Archaeological Sites and Local Renaissance: Enlightening Italy’s Inner Rural Areas – The Case Study of the 21 Villages in the Madonie Park, Sicily

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Abstract: In Italian inner rural areas, archaeology emerges as the thread that connects past and present, revealing the cultural and historical roots of often overlooked small villages. These settlements, like the Madonie District and its 21 villages, nestled in picturesque landscapes, hold archaeological treasures that, if properly rehabilitated and valorized, can trigger a social, economic, and cultural revival. Archaeology can play a pivotal role in reigniting the vitality of these communities with the contribution of technological innovation. Using augmented and virtual reality and emerging technologies, it is possible to immerse oneself in antiquity and have immersive experiences that allow the perception of inner rural areas history in new ways that revitalize existing sites but also enable the experience of what no longer exists, digitally reconstructing structures and realities lost over the centuries. This can attract visitors eager to uncover the authentic charm and intrinsic history of these places and can transform them into smart villages.

1. INTRODUCTION

In the northwestern part of Sicily, at the heart of the Mediterranean Basin, lies a protected natural gem known as the Madonie (Farinella, 2022) GeoPark UNESCO (Figure 1). Spanning 39,679 hectares and encompassing 21 municipalities in the province of Palermo, this geological wonder offers a captivating journey through landscapes (Anselmo, 2020) ranging from the Mediterranean coast to snow-capped mountain peaks. Majestic and diverse natural attractions include Mount Carbonara, the second-highest peak in Sicily at 1,979 meters above sea level, and the Pollina River Valley, a fluvial valley adorned with lush vegetation and wildlife, completing the panorama of this exceptional natural paradise (Trapani & Vesco, 2013). The Madonie Park is not merely a testament to grand landscapes; it is also a biodiversity sanctuary, home to century-old trees like the Abies Nebrodensis, Mediterranean plants, and a variety of wildlife (Schicchi & Inglese, 2022). Beyond being a prominent tourist attraction, this extraordinary place offers a range of activities and attractions. Nature enthusiasts can partake in hiking, trekking, and mountain biking, while those with a penchant for culture can immerse themselves in the historical centers of the park’s villages. Tastings of local typical products add the finishing touch to the experience. Yet, the Madonie Park is more than a natural treasure; it is a guardian of human history (Gennuso, 2022). Neolithic, Bronze Age, Iron Age, Roman dominion, and influences from Byzantine and Arab cultures have shaped Madonie’s history, evident in the remains of ancient villages, castles, and churches. Recent archaeological discoveries in the Madonie Park have further enriched our understanding of this millennia-old history, unveiling secrets dating back to remote epochs, such as Neolithic villages, Greek sanctuaries, and Roman settlements.

Archaeological findings (Figure 2) have demonstrated that Madonie has been inhabited since prehistoric times, hosting a variety of diverse cultures over the centuries. The earliest traces of human
activity date back to the Lower Paleolithic, when the area was inhabited by groups of hunter-gatherers. During the Neolithic period, the population settled more permanently and began practicing agriculture and animal husbandry. In this period, the first villages of the Madonie were built, the remains of which are still visible. It has also hosted a variety of diverse cultures over the centuries; in the Bronze Age, it was inhabited by populations of Sican culture, who built numerous settlements. In the Iron Age, the district was conquered by the Siculi, who founded the city of Himera (Farinella, 2021). In the Roman era, it was an important center of agricultural production, and, in the medieval period, it was inhabited by populations of Byzantine and Arab culture. Archaeological findings, today, provide information about the economic activities practiced in the Madonie over the centuries. For example, discoveries of agricultural settlement remain attest to the importance of agriculture and animal husbandry. Discoveries of artisanal artifacts testify to the importance of craftsmanship. But also, findings provide information about the customs and beliefs of the populations that have inhabited this place over the centuries, for example, discoveries of ritual objects attest to the importance of religious practices.

