

- Conservation (cataloging, diagnostics, analysis and monitoring)
- Restoration (Nano, Bio, Laser, ICT, etc. for all phases such as consolidation, cleaning, protection)
- The enhancement and communication of content
- The inclusiveness of the sites and content
- Use in presence and remotely
- Promotion and complementarity with other productive sectors such as tourism
- Flow management
- The economic and environmental sustainability of the heritage



Le Tecnologie per il Patrimonio Culturale e il Paesaggio sono una opportunità stimolante per lo sviluppo di molti settori legati al Patrimonio:

- La conservazione (catalogazione, diagnostica, analisi e monitoraggio)
- Il restauro (Nano, Bio, Laser, ICT, ecc. per tutte le fasi come consolidamento, pulitura, protezione)
- La valorizzazione e la comunicazione dei contenuti
- L'inclusività dei siti e dei contenuti
- La fruizione in presenza e in remoto
- La promozione e la complementarità con altri settori produttivi come il Turismo
- La gestione dei flussi
- La sostenibilità economica e ambientale del patrimonio



The macro groups of technologies available and used are:

- Virtual Reality, Augmented Reality, Mixed Reality
- Videogaming, storytelling, cinematic paradigms and 3D reconstructions
- Proximity technologies (bluetooth, beacons), IoT, computer graphics and three-dimensional holographic projections,
- High resolution immersive multi-projections
- Solutions for the safety and monitoring of cultural heritage
- Alternative energy sources for cultural heritage
- Innovative models of cultural heritage management;
- Digitization, archiving, use and enhancement of cultural heritage;
- Business model systems platforms for the protection, safety and management of cultural sites;
- Restoration, redevelopment and enhancement of buildings and places of culture;
- multi-screen and multi-sensory environments;
- 3D relief, modeling and printing technologies;
- Technologies for surveillance, security of cultural heritage;
- Digital Art and Light art.

In Augmented Reality (AR) the computer uses sensors and algorithms to determine the position and orientation of a camera. Using a computer, AR technology creates objects in 3D graphics and orients them as they would appear from the camera's point of view, finally superimposing the generated images on those of the real world. [Real world enriched with digital content]. In Mixed Reality (MR) virtual objects

are not simply superimposed on the surrounding reality, but are anchored to it, so that the user can interact with it, creating a particularly dynamic experience. [Real world enriched with interactive digital content]. The term Virtual Reality (VR) refers to the use of information technologies to create a simulated environment. Unlike other traditional user interfaces, VR technology places the user within an experience: instead of viewing a screen in front of them, users are immersed and able to interact with virtual 3D worlds in which they can be simulated all the senses: sight, hearing, touch, and even smell. [Fully digital world].



Quali sono i macro gruppi di tecnologie disponibili e utilizzate

- Realtà Virtuale, Realtà Aumentata, Mixed Reality
- Videogaming, storytelling, paradigmi cinematografici e ricostruzioni 3D
- Tecnologie di prossimità (bluetooth, beacon), IoT, computer grafica e proiezioni olografiche tridimensionali,
- Multiproiezioni immersive ad alta risoluzione
- Soluzioni per la sicurezza e il monitoraggio dei beni culturali
- Fonti energetiche alternative per i beni culturali
- Modelli innovativi di gestione dei beni culturali;
- Digitalizzazione archiviazione fruizione e valorizzazione patrimonio culturale;
- Piattaforme sistemi modelli di business per tutela, messa in sicurezza e gestione dei luoghi culturali;
- Restauro, riqualificazione e valorizzazione di edifici e luoghi della cultura;
- ambienti multi screen e multisensoriali;
- Tecnologie di rilievo, modellazione e stampa 3D;
- Tecnologie per la vigilanza, la sicurezza dei beni culturali;
- Digital Art e Light art.








In the further slides, there are some „real“ examples of technologies for cultural and environmental heritage.



Realtà Aumentata, Mista e Virtuale



Nella **Realtà Aumentata (AR)** il computer utilizza sensori e algoritmi per determinare la posizione e l'orientamento di una telecamera. Attraverso un computer, la tecnologia AR crea oggetti in grafica 3D e li orienta come apparirebbero dal punto di vista della telecamera, sovrapponendo infine le immagini generate a quelle del mondo reale.

[Mondo reale arricchito da contenuti digitali]



Nella **Realtà Mista (MR)** gli oggetti virtuali non vengono semplicemente sovrapposti alla realtà circostante, ma vengono ancorati ad essa, in modo che l'utilizzatore possa interagirvi, creando un'esperienza particolarmente dinamica.

[Mondo reale arricchito da contenuti digitali interattivi]



Con il termine **Realtà Virtuale (VR)** si intende l'uso di tecnologie informatiche per creare un ambiente simulato. A differenza di altre interfacce utente tradizionali, la tecnologia VR pone l'utente all'interno di una esperienza: invece di visualizzare uno schermo di fronte a loro, gli utenti sono immersi ed in grado di interagire con mondi virtuali in 3D in cui possono essere simulati tutti i sensi: la vista, l'udito, il tatto, e persino l'odore.

