

Chapter 3

Architectural Heritage and Digital Transition: Intangible Components as Regeneration Infrastructure for Inner Rural Areas



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Abstract Architectural heritage (AH) located in inner rural areas, hardly accessible and sparsely populated, requires specific preservation actions to enhance its systemic role as a development vector. The digital transition, promoted through global, European, and national strategies, represents, in this sense, an opportunity and a challenge. The fragile equilibrium between AH and its environmental and cultural context requires to deal both with its tangible and intangible components. The chapter tackles this problem, providing a methodological framework and a case study (Calascio, Italy) about the use of digital technologies to enhance accessibility and attractiveness of AH in inner rural areas, through a sustainable, participatory, and low-impact approach. GIS methods and tools permit integrating physical-spatial data with several intangible information levels (social, historical, cultural, etc.), building up a collaborative, multidisciplinary, and transcalar base of knowledge. Thus, intangible heritage recovery, in the form of digital narratives, is systematized with the design of AH access and fruition paths, emphasizing its connections (spatial and temporal) with the context and activating both attractive mechanisms for external temporary communities (tourists, students, researchers) and new awareness of the place's cultural value in the local community, with the aim of encouraging participatory processes of preservation and sustainable development.

Keywords Architectural heritage · Digitalization · Intangible heritage · Rural area · Rural regeneration

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3.1 Introduction

3.1.1 *State of the Art*

The definition of “rural areas” is not only based on agricultural land use. It depends on the relationship and equilibrium between the natural environment and people.

The United Nations Statistical Commission (UNSC) provides a global comparative framework for measuring the rurality along an urban-rural continuum. The degree of urbanization, based on a population regular grid of 1 km² per cell, classifies the local units as “rural areas” considering a density of people lower than 300 per 1 km² and less than 5000 inhabitants in the contiguous cells (cluster) (UN Statistical Commission 2020).

The European Union Stat (EuroStat), following these methodological guidelines, moves the definition of rurality from the abstract level of a geographical grid to an administrative one. “Rural areas,” in the EuroStat framework, become a basic territorial typology of local administrative units (LAUs), where the majority of population lives in a rural 1 km² cell (Eurostat 2018), according to the UNSC’s degree of urbanization.

This general definition, based more on quantitative geostatistical and demographic factors rather than on qualitative recurrent patterns, makes the territories identified as “rural” not homogeneous but “highly diversified by nature” (National Strategy for Inner Areas (NSIA) 2013).

In fact, rural areas include a high variability of orography (plains, hills, mountains, etc.), land cover (crops, water, built area, etc.), land use (agriculture, forestry, etc.), and accessibility conditions.

Thus, to identify more homogeneous clusters of rural areas with similar characteristics (and problems), the European Union (EU) classifies them as “remote” where the majority of population live more than a 45-minute-drive-by car from the nearest city (Eurostat 2021; European Network for Rural Development 2020). The remoteness identifies a general condition of physical inaccessibility and isolation that, in addition to the lack of population in rural areas, generates risks at different levels (abandonment and migration dynamics, poverty, lack of primary goods, etc.), requiring common counteraction strategies.

The Italian National Strategy for Inner Areas (NSIA), developed as a systemic action to mitigate the marginalization and de-anthropization of a high percentage of national territory and settlements, introduces a specific factor to more precisely qualify the lack of accessibility. The “inner areas” are rural areas at a significant distance from main essential services (transportation hubs, hospitals, schools), which contain major environmental and cultural resources (National Strategy for Inner Areas (NSIA) 2013).

Thus, rural inner areas refer to a context with low presence and density of people, in comparison with the richness of the natural and cultural environment, and hardly accessible, due to physical distance from basic services and main transportation hubs (National Strategy for Inner Areas (NSIA) 2013; Barca et al. 2014; Bertolini and Pagliacci 2017).

The last decades' trend and the future forecasts stress this condition, at different scales. The World Bank estimates that in 2021, around 3.5 billion people lived in rural areas (44% of global population) (World Bank 2018). However, the time series shows a constant degrowth in the last 60 years: -20% since 1960. Europe is in line with this dynamic, with the 25% of rural areas population in 2021 (Eurostat 2021) and a -16% negative trend since 1960 (World Bank 2018).

This radical change in the delicate equilibrium between human presence and natural environment in rural inner areas is expected to have a systemic effect. By 2040, it is foreseen to have a reduction of agricultural land (-2%), with a parallel growth of forests and natural areas and an expansion of urban areas (LUISA 2023).