![Madonie Geopark](source: Carmelo Di Salvo, 2022)

![Grotta della Gurfa](source: Visit Madonie, 2023)

Still today, the archaeology of the Madonie is a continually evolving field of research. Discoveries are made every year, contributing to improving our knowledge of this territory rich in history and culture. On the contrary, despite the numerous architectural, naturalistic, and archaeological peculiarities of the “Parco delle Madonie” region, it is regrettable to note the presence
of serious issues within the surrounding villages. Presently, these communities face the challenge of a significant demographic gap, especially among the elderly, a lack of adequate and sufficient services, a locally prosperous economy that struggles to expand beyond the territorial borders, and a deficiency of a significant number of young people (Farinella & Anselmo, 2023). These factors put the region at risk, like many other internal areas of the Italian territory, of disappearing and becoming a neglected portion of our country. However, it is essential to consider the opportunity to promote initiatives aimed at the recovery and enhancement of these areas, which represent the most identifying roots of our country. Promoting a different and more innovative approach to protection and conservation could provide future generations with a heritage rich in history, architecture, arts, and millennia-old traditions. If well-appreciated, these features could bring the Madonie district to a condition of absolute prestige on the island and in Italy. In particular, the use of numerous archaeological areas in the region could enable a more informed enjoyment of the places and promote different paths of urban revitalization. The integration of technology in archaeology or technological design to enhance the usability of archaeological areas often left abandoned, for example, could play a key role in making these territorial peculiarities accessible and attractive, thereby increasing tourist enjoyment, and stimulating the sustainable economic development of the region.

2. UNLOCKING ITALY’S ARCHAEOLOGICAL TOURISM POTENTIAL

During the second edition of the Mediterranean Archaeological Tourism Exchange (BMTA, 2023) held in Paestum, the research conducted by Intesa Sanpaolo’s study center highlighted that UNESCO recognition can be an economic development catalyst only if supported by a strategic plan and strategy. Italy stands out globally for the number and diversity of its 45 archaeological sites recognized by UNESCO (Settis, 2018), with the Southern regions boasting 12 of them, representing 27% of the national total. In the historical-archaeological context, the southern region exhibits significant tourist appeal, aligning with the rest of the country. Despite representing 27% of UNESCO-recognized historical-archaeological areas, the Southern Peninsula attracts 30% of visitors and contributes to 27% of the total revenue. Italy is the country with the highest number of UNESCO World Heritage sites globally (Figure 3), and many of these sites are linked to the archaeological world, spanning from prehistory and Magna Graecia to the Roman Empire and the Paleo-Christian tradition (Settis & Di Teodoro, 2022). In this context, rural areas play a vital role in preserving Italy’s rich historical heritage. Due to their geographical isolation from urban hubs, small towns, especially those in the hinterland, have diligently safeguarded and showcased the historical treasures passed down to them. Italy boasts numerous instances of smaller communities successfully preserving their historical significance and, of course, some of them are also UNESCO sites. Italy hosts numerous villages - true hidden gems waiting to be revitalized and restored, rich in history and nature. Leveraging emerging technologies, especially for the preservation of archaeological heritage, could ensure the transmission of these forgotten treasures across generations.

Harnessing emerging technologies could ensure the sustainable development of these sites, enriching the tourism offerings and promoting a green economy. For example, revitalization projects include Craco Vecchia (Figure 4), a village dating back to 1154 whose enjoyment is now possible thanks to the ability to enter within a predetermined path enclosed by metal cages, a technology employed to protect visitors, accompanied by appropriate tour guides, from potential structural collapses (Laterza, 2022). This allows them to experience the charm of a decayed yet unforgettable place. Pentedattilo on Mount Calvario in Calabria, both aspiring to transform into tourist destinations with technological applications and tools ICT.
In Sant’Angelo, Basilicata, tombs dating back to the 8th century B.C. have been discovered, highlighting the potential for sustainable tourism through geo-archaeology with murals, street art, and land art to involve tourism. Mozia, in Sicily, is an exemplary and intact city from the 8th century B.C., emphasizing its unique potential to preserve the charm of Sicilian Carthage, important to be valued and rediscovered (Farinella, 2021). Through the construction of the power line connecting the island to the mainland for the transmission of electrical energy, a definitive end is brought to the series of limitations to which the island has been subjected. This initiative promises increased tourism and cultural accessibility on the island, translating to enhanced comfort for visitors to the archaeological museum managed by the Giuseppe Whitaker Foundation by extending visiting hours, illuminating external pathways, and excavating areas. The research and geo-archaeological study represent an extraordinary opportunity for documentation and surprising knowledge in these places, as well as in lesser-known territories like the recovered village of Pentidattilo in Calabria (Gaetano, 2022). Promoting archaeological itineraries to explore our past and using emerging technologies can enhance the documentation and study of these places, capturing the interest of scholars, tourists, and researchers is crucial for the revival of these territories. There is much to rediscover in Italy, remarkable geo-environmental and archaeological sites that can facilitate substantial development of cognitive activities, exploring emerged territories and submerged coastal
areas. Leveraging emerging technologies for heritage preservation is imperative not to be overlooked, as geo-archaeology emerges as an inexhaustible field of study and knowledge, offering a new and original approach to integrated and multidisciplinary understanding of the past and approaching the oldest. Unfortunately, these sites are not being fully utilized and are allowed to deteriorate, but they represent unique intersections of history, environment, and archaeology, offering a singular perspective under the geo-archaeological lens.