[Mondo completamente digitale]



Digital Heritage e Machine Learning



FRUIZIONE



ACCESSIBILITÀ



LOGISTICA & SOSTENIBILITÀ



SICUREZZA



EDU-TECH



OPERATORI CIVILI



TECNICI

ATTENZIONE
CATEGORIE FRAGILI (CONCERTI, HACKATON, ECC.)
EVENTI MULTICULTURALI



Le tecnologie per il patrimonio culturale, paesaggistico – alcuni esempi concreti:

Realtà Virtuale, Realtà Aumentata, Mixed Reality un viaggio in Barca

<https://www.ikon.it/it/progetti/barcolana>



Visita nelle trincee della prima guerra mondiale

<https://www.ikon.it/it/progetti/museo-del-monte-san-michele>



Le tecnologie per il patrimonio culturale, paesaggistico – alcuni esempi concreti:

Antica Roma ricostruzione archeologica

<https://www.ikon.it/it/progetti/universita-padova>



UACE prodotto editoriale multilivello

<https://www.uace.eu/>



Le tecnologie per il patrimonio culturale, paesaggistico – alcuni esempi concreti:



Gaming e patrimonio culturale

Edutainment: imparare giocando

Un gioco che si pone come **obiettivo** l'insegnamento di alcune nozioni viene inserito nell'ambito dell'Edutainment. Si tratta infatti di una forma di **intrattenimento ludico** incentrata sull'educazione. Le **meccaniche** del videogioco incontrano le esigenze didattiche, facendo da supporto al processo di apprendimento. La **principale caratteristica** degli Edutainment games è quella di **supportare** il giocatore nel **raggiungimento** di un grado di apprendimento maggiore attraverso un'esperienza divertente e coinvolgente.

<https://youtu.be/Ys15hVbkdgQ>



Mostre Immersive
<https://youtu.be/GNoND1IASHM>



Controllo in remoto e controllo flussi

<https://youtu.be/CZg5jUoVC6A>



Eventi immersivi

<https://youtu.be/4QMRxwDrWaY>



Furthermore, in regards of WP5.3 contribution to the Smart Tourism set of actions and sub-title on Advanced technologies and cultural heritage, a specific module of TIPICITA' IN BLU FORUM (MAY 2022) has been organized, in which many best practices have been presented and disseminated: Antonella Varesano, Professor of Innovation Technologies at the University of Udine, has presented "Digital instruments and technologies of the Cultural Heritage". Here below best practice's explanation: in the 3rd slide, it is written that digital technologies and its usage are tremendously growing, 7 Italians out of 10 are active in social media like in YT, WhatsApp and FB. It is represented into graphs and specific percentages how the global digital growth is changing and evolving (2020-2021 years). 6th slide explanation: In 2019 post-pandemic, 92% of the museums were closed, excluding the exceptions of Sweden, Albania and Austria, in contrast the growth of social media has been significant: more than 70% of museums has increased its presence online (NEMO 2020). More than a third of the museums (about 70%) has activated new social channels or reactivated leftover social channels hitherto unused (Icom - International Council of Museums 2020). In particular, it emerges that: 44% opened a YouTube channel; 27% opened an account Instagram; 10% opened a page Facebook; 8% activated an account on platforms on which to be able to upload podcasts (Spotify, Spreaker, etc.); 6% activated Twitter. 7th slide: The museal future in the social media, On Facebook you register the greater presence (51%); follows Twitter (31%) e Instagram (15%). Even 10% of the museums that does not have a website it appears but active on Facebook. ... Istat data indicate the services most used digital in museum: The website is adopted by 57% of the museums; Social networks (Facebook, Twitter, Instagram) follow with 41%; The newsletter is third (25%). The 8th slide: the technologies have applications that evolve continuously often combined together through different fields (games, museums, arts, video, marketing, design, etc.)

STRUMENTI DIGITALI per il PATRIMONIO CULTURALE

Antonella Varesano – maggio 2022

STRUMENTI e TECNOLOGIE DIGITALI



Digital media
technology
PRODUCT/SERVICE
devices/software

Virtual spaces: GC, AR,VR, MR,XR,
360, 3D, Ologrammi,

Digital Media: Social MEDIA, QRcode, RFID,
NFD, BITcoin, Blockchain, NFT

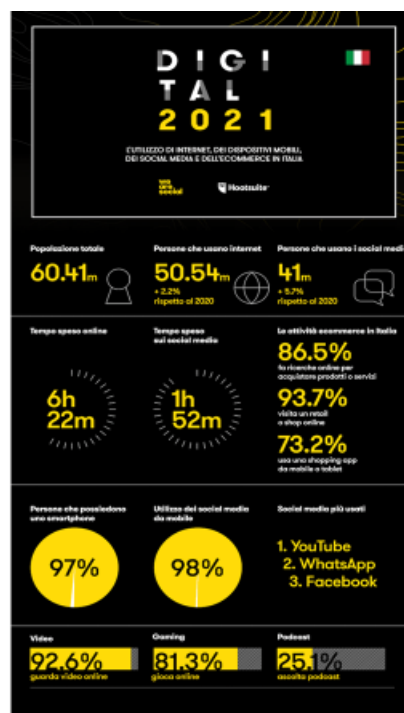


**>IN AUMENTO
ESPONENZIALE...**

Sette italiani su dieci sono
attivi sui social.

la piattaforma
più utilizzata:

