

Research Paper

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# **From tangible architecture to intangible cultural landscape :Tools for the protection and monitoring of cultural heritage**

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## **Abstract**

The architectures of oriental matrix are the material and tangible testimony of a culture that for centuries has invested southern Italy, and in particular the eastern regions close to Greece, which had specific geographical and orographic configurations. The traces of this incredible story are, in some cases, striking, majestic, and complex architectural masterpieces; in other cases, minute and widespread, myriads of small artefacts, lined up along the ancient paths. The theme of this research aims to connect, in an organic network, the small artefacts that belong to the oriental tradition and which are present along the Sicilian and Calabrian eastern coasts. The aim of the research is not to reconstruct medieval perceptions – a methodologically problematic operation, as well as scientifically risky in the absence of sources – but rather to investigate how contemporary communities reinterpret the Italian-Greek heritage, how they have tacitly assimilated it into the surrounding landscapes, and how digital tools (photogrammetry, participatory methods and mobile applications) can mediate this relationship and contribute to its intangible cultural value.

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## **Keywords**

*Byzantine routes; Tangible and Intangible Heritage; Analogue and Digital Landscape, Cultural Paths*

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## **1. Introduction**

This continuous play of references between the coast of Sicily and Calabria is at the center of the research "BYZANTINE CULTURAL ROUTES", funded by the National Recovery and Resilience Plan for Projects of National Interest (PRIN). The project aims to highlight the correlations between architecture and landscape, between minimal and widespread artifacts and territorial textures, between tangible and still present material culture, and the intangible baggage of perception and awareness of places.

In the specific context of northeastern Sicily, the architectural and settlement traces left by the Italo-Greek monastic tradition have been the subject of significant historical and archaeological studies, with scholars examining the influence of these religious communities on the region's cultural and architectural development. Lucia Arcifa (Arcifa, 2005), for instance, described the network of roads and religious settlements in the Val Demone, illustrating how Byzantine-era infrastructure influenced the region's spatial development up until the Norman period. In turn, Reina (2016) investigated the churches of the Val Demone, whose landscape positioning was closely tied to religious,

agricultural, and administrative functions. These studies, alongside others, provide a valuable historical foundation upon which the project's theoretical framework is built, integrating digital tools with landscape-oriented narratives.

The concept of landscape carries with it a multitude of specificities and subtle nuances that make it elusive, almost intangible. The semantic and conceptual complexity associated with its use tends to inspire a sort of awe in those who wish to explore the path traced by the etymology and pronunciation of the term (Filleron, 2008, pp. 1-10). It is a real, not abstract, entity which, in Italy as in Europe, throughout the Mediterranean basin as far as Central Asia, when viewed from a Western cultural perspective, and as far as the heart of Africa, inextricably integrates the geographical (geological-environmental) dimension with the history of the individuals or communities that have succeeded one another over the centuries. The interaction between these two components, which has continued for long periods but is still significantly shorter than a geological era, contributes to the formation of the culture of a place, giving rise to a new product: the “cultural landscape” (Lazzari, 2014, p. 12).

The concept of cultural landscape, already established by the 1992 UNESCO Convention, recognises the territory as a combined work of nature and human cultures, an expression of social evolution in relation to the natural environment, a dynamic system that combines tangible and intangible heritage. Rössler (2006) highlights innovations in the implementation of the World Heritage Convention through the landscape-based approach, with particular regard to the management of complex assets involving local communities and indigenous peoples.

Reconnecting the threads of knowledge, reconstructing the historical, cultural, technological, and perceptive apparatus, can bring out hidden plots in the territory and in the memory of the local population, and can implement the awareness of the value of these architectures. Awareness is always the first step towards the conservation and enhancement of a good; restoring the architectural heritage in its cultural and landscape context is a strategy that enhances both the architecture and the aesthetic-cultural values of the Sicilian and Calabrian landscape.

The research will move in two different and complementary areas: the scientific documentation and the reconstruction of a collective imagination. The new documentation, through a consolidated analytical approach in contemporary scientific practice, includes: the creation of organigrams for the cataloging and identification of artifacts; maps for the localization of lost toponyms and architectures; bibliographical analysis and historical documentation of the territory; and an instrumental survey of the existing architectural heritage.

The reconstruction of the collective imagination linked to architectural emergencies (Figure 1) involves the search for photographic documents, memories, descriptions, and various finds, which testify to the importance of this heritage, its roots in the territory, and in society.

Supported by historical and archaeological sources, which help to contextualise the role of Italo-Greek churches in the medieval landscape (Arcifa, 2005; Reina, 2016), this research focuses instead on contemporary perceptions and narratives, gathered through more recent material (photos, images, reconstructions, visual documentation) that does not necessarily place the artefact in the foreground, but rather as a sign in the established landscape. This dual perspective allows us to distinguish between the historical reconstruction of settlement patterns and the reactivation of contemporary cultural meanings. In this sense, community-based narratives and related participatory aspects are treated as indicators of how current communities reinterpret and transmit the intangible values associated with these sites.

The use of the itineraries will be possible through a mixed fruition system: analog and multimedia. The two systems will be interconnected and guide users in a multidimensional cultural and perceptive experience. Along the routes, it will be possible to dialogue with the landscape system and identify privileged observation points, and it will be possible to access systems that involve the user in a personal perception of the landscape and its specific history.