The whole landscape ecosystem is going to change along with social practices, economic activities, and the built environment. The lack of human presence and the agricultural abandonment produce a shift in the use of buildings, which causes the deterioration of their physical status, accessibility, and attractiveness (Orbasli and Vellinga 2020; Sardaro et al. 2021a; Mu and Aimar 2022).

Furthermore, this lack of maintenance impacts on the evaluation of architectural heritage (AH), compromising its tangible and intangible components, made up of related social practices and memories (UNESCO 2003; Srinivas 2015).

The contrast between this trend and the richness of rural areas, in terms of potential drivers for sustainable development, has activated counteractions, at different levels.

In 2021, the World Social Report of United Nations (UN), titled "Reconsidering Rural Development," underlines the need for a new perspective on this topic, moreover after the global pandemic, focusing on overcoming the rural-urban divide and proposing "in situ urbanization as a model of rural development" (United Nations 2021).

A similar trend moves the European "Long-term vision for rural areas" (European Commission 2022). The core of this Action Plan stands on the improvement of access to services, the enhancement of connectivity (both in terms of transport and digital access), the preserving of natural resources as an aid for climate change resilience, and the diversification of economic activities.

The common *fil rouge* of these strategies concerns the identification of a structural weakness (Ferretti et al. 2022) of rural inner areas, related to digital divide and inaccessibility, which makes them "no longer meet contemporary human needs" (Sardaro et al. 2021b).

The concept of accessibility has been differently defined and declined, moving between a physical, cultural, social, economic perspective (Beretić and Plaisant 2019), but its influence on landscape change and urban development is widely accepted in literature (Antrop 2005), and it plays a key role, at different levels, in the development of rural inner areas.

The distribution and isolation of people, dispersed through the natural environment, set a high priority to the creation and maintenance of a local social network, empowering a sense of collective identity and community. The cultural access to information on tangible and intangible, natural, and cultural heritage encourages the activation of local safeguarding and evaluation strategies. These immaterial forms

of accessibility are interconnected with the physical one, at different scales, from the territorial transportation connections to the architectural management and maintenance of the built environment.

The enhancement of digital infrastructure and the reduction of digital divide, promoted by both European and national strategies, represent an opportunity, in terms of accessibility, providing strategies to mitigate, if not overcome, the structural remoteness of rural inner areas.

However, the introduction and diffusion of digital technologies should be aware of the specific ecosystem of rural areas, avoiding threats related to invasive infrastructure, detachment from the physical environment, and massive attraction of external fluxes.

The essay tackles this problem, considering how digital technologies can be used to enhance the accessibility and attractiveness of architectural heritage in inner rural areas, through a sustainable, participatory, and low-impact approach, based on a broad concept of accessibility and on digital storytelling as a strategy to reconnect tangible and intangible heritage.

3.1.2 Problem Definition

Digital technologies consist of a network of tools, physical devices, methods, people (professional and users) built around data, and their computation. Data, as a computable minimum information unit, becomes the shared language of different disciplines at different scales (from the territorial geography to the subatomic chemical), encouraging transcalar and multidisciplinary approaches.

Furthermore, the life cycle of data, from its collection or production to its visualization and publication, links operators and professionals to general users, activating a human ecosystem generated by information exchange through shared platforms.

A “third infoscape” (Iaconesi and Persico 2017), which overlays to the physical space a virtual dimension, opened both to a mimetic reproduction of reality (digitalization) and to its information enrichment (augmentation).

This multilayered and interconnected infoscape, generated by digital technologies, makes their application to AH not limited to virtual representations, functional to descriptive and predictive simulations to monitor the physical condition of the building in a diachronic perspective.

Digital technologies permit also to enrich the AH’s representations with contextual information layers, related both to the natural environment and to anthropic dynamics, offering the opportunity of building up an information system comprehensive of both tangible and intangible components.

Thus, the intangible layer of memories and practices becomes accessible through digital technologies, unveiling the cultural and social value of AH, in addition or despite its present physical condition, making evident its attractiveness through the

enhancement of the accessibility of its hidden cultural value (Iaconesi and Persico 2017; Hatzopoulos et al. 2017; Georgopoulos 2018; Maietti et al. 2020).