**YouTube
WhatsApp
Facebook**



> DATI MONDIALI 2021



> CRESCITA



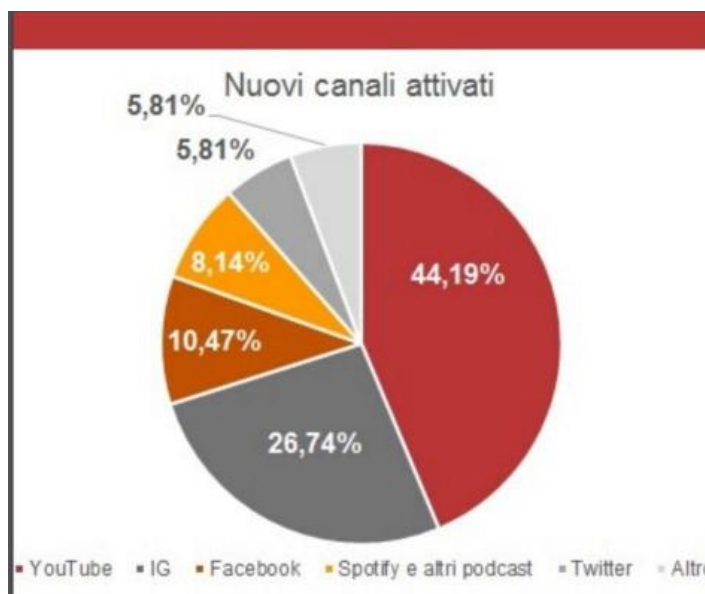
> DATI MUSEI post pandemia

Nel 2019 il 92% dei musei era chiuso, escludendo eccezioni di Svezia, Albania e Austria, di contro la crescita dei social media è stata significativa: **più del 70% dei musei ha aumentato la propria presenza online (NEMO 2020).**

Più di un terzo dei Musei (circa 70%) ha attivato nuovi canali social o ha riattivato canali social rimasti finora inutilizzati (com – [International Council of Museums 2020](#)).

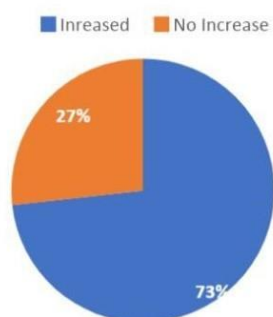
In particolare emerge che il:

- 44% ha aperto un canale YouTube
- 27% ha aperto un account Instagram
- 10% ha aperto una pagina Facebook
- 8% ha attivato un account su piattaforme su cui poter caricare podcast (Spotify, Spreaker etc.)
- 6% ha attivato Twitter



> FUTURO MUSEALE sui social media

Communication on Social Media



Visto che con il covid i musei hanno aumentato del 70% le attività social

Su Facebook si registra la maggiore presenza (51%); seguono Twitter (31%) e Instagram (15%).

Anche il 10% dei musei che non ha un sito Internet risulta però attivo su Facebook. ...

I dati Istat indicano i servizi digitali più utilizzati nel museo:

>Il sito web è adottato dal 57% dei musei

>I social network (Facebook, Twitter, Instagram) seguono con il 41%

>La newsletter è terza (25%)

> APPLICAZIONI

**LE TECNOLOGIE hanno applicazioni in continua espansione
 SPESSO COMBinate INSIEME per produrre applicazioni in diversi campi:**

- _ GAME
- _ MUSEI
- _ BENI CULTURALI
- _ MEDICINA
- _ ARTE
- _ VIDEO
- _ MARKETING
- _ TURISMO
- _ SCIENZA
- _ DESIGN
- _ ARCHITETTURA
- _ CINEMA
- _ EDUCAZIONE
- _ SPORT
- _ MODA



500 mln sul PNRR

Qual è l'obiettivo dell'investimento?

Digitalizzare quanto custodito in musei, archivi, biblioteche e luoghi della cultura per migliorare la gestione, la conservazione e la divulgazione, consentire a cittadini e operatori del settore di esplorare nuove forme di fruizione del patrimonio culturale. Per questo investimento sono previsti ulteriori 1,46 miliardi di euro finanziati dal Fondo Complementare.



PNRR (Italian National Recovery and Resilience) has the objective to invest 500 mln in the digitalization process of museums, archives, libraries and cultural location in order to improve the management, conservation and dissemination of these sectors through the citizens.

HORIZON EUROPE Programme, with a total financial endowment of 95.5 billion euros, the European framework program for research and innovation for the seven years 2021-2027, will constitute the largest incentive package for the research and innovation never funded by the EU budget. Among the main novelties of the program, the new cluster “Culture, creativity and inclusive society” aimed at promoting the European cultural heritage and explore the potential of the cultural and creative sectors. An inspiring plot that finds confirmation and support also in the strategies of "System" also indicated by the funding instruments of Europe Creative e for the resumption of the Next Generation EU. CULTURAL HERITAGE Finally, the culture as an indicator of quality improvement of life and the creation of new sources of income. Heritage as a typology of non-formal learning, capable of improving it exchange and dialogue both intergenerational that inter-territorial, which also between citizens and tourists, favoring the cultural diffusion and traditions. OBJECTIVES: Connecting cultural heritage to emerging creative sectors, Promote the European cultural model; ENHANCE, PRESERVE and MANAGE cultural heritage in a sustainable way Analyze the role of culture and cultural heritage in multicultural societies and in the dynamics of social inclusion; Apply digital technologies and innovative methods in the field of heritage research cultural.



Con una dotazione finanziaria complessiva pari a **95,5 miliardi di euro**, Horizon Europe, il programma quadro europeo per la ricerca e l'innovazione per il settennio 2021- 2027, costituirà **il più grande pacchetto di incentivi per la ricerca e l'innovazione mai finanziato dal bilancio dell'UE**.

Tra le principali novità del programma, **il nuovo cluster “Culture, creativity and inclusive society”** volto a **promuovere il patrimonio culturale europeo ed esplorare il potenziale dei settori culturali e creativi**.

Una trama ispiratrice che trova riscontro e sostegno anche nelle **strategie di “sistema”** indicate anche dagli strumenti di finanziamento di **Europe Creative e** per la ripresa del **Next Generation EU /**

> INNOVAZIONE ECONOMIA della CULTURA

CULTURAL HERITAGE

Finalmente si identifica la cultura come un **indicatore di miglioramento della qualità della vita e la creazione di nuove fonti di reddito.**

Il patrimonio come tipologia di **apprendimento** non formale, capace di migliorare lo **scambio** e il **dialogo** sia intergenerazionale che interterritoriale, che anche tra cittadini e turisti, favorendo la **diffusione culturale** e di tradizioni.