Recent studies show that the perception of landscape is influenced by infrastructural, cultural, and landscape elements (Jafari Khaledi et al. 2022) and that visual quality is modulated by composition, management, and personal experience (Alampi Sottini et al. 2018). In this context, digital storytelling, in its many forms, analysed in recent years by the academic world, has the potential to transform the enjoyment of cultural heritage and is recognised as an important strategy for attracting and satisfying visitors to museums and other cultural sites (Vrettakis et al., 2019).

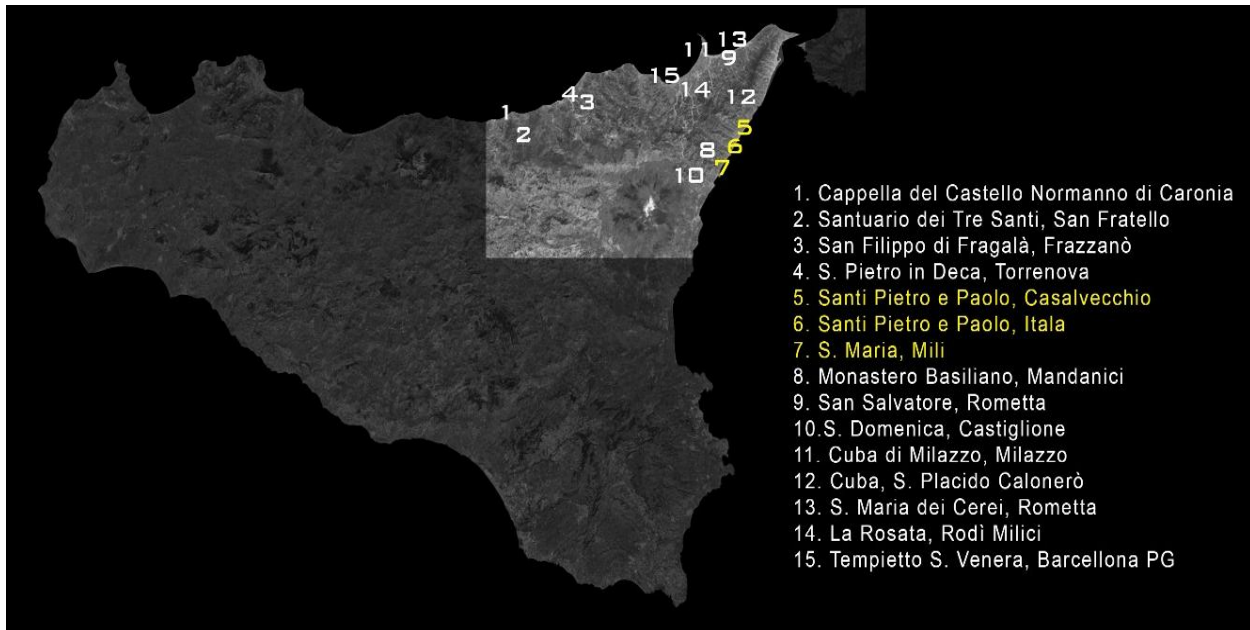


Figure 1. Location of the surveys carried out in Sicily. (Elaboration by the authors)

## 2. Some storytelling hypotheses

The cultural components that gave rise to the phenomenon of Italo-Greek architecture in southern Italy are many. The extreme cusp of Sicily is, at the end of the first millennium, a land of conquest and multi-ethnic coexistence. The architectures that arose in this period are influenced by the multiculturalism that generated them.

The churches and monasteries analysed in this research were built in the Norman era but have, in the material component and in the masonry equipment, the imprint of oriental culture, while the vaults and the structures that connect them to the drums are clearly inspired by the Maghreb (Arena, 2025).

In this context, it is important to remember that the decorative and iconographic apparatus of sacred architecture, and of the oriental one in particular, is designed to tell, to disseminate, to create a ‘common ground’ in the faithful. Its interiors, completely frescoed, with the sacred iconography codified by the oriental rite, take the believer by the hand and introduce him to the mysteries of faith. Byzantine art connects the divine with the earthly, the intangibility and immateriality of the sacred with the concreteness and finiteness of reality (Grabar 1964; Florenskij 2002). In the churches analysed, the decorative apparatus has been lost and, even when it is present, the contemporary user is no longer able to interpret what they see. Not in the deepest sense of the term. For this reason, the research in question aims to reconnect the threads of communication to tell the story of these architectures with a popular approach, open also to less aware users. The stories that the architectures tell are multiple; the decorated interior transcends the real and connects with the divine, while the exterior relates to the contingency of the real. In rural sacred architecture, distant from urban centres because it is the katholicon of a monastery, the relationship with the territory was very strong and connected to various aspects: the administrative and legal control of the territory and the management of productive activities related to agriculture (Arcifa, 2005). The Byzantine monasteries were destroyed and with them the life that animated them; only the churches remain: silent testimonies of a different past. The landscape that welcomes them, in this portion of north-eastern Sicily, preserves the morphological characteristics of the era; it is, in fact, marked by deep rivers and the steep folds of the Peloritani. The use and exploitation of the land are difficult; consequently, current agricultural techniques have not altered its morphology and perception.