However, the encouraging experiences in applying digital technologies to AH do not exclude the need for a careful evaluation of their impact. In fact, digital technology is a broad concept that refers to different technical solutions driving different digitization processes with a consequent effect on the local ecosystem.

The specific contextual condition of rural areas stresses this warning, encouraging the use of technologies like Global Positioning Systems (GPSs), mobile devices, and AR/VR, which minimize the infrastructure in the physical space, maximizing the connectivity, in terms of data exchange, and the flexibility (they can be used in any area covered by satellites).

These technologies can be part of more complex pipelines, which involves all the required hardware and software to build up a descriptive/predictive information system around the AH, but their optimization of the physical size/information volume ratio makes them suitable for digital acupuncture interventions (Iaconesi and Persico 2017) with positive side effects.

They can guide, through the development and sharing of location-based storytelling, the exploration of rural inner areas, following the digital traces of historical events, local memories, traditional practices, and enhancing the physical and cultural accessibility of the place.

In this way, adopting a transcalar approach, they permit to look at the digitalization of AH not as the representation of an isolated volume, based on the recognition of a single point of interest (POI), but as the reconnection of a network of nodes and pathways, both in the tangible and intangible layer, which form the living continuity of heritage (UNESCO 2003).

In this sense, digital technologies work as a mediation tool, supporting the interlinking between local community and AH, through participatory practices like crowd and community mapping experiences, aimed at setting up a shared information system, directly updatable by the local community, which generates a common and expandible base of knowledge.

A rural infoscape with a potential cascade effect on the physical renovation of AH in rural areas, enhancing its accessibility and attractiveness and becoming, in this way, a driver for gathering economic investments.

Furthermore, the practitioners involved in the digital creative economic chain (digital content creators, coders, and engineers involved in the startup and maintenance of digital infrastructures, promoters of phygital experiential tourism offers, etc.) set the base for a diversification of economic sectors in rural areas.

Thus, the use of digital technologies such as knowledge sharing, participatory, and mediation tools supports the development of rural context in contemporary terms, overcoming the traditional urban/rural dichotomy through the identification of the specificity, and of specific lifestyles, of contemporary rural areas.

In this sense, the reactivation of AH, and the enhancement of its accessibility, becomes a vector of a more systemic action, fostered to the regeneration of the conditions of living in rural inner areas.

3.2 Methodology

“When we experience territories, we create stories” (Iaconesi and Persico 2017), locative stories (Wilken 2019), which means that the user experience of a place opens the dimension of his connection with the environment, his personal landscape.

This dimension is set up and populated by perceivable elements, POIs, where some event happened, or something generated curiosity and interest. This perceptive system can remain unexpressed, or it can produce different forms of representations (texts, images, multimedia) to be shared.

Thus, the presence and action of people in a place activates a palimpsest of pathways, memories, and narratives, with different levels of significance for the definition of a collective identity. A map, made up of invisible layers that overlays and interact with the physical space, activating and revealing the importance of some points and preferred paths.

Geographic information system (GIS) is a set of digital tools and methods developed for the collection, management, analysis, and visualization of spatial data. This digital technology makes it possible to maintain or create a link between data and their spatial representation. Data, by themselves, have no shape, but they can be spatialized and located in a cartographic image of physical space.

In this way, GIS reads the territory through the lens of its digital infospace, letting emerge the invisible layers of individual or collective spatial explorations. Thus, GIS provides both an open and operational digital archives for collecting and elaborating data and a platform for sharing information.

In the academic framework of The Department of Urban Planning, Design and Technology of Architecture (PDTA) of the University of Rome “La Sapienza,” which encourages the development of cross-disciplinary approaches to design at different scales, the research team of the authors experiments the application of GIS technologies to support data-driven and participatory methodologies, facilitating the communication with the stakeholders and the decision-making process.

The use of GIS tools and methods activates a dialogue between different disciplinary fields, ranging from humanities and social sciences to design and technology of architecture, offering the map as a dynamic and operative common tool in multidisciplinary and multiscale workflows.

Furthermore, the integration of GIS with other digital technologies, like GPS and mobile devices, opens the possibility to activate collaborative mapping experiences, enriching the design process with inputs from stakeholders and community.

The possibility to generate and deliver in-place digital contents, uploading and downloading data to and from the information system, not only supports the data collection field work but also turning this process into a participatory activity.

Thus, the data-driven approach to the development of regeneration strategies, centered on the reactivation of AH, supports an open and people-centered workflow, where community and stakeholders, with the mediation of digital technology, are directly involved in the imagination of transformation scenarios.