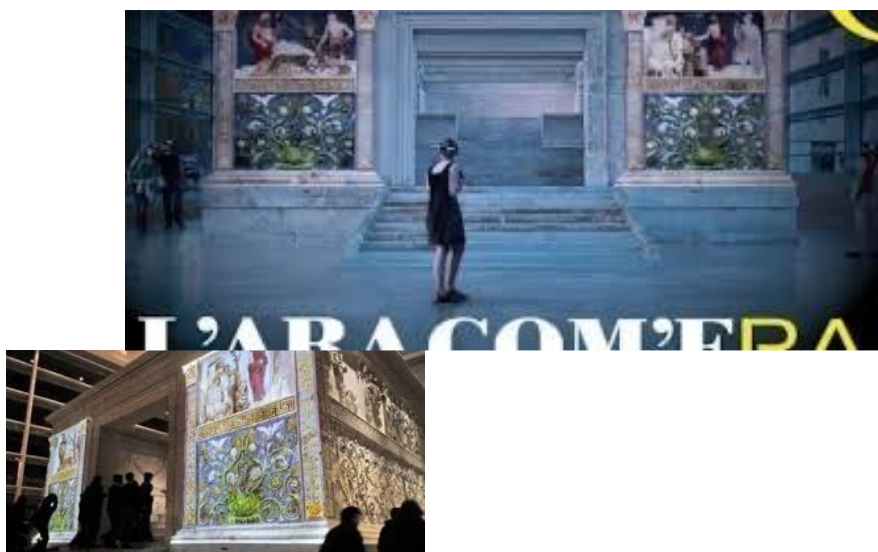
OBIETTIVI

- Connettere il patrimonio culturale ai settori creativi emergenti,
- Promuovere il modello culturale europeo;
- VALORIZZARE, CONSERVARE e GESTIRE in modo sostenibile il patrimonio culturale
- Analizzare il ruolo della cultura e del patrimonio culturale nelle società multiculturali e nelle dinamiche di inclusione sociale
- Applicare tecnologie digitali e metodi innovativi nel campo della ricerca sul patrimonio culturale

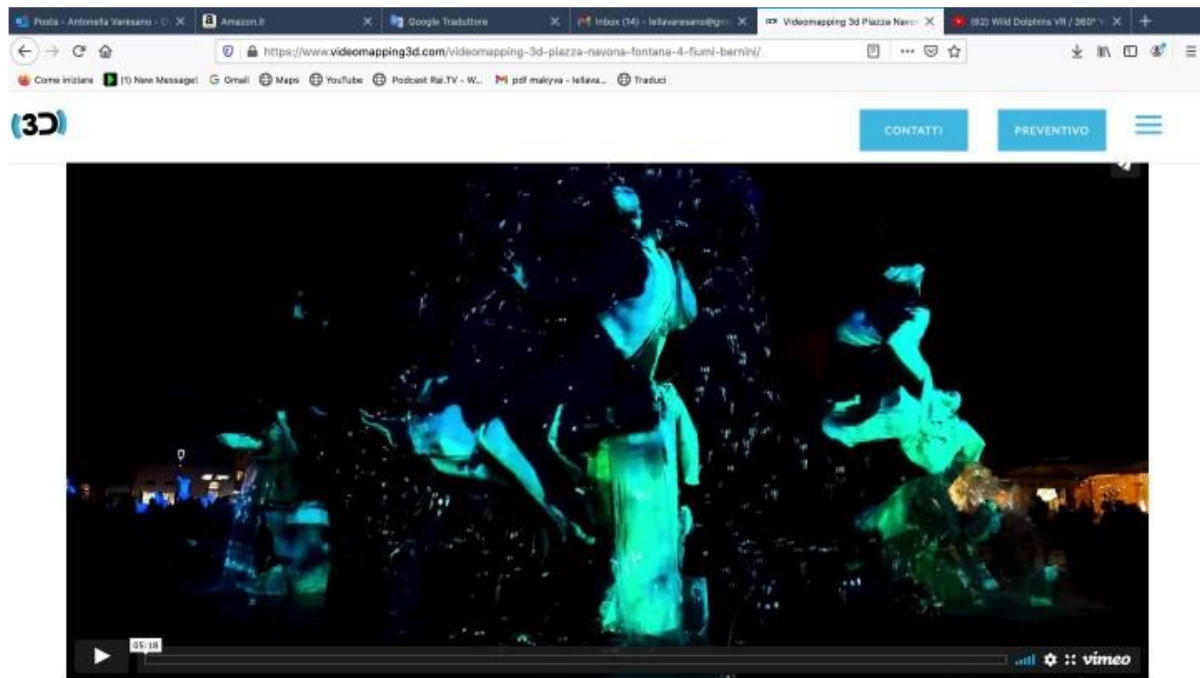
> SPAZI CLASSICI e SPAZI IBRIDI



> ROMA _ ara pacis



> ROMA fontana di trevi



VIDEOMAPPING 3D PIAZZA NAVONA FONTANA 4 FIUMI BERNINI

M9 in Mestre, open at the end of 2018, totally dedicated digital museum to the twentieth century in Italy with installations interactive, VR, AR, 360, holograms. The use of technology for a purpose didactic in the field socio-anthropological.