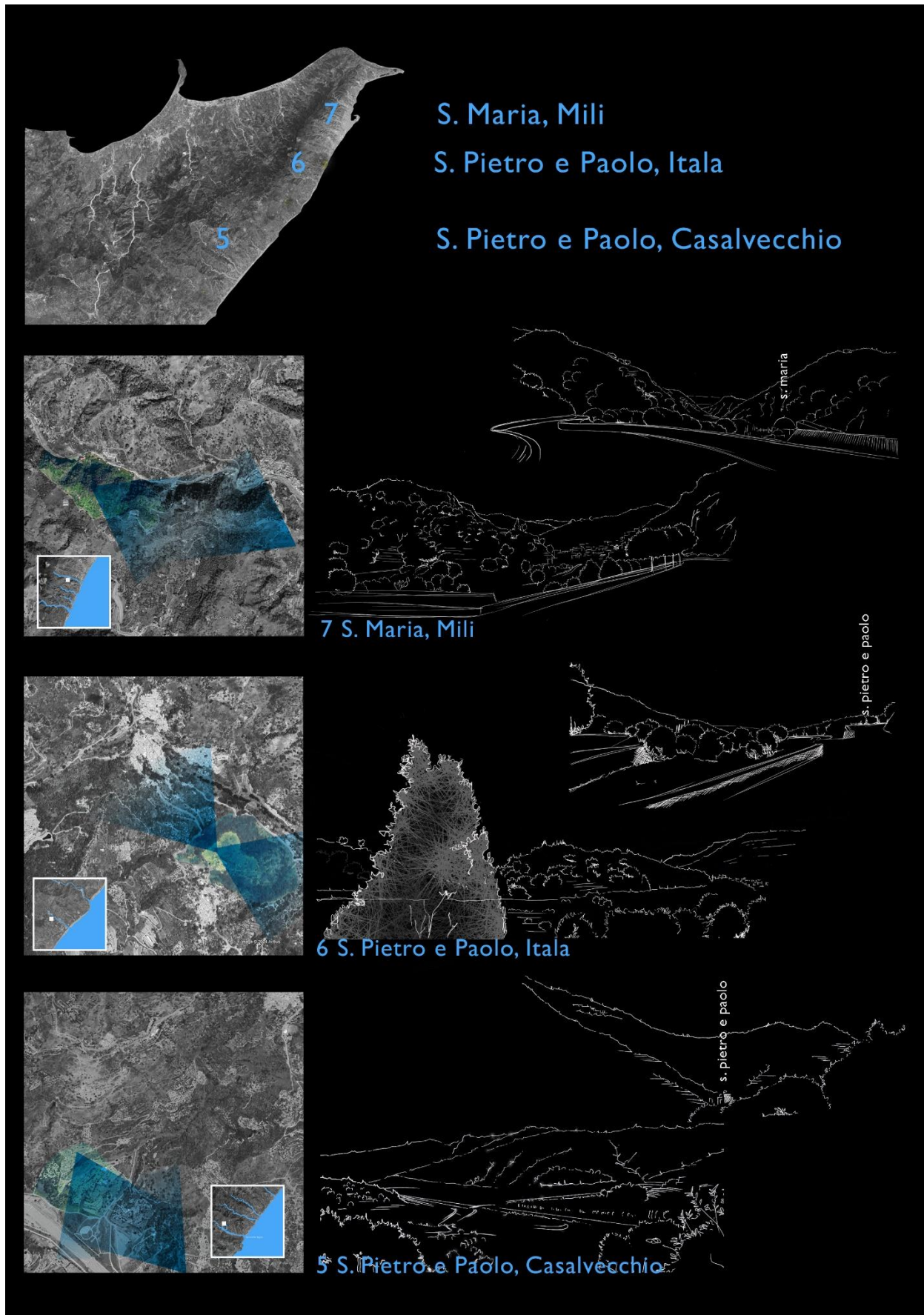


Figure 2. Storytelling hypothesis for the representation of the territory. Original graphic elaboration by the authors, based on historical and territorial sources discussed in Reina (2016).

The exploration of the relationship between Italo-Greek sacred architecture and the surrounding landscape is one of the key aims of this research, an aim which is often overlooked. The study uses the historical boundaries of monastic estates to recreate how these places looked and were experienced (figure 2). It imagines what the landscape would have looked like to the local population and how the architecture, which is now mostly in ruins, once protected and symbolised the environment.

The definition of the particles, the tracing of the roads and pedestrian paths, and the virtual reconstruction of the landscape are ways to reconnect the threads cut by history, by natural disasters, and by abandonment (figure 3). The project involves the creation of an APP capable of accompanying the user in these places, of suggesting formal and cultural references, near and far, and of highlighting the links with the natural space. The images shown are a first trace of a complex and articulated storytelling that, from the material reality of sacred architecture, tries to give back a well-rounded vision of a phenomenon that has acted as a palimpsest for the territory of eastern Sicily.



Figure 3. Historical images of the churches of SS. Pietro e Paolo in Casalvecchio Siculo and Itala; collage by the authors, based on images also included in Tranchina (2023).