In Italy, in recent years, several initiatives have focused on archaeology, particularly in smaller communities, such as the “Night of Archaeological Villages” - sustainable heritage for lively communities, and the “Orange Flag Villages” (Borghi Bandiera Arancione, 2023). These events facilitated exploration, guiding participants through an itinerary along the village streets, unveiling the rich historical tapestry beneath the surface. Beyond archaeological exploration, these initiatives were collaborative efforts actively engaging citizens and local associations that provided an immersive experience, leveraging the principles of archaeology as a medium for storytelling. These are some examples of smart strategies applied to Italian heritage and archaeology, particularly in the inner areas, aimed at enhancing the more remote regions of our territory. Beginning with culturally focused strategies, accessibility features, routes and itineraries, it becomes possible to revitalize the territories of Italy’s inner areas. Moreover, considering the prospect of sustainable technological design opens avenues for experiencing archaeological sites not only through traditional tourist tours but also by advancing into the digital realm (Condorelli & Bonetto, 2022). This approach facilitates the appreciation and innovative storytelling of these sites, providing a broader perspective for the new generation. It allows them to view archaeological heritage through a different lens, offering them a unique opportunity to engage with and appreciate our cultural legacy in a novel and meaningful way. At the same time, this can be a methodology to apply to invigorate these areas from a tourist perspective and reactivate the local economy. The combination of cultural strategies and sustainable technological solutions not only enhances the tourist experience but also contributes to the economic growth of local communities. The innovative enjoyment of archaeological heritage, supported by technology, can become a driving force for attracting visitors, generating employment opportunities, and promoting the sustainable development of Italian inner areas (Beale et al., 2022).

3. SMART – IN MADONIE: ROCK ARCHITECTURE, TEMPLES, AND CASTLES IN THE MADONIE

In the evocative context of Madonie Park, comprising 21 municipalities, a rich archaeological heritage emerges, which, unfortunately, is currently poorly preserved, sometimes abandoned or neglected over time. Despite the presence of sites of considerable value in each municipality, the current lack of an appropriate technological approach hinders the widespread enjoyment of these historical testimonies. Each municipality boasts significant archaeological sites that, however, lack a technological project enabling easy and informed public access. The absence of technology-oriented infrastructure for an intelligent visit experience is evident, as well as the lack of plans for the restoration, enhancement, and use of these sites. Currently, these testimonies are left to degradation and neglect, without the possibility of returning to the center of public interest. The lack of funding and the absence of a programmatic plan for events aimed at their use inevitably leads to a lack of interest, contributing to the closure of these sites, and making them inaccessible to the public. This situation has also prevented tourists, who rarely manage to discover the wonders of the hinterland because they are less known or less accessible, from enjoying a complete experience aimed at understanding the immense architectural, monumental, and archaeological heritage.
present. Peak hours, especially during the weekend, prove critical, with bars and museums often closed. The use of these places and their related services is not guaranteed, undermining the opportunity for a fulfilling and cultural discovery for both visitors and residents.