> MESTRE Museo M9

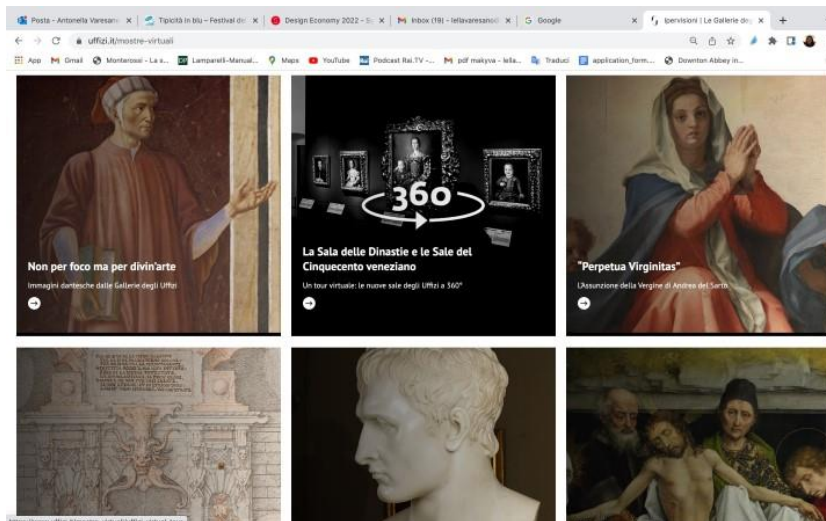
M9 di Mestre, aperto fine 2018,
 museo digitale totalmente dedicato
 al '900 dell'Italia con installazioni
 interattive, VR, AR, 360, ologrammi.
 L'impiego della tecnologia a scopo
 didattico in ambito
 Socio- antropologico



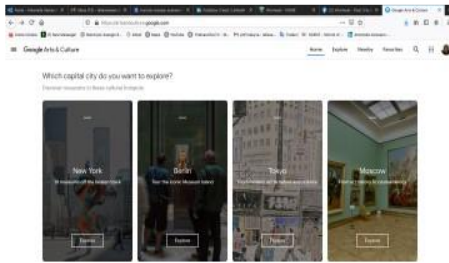
Some examples of Italian museums that have websites and virtual tours.

> I 5 MUSEI ITALIANI

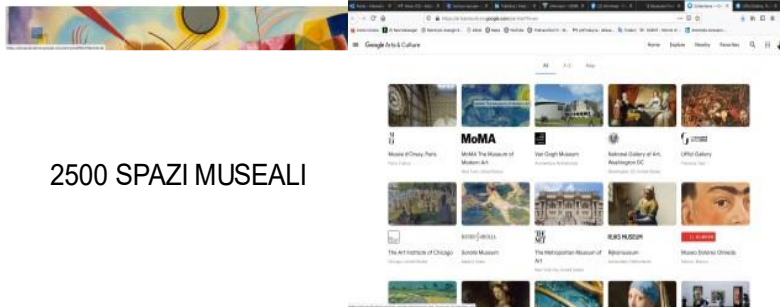
1. **MuseoGalleria degli Uffizi** > <https://www.uffizi.it/mostre-virtuali>
2. **Pinacoteca di Brera** > <https://pinacotecabrera.org/virtualtour/start.html>
3. **I Musei Vaticani** > <https://m.museivaticani.va/content/museivaticani-mobile/it/collezioni/musei/tour-virtuali-elenco.html>
4. **Il Museo Egizio di Torino** > <https://virtualtour.museoegizio.it/>
5. **Canova Experience** > <https://www.canovaexperience.com/it/3Dvirtual-tour.php>