### 3. Narrative landscapes: a storytelling-based methodology for cultural heritage

This study adopts visual storytelling as a methodological approach. This approach is used to organise thinking through storytelling. This fosters both learning and critical reflection. There are two levels to it. The first is individual, providing a space for personal insights, memories, and interpretations. The second is collective, drawing on shared cultural references to promote mutual understanding and communication.

The first approach collects unpublished images belonging to the local population, private memories documented by photographs or stories. This first level is not directly connected to historical or archaeological investigations but rather collects and illustrates the local population's perception of the property present in their territory. Feelings of affection and attention toward the property itself can stimulate a new perception in users who approach these architectures for the first time.

The second approach, however, is analytical and based on solid scientific foundations. After the usual bibliographic and source analyses, the following religious buildings in Sicily and Calabria were documented with instrumental and photometric surveys from the ground and air.

Analyzed Churches and Chapels of Sicily and Calabria			
Church / Chapel Name	Location	Province / Area	Region
Chapel of the Norman Castle	Caronia	Messina	Sicily
Filadelfi (Three Saints)	San Fratello	Messina	Sicily
San Filippo of Demenna or Fragalà	Frazzanò	Messina	Sicily
Saints Peter and Paul of Agrò	Casalvecchio Siculo	Messina	Sicily
Saints Peter and Paul	Itala	Messina	Sicily
Santa Maria of Mili	Mili	Messina	Sicily
Abbey of Santa Maria Annunziata	Mandanici	Messina	Sicily
Santa Maria in Cielo Assunta	Savoca	Messina	Sicily
Cuba of Santa Domenica	Castiglione di Sicilia	Catania	Sicily
Cuba of Milazzo	Milazzo	Messina	Sicily
San Placido Calonerò	Messina	Messina	Sicily
Church of Jesus and Mary or Santa Maria dei Cerei or Church of San Salvatore	Rometta	Messina	Sicily
St. Pietro in Deca	Torrenova	Messina	Sicily
Little Temple of Saint Venera	Barcellona	Messina	Sicily
Madonna of Loreto	Pezzolo	Messina	Sicily
Church of the Crocifisso	Carlentini	Siracusa	Sicily
San Giuliano lo Spedaliere	Lentini	Siracusa	Sicily
Oratory of San Micidario	Sortino	Siracusa	Sicily
San Nicolichio	Pantalica	Siracusa	Sicily
Church of the Catalans	Messina	Messina	Sicily
San Tommaso il Vecchio	Messina	Messina	Sicily
Santa Maria de' Tridetti	Staiti	Reggio Calabria	Calabria
Cattolica	Stilo	Reggio Calabria	Calabria
San Giovanni Theristis Fuori le Mura	Stilo	Reggio Calabria	Calabria
Sant'Adriano e Natalia	San Demetrio Corone	Cosenza	Calabria
Hermitage of Santa Maria della Stella or Sanctuary of Monte Stella	Pazzano	Reggio Calabria	Calabria
S. Elia Vecchio	Curinga	Catanzaro	Calabria
San Marco	Rossano	Cosenza	Calabria
Il Patire	Rossano	Cosenza	Calabria
St. Philomena	Santa Severina	Crotone	Calabria
Baptistry of St. Severina	Santa Severina	Crotone	Calabria

Figure 4. Synoptic table of the buildings surveyed and their locations. Preliminary and ongoing dataset developed within the Byzantine Cultural Routes PRIN PNRR 2022 Project. Elaboration by the authors.

The results of the surveys (Figure 4), the point clouds, and the technical drawings will form the App's repository. The documentation was developed over several years, and the final documents were edited to provide a consistent and comparable view of the architectural heritage (Arena 2022; Mediati 2020).

Instead of just showing abstract ideas, visual storytelling creates a journey through a story that lets users explore the complex relationships that define cultural experience. It is an immersive interaction that, through engaging content, opens the door to new interpretations, anchored to both lived experience and imagination.

In this context, telling stories is not just a means to convey information. It is a process of creating meaning. This encourages involvement and co-construction. Increasingly, scholars stress that to move from simple information to true knowledge is an active process of reinterpretation and revision. Access to cultural knowledge depends on dialogical exchanges (Bonacini 2021) in which meanings are negotiated and reformulated, creating more inclusiveness and understanding (Burke, 2013). It is necessary, therefore, to make a fundamental reassessment of the language used, often too technical and, therefore, exclusive, making it difficult and inaccessible to a wider audience. The concept of 'cultural accessibility' was proposed by Rocco et al. (2018) as a response to this need. This is a set of narrative and communicative strategies designed for a heterogeneous audience with different social, educational, and cultural backgrounds.

In this framework, storytelling acts as a bridge between those who produce knowledge (whether scholars, experts, or institutions) and the wider community. The role of ‘mediator’ is made possible by carefully refining and adapting the message, a process that Ossola (2018) describes as a ‘patient peaufinage of clarification’. It is precisely in this function that storytelling, especially when conveyed through visual and interactive modes, is employed as a powerful tool for cultural democratisation. It enables more active participation, making the transmission of knowledge more inclusive and understandable (Handler Miller, 2008; Cataldo, 2011; De Felice, 2014).