To cite just a few of the archaeological sites in the vast Madonie District, the most famous and recent is the Virtual Archaeological Museum (M.A.V.) (Figure 5) to relive 5000 years of archaeological history of the Madonie and make archaeological sites virtually accessible today due to geomorphological conditions. The museum, once open to the public, also allowed children to learn archaeology through play. However, today, its use is not allowed. The archaeological site Balza Areddula, between Balza Areddula and Balza Solletta the Strittu, a gorge where the Salso River narrows, creating a beautiful landscape with small natural pools and sulfur springs. Also, the Roman Villa of S. Marina in Petralia Soprana, Monte Aburchia, one of the most important archaeological areas in the Madonie, the Civic Museum of Castellana Sicula, located within the archaeological area of Contrada Muratore, Grotte della Gurfa (Figure 2), rock architectures on multiple levels, probably of protohistoric age and today always closed unless requested by the local administration. Not to be overlooked is the presence of Himera, a Greek city founded in 648 B.C. by the citizens of Zanclae and now an archaeological park, but not easily accessible. Caccamo, with its medieval castle, Isnello and its Urban Geological Path, the Civic Museum “Antonio Collisani” in Petralia Sottana, and other civic museums in the Madonie, some recently discovered Menhirs and Cromlechs in the Madonie Park, currently under study. Lastly, Contrada Muratore, in Castellana Sicula, is the three-arched Romanesque bridge in Blufi, erected over the Southern Imera River in the medieval period, between the territories of Blufi and Petralia Sottana.

The “Archeoaccessibility” project was initiated as part of the “In the Heart of the Madonie. Villages Accessible to All” initiative, supported by the Foundation with the South for an experiential journey inside the Archaeological Museum of Gangi. However, what has been accomplished so far is insufficient: 21 municipalities are not self-sufficient from a tourist perspective, unable to propose itineraries suitable for their heritage. Sites that could be revitalized differently through technological implementation can indeed promote the development of rural areas by sharing information and moments of what once existed. Concerning the possibilities offered by new technologies in archaeology, consider, for instance, the concrete ability, thanks to cutting-edge tools, to pinpoint the exact location, material quality, and size of a specific archaeological artifact deep within the ground without even excavating the soil. This innovation makes previously unthinkable discoveries possible and, at the same time, allows the preservation of each site by avoiding overly invasive investigations.
Radar, 3D technologies, drones, lidar cameras, infrared remote sensing technologies, computerized tomography, and magnetometers are just some of the tools used in modern archaeology today, for example in Pompeii. They not only generate realistic images for public display but also enable meticulous reconstructions of past eras and contexts that have led to what is now our present. The goal is to create a comprehensive and immersive approach that engages both the local community and tourists in a deeper exploration of the inner rural areas, significant monuments, traditions, and collective memory. Proposed activities include an interactive map of monumental heritage both online and on-site, serving as a comprehensive guide showcasing the rich monumental heritage of the area, and integrating geographical and historical information about each site. A dedicated rural area app could offer features such as guided tours, historical insights, and interactive elements like quizzes or challenges to engage users in the cultural narrative. Additionally, features for route customization, duration adjustment, and theme selection could cater to the preferences of individual visitors (Hein, 2022). An exhibition and
video documentation for an immersive exhibition that combines artifacts with multimedia elements to showcase the monuments, history, and culture of the region. Produce a visually compelling video documenting significant cultural aspects, providing a captivating narrative accessible both physically and virtually. Community dialogues could facilitate moments of debate and conversation within the community through digital platforms or live events, encouraging active participation, exchange of insights, and collaborative storytelling to enrich the cultural heritage experience. Multimedia installations, including interactive displays, audiovisual presentations, and augmented reality elements, create an engaging and educational environment for visitors. A guided visitor app could be developed as an advanced mobile application for guiding visitors to key points of interest in rural areas, contributing to a networked system of cultural offerings, and ensuring a comprehensive exploration of the heritage sites. Integrated features such as automatic recognition of archaeological structures, detailed descriptions, automatic readings, and augmented reality enhancements provide a rich and personalized experience. Last but not least, accessibility features: To ensure inclusivity, the smartphone app could incorporate features catering to visitors with visual disabilities. It will automatically recognize archaeological structures through the phone’s camera, providing detailed descriptions. The app could also offer automatic readings and use augmented reality to highlight specific parts of the structure described. Visitors can customize their experience, ensuring a unique and personalized journey into the past. By combining these innovative initiatives, it is possible to transform the cultural heritage experience in the rural inner area of the Madonie in Sicily into an engaging, accessible, and highly personalized adventure for both the local community and tourists. This holistic proposal aligns seamlessly with the broader objective of preserving and promoting the historical and cultural richness of the region through the integration and enrichment of state-of-the-art technologies. In addition to providing an immersive and personalized cultural heritage experience, the proposed technological solutions play a crucial role in empowering visitors to explore the rural inner areas of Sicily independently. This autonomy becomes particularly significant where there is a shortage of personnel, addressing the challenges and enhancing the accessibility of historical sites in remote regions.