> GOOGLE ARTS and CULTURE

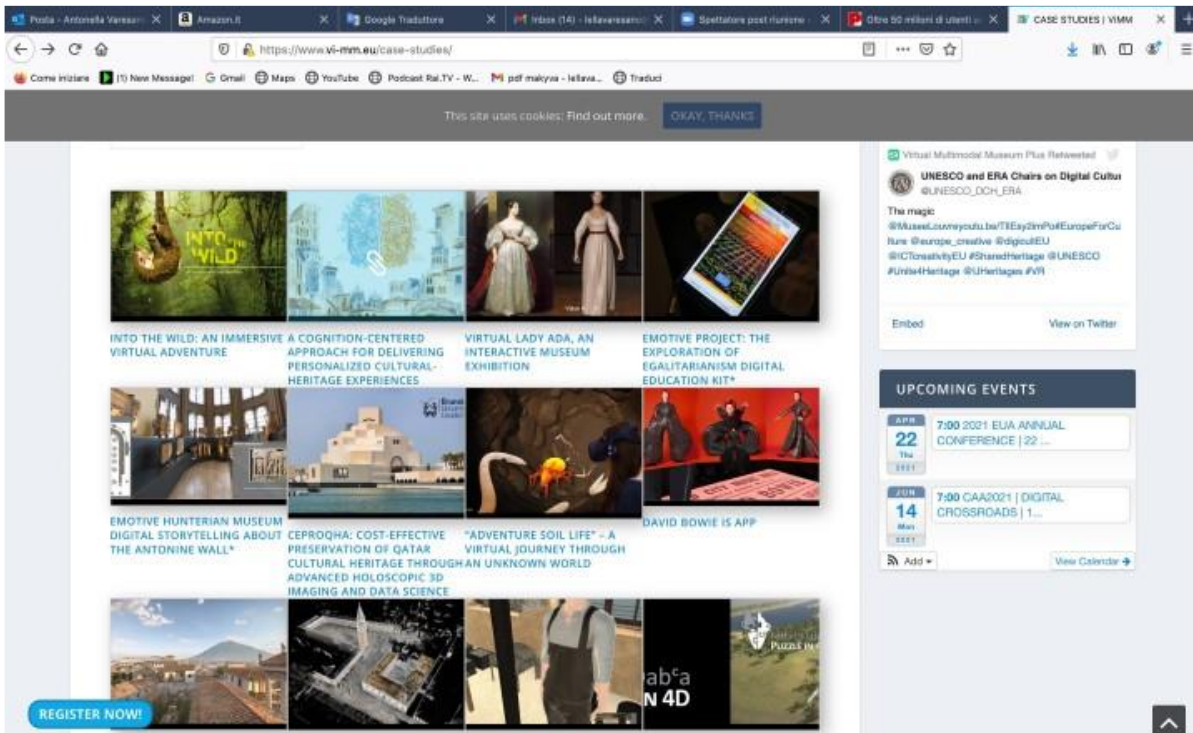


centinaia di virtual TOUR



2500 SPAZI MUSEALI

> VMM virtual multimodal museum progetto europeo del 2016



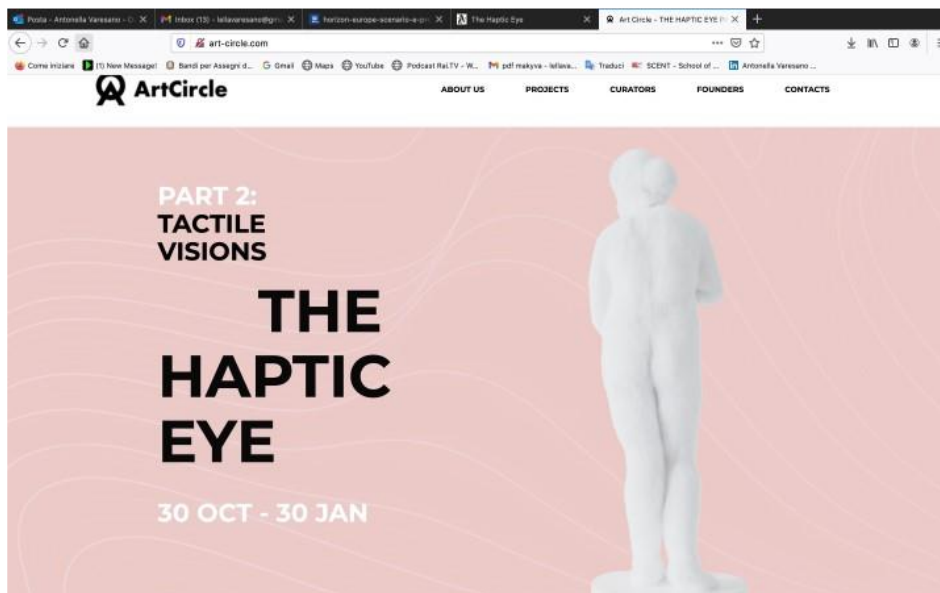
> PARIGI atelier de lumière

2020 IMMERSIVITA' NELLA PITTURA DELLA '900

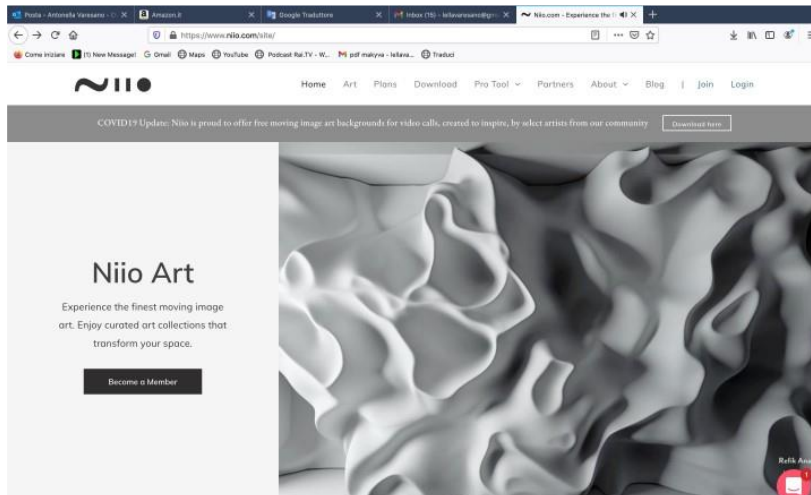


> THE HAPTICEYE: Part II "Tactile Visions"

LONDRA MILANO LUGANO



> TEL AVIV NIOO

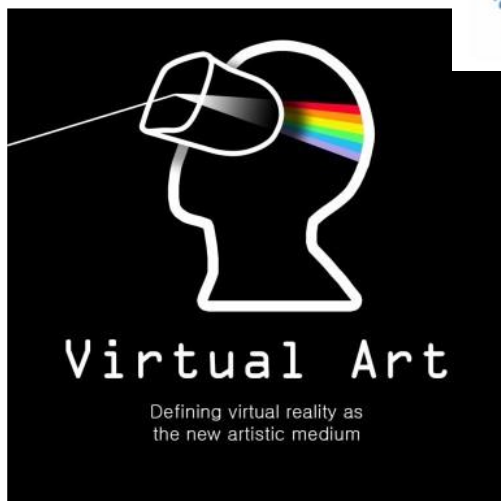


> Ellen Lupton

activate multiple senses, not just the eyeball...