The narrative architecture is the result of elaborations and processes of communication of scientific data, which, therefore, follows a thorough phase of collection using cutting-edge techniques such as laser scanning and photogrammetry.

Therefore, the methodological approach of this study is based on the systematic integration of material and immaterial data, with the aim of constructing a multidimensional understanding of Italo-Greek sacred sites. Laser scanner surveys were conducted with FARO Focus 360, acquiring high-density point clouds with millimetre resolution. The scans were recorded, filtered, and aligned using native FARO Scene software, ensuring geometric consistency between the various survey stations and an overall accuracy of  $\leq 2$  mm. Photogrammetry was conducted with a DJI Mavic drone, operating in two modes:

- Automatic flight: with a programmed flight plan, frontal image overlap  $\geq 80\%$  and lateral overlap  $\geq 70\%$ , flight height varying between 30 and 60 m depending on the size and accessibility of the structure, generating an estimated GSD (Ground Sampling Distance) of 1–3 cm/pixel;
- Manual flight, adapted to the operating conditions and morphology of the site, to optimise coverage of architectural details that cannot be acquired with the automatic plan.

The acquired images were processed with Agisoft Metashape, following the standard workflow: 1) photo alignment; 2) generation of dense point clouds; 3) construction of 3D meshes; 4) production of orthophotos and textured models.

The quality control of the photogrammetric and laser models was carried out by verifying: completeness of coverage, geometric accuracy by comparison with control points, texture resolution, and consistency between multiscale data. All data were stored in a structured digital repository, accompanied by standardised metadata (site, acquisition date, instrument, technical parameters, resolution), to ensure traceability, accessibility, and future reusability.

It is challenging to provide precise numerical data for the study because of the site-specific nature of the cases examined. Each Italo-Greek sacred site presents unique characteristics in terms of scale, accessibility, preservation state, and complexity of architectural details. As a result, survey operations must be adapted to the conditions of each site. Flight plans for drone photogrammetry, for example, vary in altitude, image overlap, and path depending on the structure's size, orientation, and surrounding obstacles. Manual adjustments are often required to capture architectural elements that cannot be documented automatically. Similarly, the collection of intangible data depends on local availability, engagement, and site-specific cultural practices. The methodology is case-sensitive and flexible, prioritising the quality and contextual relevance of the data over strict quantification. This ensures that each site is documented rigorously while respecting its unique material and cultural conditions.

This approach has allowed the above-mentioned acquisitions to form the scientific basis, producing high-density point clouds, three-dimensional meshes, orthophotos, and accurately georeferenced technical drawings. These material data provide a precise and detailed spatial picture, essential for supporting any subsequent analysis and ensuring the scientific replicability of the observations.

These tools, essential to accurately document the architectural heritage and to build the technical basis of immersive narrative environments, are the starting point for adding later more complex narrative layers. These layers alternate intangible components, such as oral histories and toponyms, with tangible components such as historical documents and iconographic materials.

At the same time, the project systematically collects intangible data through oral histories, stories, toponyms, and photographs from the community. The selection of these materials follows explicit criteria: priority is given to elements that document historical uses, rituals, emotional perceptions, or collectively shared practices, as well as

narratives that highlight the relationships between local communities and architectural heritage. All contributions are carefully transcribed, coded, and inventoried according to thematic relevance, ensuring consistency and comparability between the various sites. They are accompanied by standardised metadata, including site, date, source, and type of narrative, to ensure traceability, quality control, and future reusability.

Once organised, these immaterial layers are superimposed on digital models of the artefacts, creating an analytical dialogue between the physical and cultural dimensions. This is a sort of annotation process linked to scientific data that allows correlations to be identified between architectural configurations, ritual spaces, and meanings attributed by the community, revealing patterns of use and interpretations rooted in history or reinterpreted in a contemporary key. The App functioned as both a repository and analytical tool: all tangible and intangible data were georeferenced and integrated into interactive 3D models.

Although the mobile application is still in development, a demo version focusing on three selected case studies is currently being prepared. Santa Maria di Mili, SS. Pietro e Paolo d'Itala and SS. Pietro e Paolo di Casalvecchio. These churches were chosen because they share stylistic and decorative features, have similar architectural layouts, and demonstrate comparable historical craftsmanship. Their locations along a fiumara that intersects the Dinnammare watershed and within the Ionian part of Val Demone — an area historically documented for its widespread Byzantine presence — allow for meaningful spatial and cultural comparisons. Data acquisition for the demo involves multiple sources, including historical images, archival texts, published materials, photos from trekking and pilgrimage apps, and collections of personal family photographs (e.g., from weddings and baptisms) (figure 5), which were requested from local municipal authorities and Pro Loco associations. This multilevel collection enables the construction of layered digital models that combine tangible and intangible heritage elements. While the app is not yet publicly available, these preparatory steps establish a workflow for participatory engagement. The system will integrate diverse data types, georeference them, and prepare them for overlay on 3D models. This provides the foundation for future user interaction and community participation. This pilot approach ensures that, once fully launched, the application will be able to systematically test participatory methods, document local memories, and explore the relationships between architecture, landscape, and intangible heritage. This will create a replicable model for cultural engagement. The system enables filtering by site, narrative type, or thematic category, allowing researchers to explore patterns of use, collective memory, and intangible heritage systematically.