The integration of an interactive map of monumental heritage and a dedicated rural area app allows users to embark on self-guided tours. Visitors can delve into the rich history and cultural significance of each site at their own pace, aided by detailed information, interactive features, and customizable routes. This self-guided approach is particularly advantageous in areas where limited staffing may pose challenges to providing on-site assistance. The guided visitor app further contributes to independent exploration by offering automatic recognition of archaeological structures through smartphone cameras. This feature proves invaluable in instances where personnel may be scarce, enabling visitors to access comprehensive and detailed descriptions of historical sites without the need for on-site guidance. Moreover, the incorporation of augmented reality in the app enhances the overall experience, allowing users to visually engage with highlighted parts of structures as they are being described. This not only adds an interactive dimension but also compensates for the absence of on-site personnel, ensuring that visitors receive a thorough and informative encounter with the cultural heritage. Multimedia installations strategically positioned throughout the rural area serve as educational touchpoints, offering insights and information even in the absence of dedicated personnel. These installations become integral in compensating for the challenges faced by remote regions, ensuring that the cultural richness of these areas is accessible and appreciated. These solutions enable visitors to autonomously unravel the historical tapestry of the region, ensuring that the cultural treasures of rural areas are not only preserved but also celebrated in a technologically enhanced and inclusive manner.
4. CONCLUSION - ARCHEOLOGICAL SMART VILLAGES

In a landscape marked by ongoing transformation and globalization, the smaller, lesser-known Italian towns are poised to unearth fresh opportunities for growth and advancement by revitalizing their archaeological heritage (Colajanni et al., 2021). Archaeology, seen not merely as a study of the past but as a dynamic asset for the present, assumes a pivotal role in promoting these locales, captivating aficionados of history and archaeology. The application of cutting-edge technologies greatly magnifies the tourism prospects of these sites. Through digital tools and virtual reality, visitors can dynamically engage with bygone eras, exploring what once existed, what remains, and the possibilities of epochs past. This innovative mode of exploration not only yields a deeper understanding of the location’s history but also creates an immersive experience appealing to a wider and more diverse audience. Presently, numerous sites in the Madonie region, steeped in history and archaeology, languish in obscurity. Their lack of visibility, hindered by insufficient accessibility and promotion, hampers their full contribution to the economic and cultural growth of local communities. However, adopting a modern approach to promote and present these sites could pique interest, raise awareness, and foster greater public engagement. The astute utilization of these archaeological resources not only safeguards the past but also nurtures sustainable territorial development. Crafting tailored tourist itineraries, hosting cultural events, and integrating technological solutions for dissemination can metamorphose these sites into significant tourist magnets. This not only draws ardent visitors but also fuels local employment opportunities and bolsters economic growth through tourism. In addition, the presence of diverse archaeological sites across the Madonie enclave offers a chance to create bespoke paths, contributing to the development of a robust network of smart archaeological sites. This strategy allows visitors to delve deep into the ancient history that has shaped the fabric of Madonie (Lombardo, 2022). Promoting tailored cultural circuits not only enriches visitors’ experiences but also has the potential to spur increased local employment. Designing thematic itineraries supported by cutting-edge technological solutions aids in spreading awareness about previously less-known archaeological sites. This innovative approach not only appeals to archaeology enthusiasts but can also catalyze repopulating the area by offering job opportunities and fostering sustainable development through cultural tourism. The blend of targeted tourism promotion, leveraging state-of-the-art technologies for archaeological site exploration, and the creation of personalized cultural paths present a promising model for enriching Madonie’s archaeological heritage. This approach not only contributes to preserving history but also forges a sustainable future for local communities through economic growth and increased employment.

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