> VR TECNOLOGIA e ARTE



SIGGRAPH nata nel 1974

Special Interest Group on
Computer **GRAPH**ics and
Interactive **Techniques**)
Conferenza annuale

www.siggraph.org



ARS ELECTRONICA LINZ

Ideato nel [1979](#) in forma di Festival per le arti digitali, le nuove tecnologie e le innovazioni nelle società contemporanee, si è ingrandito e consolidato quale realtà internazionale di indagine e sperimentazione [sociologica](#), [artistica](#) e [tecnologica](#) tra le più significative al mondo

<https://ars.electronica.art/news/en/>



Get the latest News & Stories of Ars Electronica



Ars Electronica's European Platform for Digital Humanism asks about the impact of technologies on society.

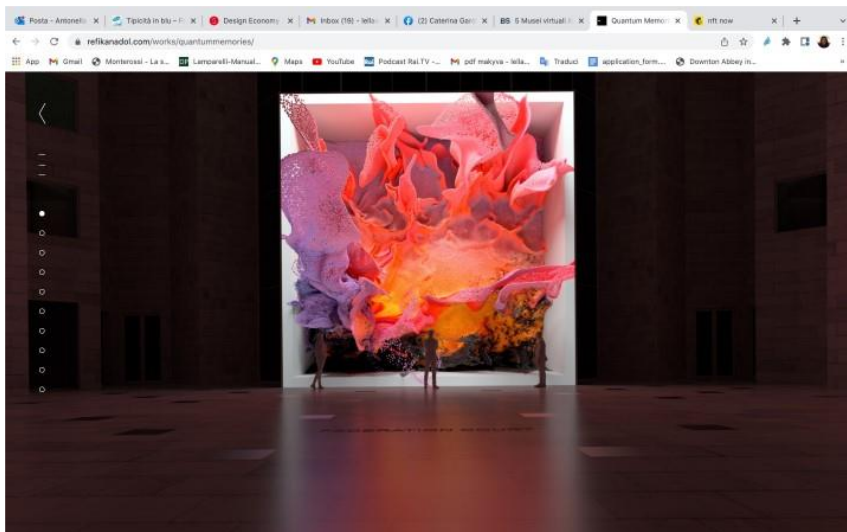
ARS ideated in 1979 as Festival for digital arts, new technologies and innovation for contemporary societies, has grown and consolidated in international reality of sociological, artistic and technological laboratories of greatest global interest.

> NEW YORK CITY _PIPILOTTI RIST AL MOMA

PipilottiRist: PourYourBody Out (7354Cubic Meters)2008



> Refik Anadol



> TOKYO MORI Building Digital Museum



Il Teamlab è un gruppo fondato in Giappone nel 2001 dall'ingegnere Toshiyuki Inoko e riunisce 400 artisti con percorsi e talenti molto differenti. Designer, architetti, ingegneri grafici e artisti del mondo dell'audiovisuale con una passione comune per l'arte digitale che ha fatto nascere più di cento progetti in tutto il mondo dall'anno della creazione del collettivo.

La loro filosofia è quella di creare un spazio fisico che privilegia l'uso collettivo dello stesso spazio, ponendo quindi più persone nel medesimo ambiente.

Team-lab is a group founded in Japan in 2001 by engineer Toshiyuki Inoko and brings together 400 artists with very different paths and talents. Designers, architects, engineers, graphic designers and artists of the world of audiovisual with a common passion for digital art that has given rise to more than one hundred projects in all over the world since the creation of the collective. Their philosophy is to create a physical space that favors the collective use of the same space, thus placing more people in the same environment. In November 2018 it was sold at Christie's auction and placed at record figure of 432,500 dollars, a New York work of art made by the IA. The painting, taken from a group of eleven portraits depicting the components of the imaginary Bellamy family, is actually the fruit of a collective project of 25-year-old French artists who they use a generative GAN adversarial network, i.e. an algorithm used in learning automatic unsupervised. Their work is based on a collaboration - but also a challenge provocative - between artistic inspiration and artificial intelligence. Also known as Mike Winklemann, Beeple is now the third living artist more valuable after selling an NFT collage for \$ 69 million. The historic sale mediated by Christie's in a first of its kind by the famous auctioneer has generated a frenzy of interest in NFTs and the wider sphere of cryptocurrencies. Beeple's social media is the result of sharing animations and illustrations every day for the past 13 years.

> ARTE e IA

Novembre 2018 viene battuta all'asta Christie's e piazzata alla cifra record di 432.500 dollari, a New York un'opera d'arte realizzata dalla IA.

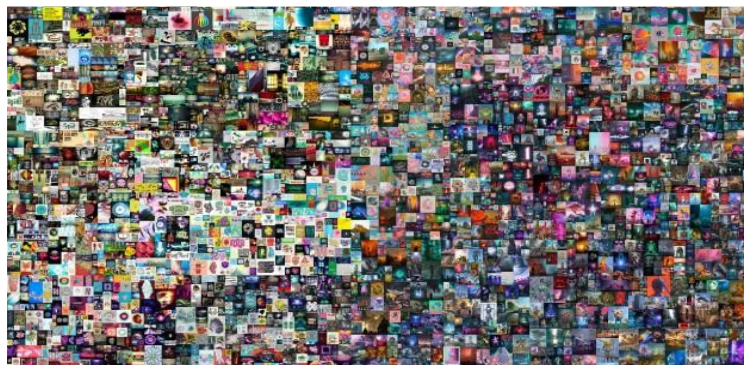
Il dipinto, tratto da un gruppo di undici ritratti raffiguranti i componenti dell'immaginaria famiglia Bellamy, è in realtà il frutto di un progetto di un collettivo francese di artisti 25enni che utilizzano i GAN **un generative adversarial network**, cioè un algoritmo usato nell'apprendimento automatico non supervisionato.