Figure 5. Mock-up photomontage illustrating one of the app's experimental outputs. Overlay of private historical photographs and current point clouds (laser scanning and photogrammetry), aimed at visualising temporal stratification and past community interactions with the monument.  
Graphic elaboration by the authors.

This integrated workflow allows the construction of complex cultural interpretations: technical information ensures scientific rigour, while collective testimonies provide contextual depth, symbolic values, and experiential perceptions that would otherwise remain invisible (Arena 2022).

This integrated approach supports detailed analysis and documentation of sites and transforms data into tools for public engagement and cultural accessibility. The methodological workflow promotes an integrated understanding of

heritage, combining technical precision and cultural insight. It offers a replicable model for the enhancement of heritage.

The narratives collected from the community (as well as the wealth of images, photos, articles, and stories related to these artefacts) aim to explore how today's communities attribute meaning to these sites and landscapes. These accounts project memories and narratives that shape the intangible value of Italian-Greek architectural heritage, integrating scientific documentation with a perspective on contemporary cultural reappropriation.

This integration allows the creation of more detailed interpretive frameworks that integrate the cultural, social, and symbolic aspects of each structure, rather than just its physical characteristics. There is, therefore, an epistemological reorientation - a change of perspective that shifts the focus from academic research to the territory itself. It is not just a matter of documenting and preserving, but of revitalising the cultural significance of these places by stimulating public participation, improving accessibility, and promoting the shared creation of knowledge.

In this communication process, digital technologies – such as interactive itineraries, augmented reality, and geolocalised multimedia content (figure 6) – play a crucial role in shaping an immersive and inclusive experience. The methodology adopted is divided into two closely related dimensions: technical and participatory. The technical dimension is based on integrated surveys, whose data have been collected, processed, and implemented in the application, so as to ensure a scientifically rigorous interpretation of the built heritage. The participatory dimension, currently under development, concerns the collection of memories related to the artefacts examined as case studies. These include oral testimonies referring to minor historical events, “alternative” narratives, place names, and intangible cultural heritage, as well as a photographic archive documenting religious ceremonies and community events with the artefacts as a backdrop.



Figure 6. Examples of augmented reality that can be appreciated in the app: evanescent geometries, virtual hierophanies, virtual anastylosis (Mercurio, 2025).

These materials contribute to the construction of a sort of virtual memory bank, which enriches the artefacts with life and provides a deeper contextualisation within the surrounding cultural landscape (figure 7).

Integrating data allows us to move from simple documentation to complex cultural interpretations. Technical information ensures scientific rigour, while collective testimonies provide context, symbolic values, and experiential perceptions. This approach allows us to analyse, describe, and transform sites into tools for participation and enjoyment.

This approach supports detailed documentation, analysis, public engagement, accessibility, and cultural reappropriation. Digital technologies enhance immersive experiences, while the combination of datasets creates a model for heritage enhancement.