I loro lavori si basano su **una collaborazione - ma anche una sfida provocatoria - fra ispirazione artistica e intelligenza artificiale.**

> ARTE e NFT

- Conosciuto anche come Mike Winklemann, Beeple è ora il terzo artista vivente più prezioso dopo aver venduto un **collage NFT per \$ 69 milioni**. La storica vendita mediata da Christie's in una prima del genere da parte del famoso banditore ha generato una frenesia di interesse per le NFT e la più ampia sfera delle criptovalute. I social media di Beeple sono il risultato della condivisione di animazioni e illustrazioni ogni giorno negli ultimi 13 anni.





Paolo Cirio, artista e hacktivista torinese, ha dato forma a Capture, un database contenente i volti di quattromila agenti di polizia francesi. Un progetto che mette in evidenza rischi e pericolose conseguenze dell'utilizzo di software di riconoscimento facciale.

Paolo Cirio, artist and hacktivist from Turin, gave shape to Capture, a database containing the faces of four thousand French police officers. A project that highlights risks and dangerous consequences of the use of facial recognition software.

> TRIESTE_ BOTHWAYS

Trieste contemporanea per ESOF

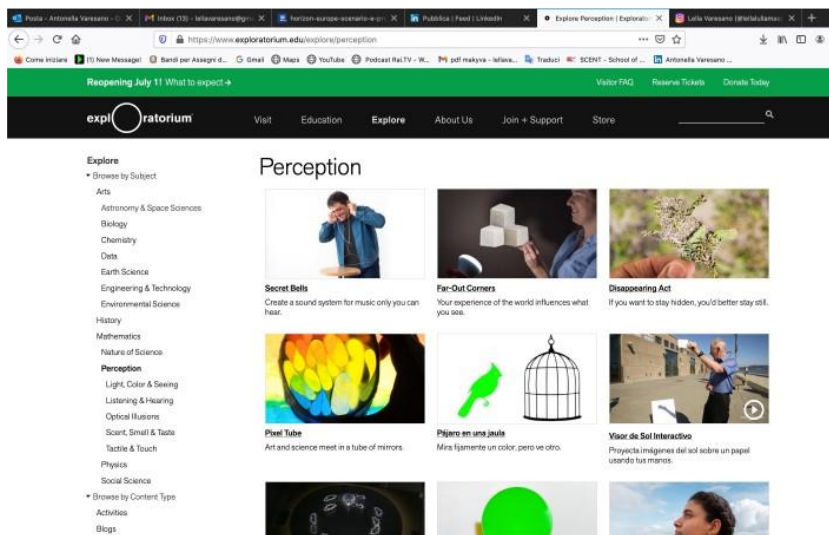


> Florian Pollack | MUSEI DEL FUTURO

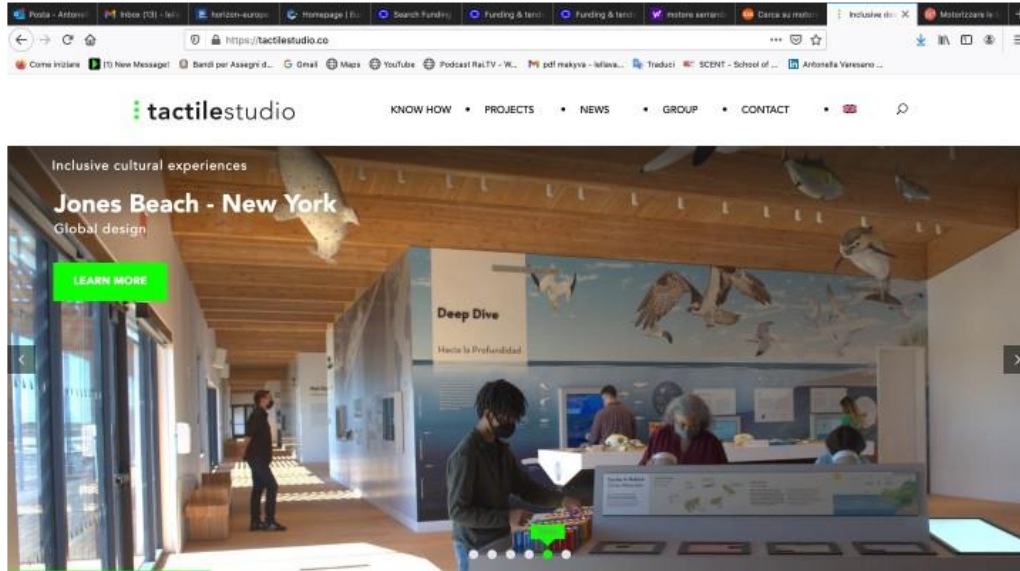


Florian Pollack highlights the important factors why we visit a museum and he explains the democratic endeavor of these old institutions. The future of museums will change with the technology to access art from all over the world.

> Exploratorium San Francisco



> TACTILESTUDIO



Our mission

> ICOM inclusione e accessibilità



Conclusions

As result of all the interventions held in the field of blue innovation and blue economy between interested “blue” stakeholders (any bodies that may have interest in the maritime sector) gathered at the FORUMS, regional working groups, partners and experts’ intense cooperation have brought in the field of smart tourism, archaeology insights and practices, cultural and environmental heritage tools/solutions/methods to be implemented in the Adriatic Sea. At the same time, presenting and discussing these topics into well-known territorial forums that deal normally with blue growth topics has been enriching and valuably useful for all the stakeholders that have recently approach into the sustainability and blue growth ways of thinking their commercial and entrepreneurship realities. This brought also a great boast on the regional and local governance to improve and revise politics and territorial plans in a strategic perspective.