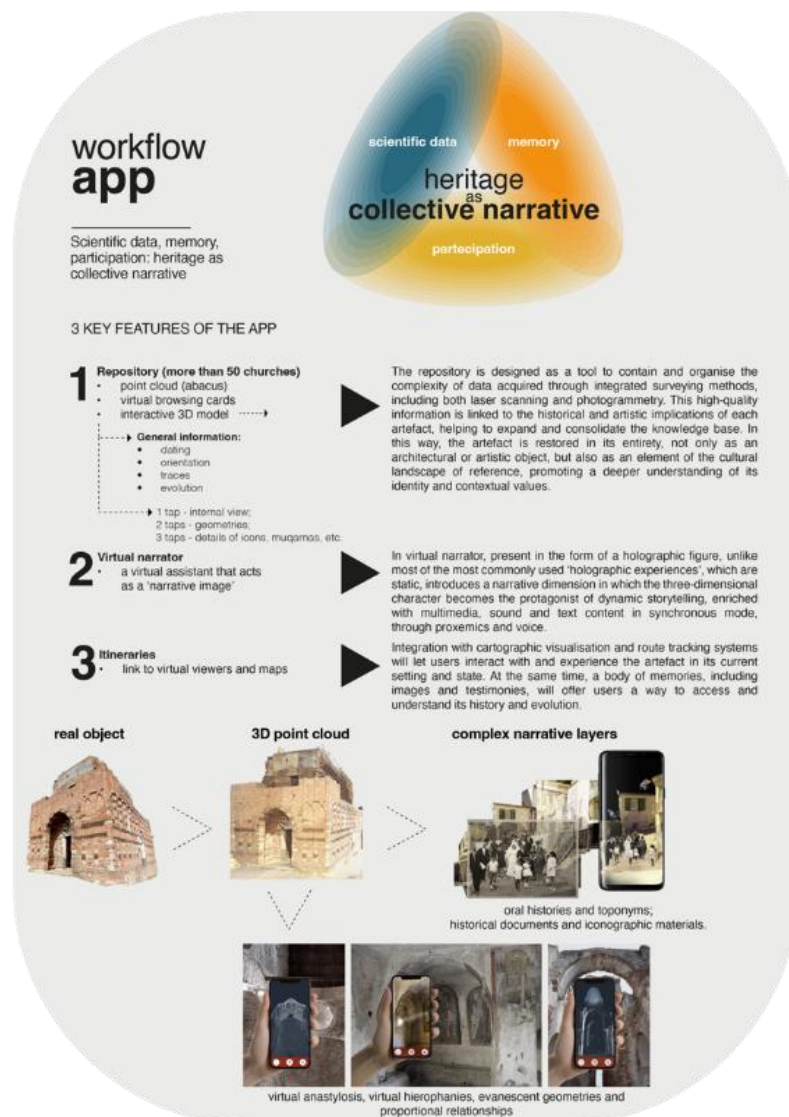


Figure 7. App workflow integrating scientific data, memory, and participation: heritage as a collective narrative. Data workflow of the mobile application developed within the Byzantine Cultural Routes PRIN PNRR 2022 Project. Graphical elaboration by the authors.

#### 4. Particular and contextual: a dialectical compromise.

The research has as its object the tangible and intangible "cultural heritage" linked to the Byzantine traces present in the territory of Eastern Sicily. From a systemic perspective, "cultural heritage" must be defined as both a cultural and a landscape asset. The landscape told, in fact, is configured as the outcome of the process of "territorialization" (Turco, 2010), so that the natural environment, due to the action of transformation, acquires anthropological value, becoming an artifact and gradually becoming known as territory.

In the history of a territory, local populations have the essential task of carrying out a creative action in identifying landscapes, their peculiarities, the relationships and contingencies that have modified them, but also in promoting the values attributed to them, encouraging memory to avoid oblivion, and putting into practice processes of valorization of the collective heritage.

An extremely concise summary of the state of the art in Sicily with regard to the fragmentation and management of agricultural areas is provided in Lucia Arcifa's study: 'Based on Michele Amari's vision, until a few decades ago, the history of Sicilian large estates was reconstructed as a story of re-emergence, in which the fragmentation of large properties during the Muslim era was followed by a recomposition of large estates with the arrival of the Normans.

This reconstruction, already challenged in the mid-1980s by V. D'Alessandro, with a view to greater continuity with the late ancient world, is contrasted by H. Bresc's "thèse", which instead emphasises the two profound breaks (the Byzantine and Arab periods) that stand in the way of the establishment of medieval latifundia. More recently, the works of A. Nef and V. Prigent propose a renewed approach, in which, within a complementary perspective between the Byzantine and Islamic periods, the themes of large estates, of their economic management, and of their impact on taxation are addressed (Arcifa 2017).

The "Byzantine Cultural Routes" research, since it considers impossible to concentrate the intention of valorization only on the artefacts to be preserved, aims to understand the specificities of the territorial palinsesto in which they are inserted and the relations that these objects have with the context, to reconstruct the complex interrelations that bind each individual built element to the others, Decoding social and symbolic meanings.

The understanding of the relationships between the multiple architectural emergencies that are the subject of this research is essential for gaining knowledge of each element, taken individually. The narration of this territory is fed, precisely, by particular and contextual, by microcosms, constituted by every point element (including religious architecture, monastic where existing, etc...) and the broad context in which these elements are inserted, in a landscape that makes evident its continuous 'tension' between materiality and immateriality, in its belonging at the same time to the sphere of reality and that of representation (Farinelli, 1981).

The complete or partial overlap of such relational, historical, geographical and political systems that describe this last bastion of east in Sicily is sometimes configured as 'area' (it is the case for example of castra), other times as network (as in the case of artefacts, whether they are sub-dives or rupestrians which are found in the part of Eastern Sicily analysed) or, finally, as a linear element (The reference here is to the routes connecting this system, both at coastal level and between the two seas) (figure 8).

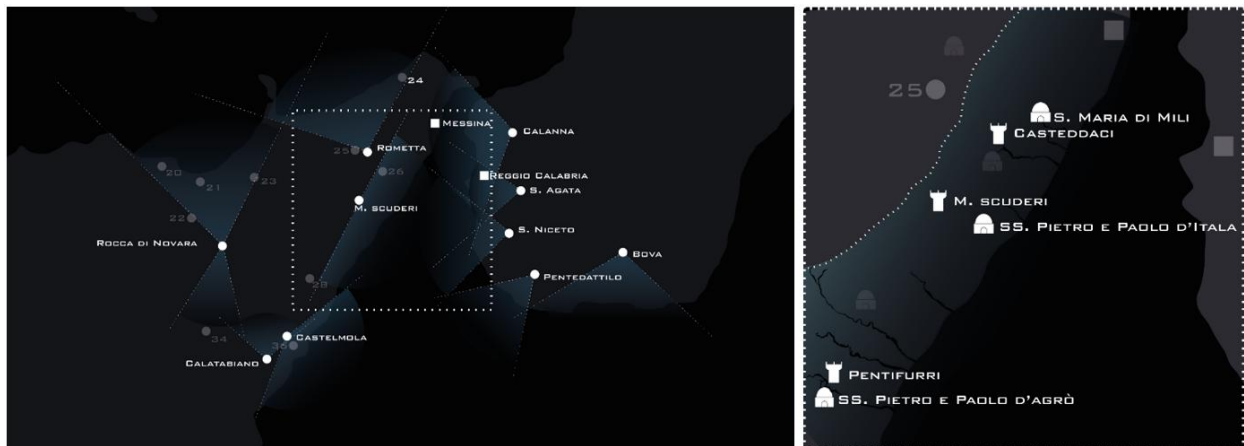


Figure 8. Views from the Strait's defence sites. Interpretative visualisations of visual points and optical cones based on Arcifa (2005).  
Graphic elaboration by the authors.

Specifically, the area of the Ionian where the churches of S. Maria di Mili, SS. Pietro and Paolo d'Itala, SS. Pietro and Paolo di Forza d'Agrò presents a toponomastic framework in which there are numerous relics of the Greco-Byzantine substratum (Arcifa, 2005), but also a road route, sometimes forced, given by the imperviousness of the orographic system, that responds to the needs of control of this important territory to flow and all these elements contribute to confirm the presence underlying rural settlements with agricultural vocation of Basilian matrix.

The representation of this territory will not be, therefore, a sum of objects, but the reconstruction of possible spatial systems: not simply point geometries, lines, areas, but visual relational systems, symbolic, functional, understood as unity.

The itinerary that is outlined, in view of these relations, allows for tracing hypothetical cultural routes that favor less known destinations, often minority and located in rural areas (Reina, 2016), but strongly identified in their spiritual and artistic dimension.

## 5. Conclusions

A wide range of tools is now used to communicate cultural heritage. These range from physical and paper media to digital devices. They are able to convey a plurality of contents and respond to different information needs. In particular, in addition to being a privileged means of dissemination, digital storytelling also plays an inclusive role by promoting the cohesion of participatory communities around shared cultural themes.

In light of the variety of technologies available, including augmented and virtual reality, it is necessary to orient the use of these tools according to specific communication objectives. To this end, a narrative kit for cultural innovation has been developed. This kit consists of principles and practices aimed at supporting museums and heritage institutions in creating accessible, interactive, and engaging digital environments. The fundamental principles of Digital Storytelling thus constitute a solid methodological basis for designing narrative experiences that can stimulate participation and promote a true democratisation of knowledge.

The ongoing research presented here situates itself within this innovative framework and proposes an integrated model for cultural heritage interpretation that combines scientific rigour with collective participation through advanced digital tools. The methodological workflow incorporates high-density three-dimensional surveys, photogrammetric reconstructions, and systematic collection of intangible cultural heritage — including oral histories, local toponyms, and archival imagery — thereby enabling a multilayered documentation of Italo-Greek sacred sites.

Preliminary results demonstrate the feasibility of this approach, particularly through the creation of a demo version of the web application focusing on three case studies: Santa Maria in Mili, SS. Pietro e Paolo in Itala, and SS. Pietro e Paolo in Casalvecchio. These sites were selected for their architectural, stylistic, and cultural similarities, and they demonstrate the potential of combining tangible and intangible documentation to reveal previously unexplored connections between architecture, landscape, and community memory. The collected datasets — comprising laser-scanned point clouds, photogrammetric models, orthophotos, historical and contemporary images, and narratives contributed by the community — provide a reproducible and scientifically rigorous basis for further participatory engagement.

These sites were selected for their architectural, stylistic, and cultural similarities, and they demonstrate the potential of combining tangible and intangible documentation to reveal previously unexplored connections between architecture, landscape, and community memory. The collected datasets — comprising laser-scanned point clouds, photogrammetric models, orthophotos, historical and contemporary images, and narratives contributed by the community — provide a reproducible and scientifically rigorous basis for further participatory engagement.

The web application transforms heritage from a static object of observation into a complex, layered cultural landscape, reconnecting built environments with historical processes, environmental contexts, and social practices. By enabling immersive exploration and interactive engagement, the system not only facilitates an understanding of architectural and historical features but also the appreciation of the symbolic, experiential, and collective dimensions.

This research contributes to the ongoing debate surrounding the study of Italian-Greek architecture and the Mediterranean cultural landscape. It attempts to demonstrate the methodological advantages and limitations of combining quantitative architectural surveys with qualitative narrative data. The project aims to provide a replicable model for enhancing cultural accessibility and community participation, bridging the gap between academic research and public engagement, which often prevents research from having a wider impact. Future work will focus on incorporating the narrative data collected into the application and testing it. Once the project's results are known, the workflow will be refined, and adjustments will be made before extending the application to other sites and perfecting its interactive features.

This will verify the effectiveness of participatory strategies for knowledge co-construction and cultural sustainability. The integration of advanced digital technologies with narrative-driven methodologies allows for the creation of an inclusive, participatory, scientifically grounded framework for heritage interpretation. This approach enhances the documentation and dissemination of cultural assets, fosters collective memory, local identity, and active engagement, and promotes a transformative vision of heritage as a living and co-constructed resource.

It will be possible to experience the heritage, in fact, not only as a simple object of observation, but also as a complex and stratified cultural landscape, reconnecting architecture with history, the environmental context, and the communities that inhabited it.

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### **Ethics approval.**

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### **Conflict of interest.**

The author(s) declare that there is no competing interest.

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