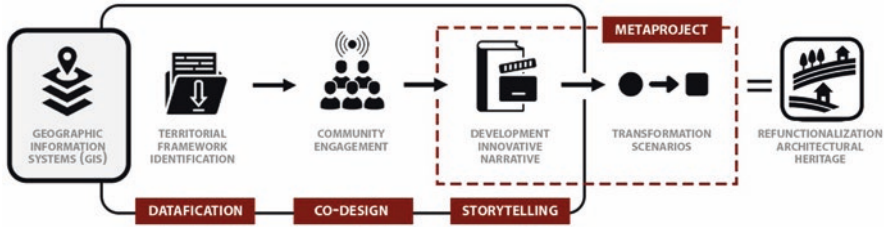


Fig. 3.1 Articulation and phases of the research methodology

Following these methodological premises, the research team has defined a five-step workflow to apply a participatory, GIS-based, data-driven approach to the regeneration of inner rural areas through the renovation and refunctionalization of AH (Fig. 3.1).

The first phase of the workflow aims at defining the territorial identity framework through data collection and mapping processes. It comprises desk research activities aimed at a cognitive reconnaissance and careful study of the areas carried out through a structured mapping and cataloging of anthropic, biophysical, energy, social, and cultural data. GIS applications programs allow for the collection and mapping of data broadly related to the strongly transversal sector like (i) socioeconomic and demographic context aimed at identifying the distinctive characteristics of the community, through the study of data from statistical sources; (ii) environmental, facility, and mobility macrosystems, aimed at acquiring an integrated view and understanding of the peculiarities of the context; (iii) active realities operating in the area such as associations, social or cultural cooperatives, local citizens networks; and (iv) economic and social enterprises with a special focus on the local tourism SMEs (farmhouses, B&Bs, widespread hotels in the historical villages).

The GIS is the collector of spatial information layers related to both physical and intangible elements, to institutional POIs along with the perceived ones, derived from the information shared by users through Web portals and social media.

The representation of this base of knowledge on a map is a first outcome to set a dialogic interaction with the local community.

The second phase concerns community engagement, taking into consideration both top-down and bottom-up models. The engagement of different categories of stakeholders, interested in the transformation of the territory, allows to collect valuable points of view for a participatory enrichment of the map. The GIS/GPS technologies support in situ workshop activities, tracking physical walks through mobile devices, marking the emerging POIs, and collecting memories and traces of intangible heritage.

In the specific context of inner rural areas, where the economic and demographic trends endanger community building dynamics and collective identity, the people's engagement in participatory activities, centered on local knowledge sharing, permits to enhance the connection with the place, retaking bottom-up information (memories, traditions, practices) as drivers for development strategies.

This phase is also useful for integrating the preliminary map of AH, based on institutional sources, with more detailed field information, related to physical accessibility, both in terms of state of conservation of the building and conditions of the built environment paths and roads.

Thus, this participatory phase enriches the information system with new, diverse data, enhancing the granularity of the tangible components' representation and expanding the intangible infoscape to include the polyphony of stories, memories, traditions, rituals, and practices shared by the local community and augmented by the information layers generated during the engagement experience.

This palimpsest requires a subsequent systematization phase to make operational the collected base of knowledge. This step consists in the development of narratives, where data are organized in a structured imagination.

The narrative act is etymologically linked to the process of sharing knowledge: it permits to render the information in an understandable and shareable form, weaving the necessary elements for shaping the knowledge in a whole interconnected texture: an image (Valese and Natta 2022).

The narrative approach to regeneration strategies is well established in literature (Soulier 2017; Stiernström and Arora-Jonsson 2022; Latour 2007; Burke 1969; Greimas and Courtés 1979). It moves from a transdisciplinary premise that considers territory not as an object but as a process, as such generated by a network of actions and actants (Greimas and Courtés 1979).

Thus, the narrative phase of the workflow consists in (i) a data analysis to develop regeneration processes as storylines where subjects (agents), chains of actions, purposes, and functionalized objects (agencies) (Burke 1969) are interlinked in a narrative plot; (ii) the identification of the subjects (stakeholders, potential new residents, and prosumers), distinguished in initiators of the action (senders) and beneficiaries from the action (receivers) and profiled through different methods (user experience design, stakeholders mapping), to understand how they can become active agents (actants) in the regeneration plot; and (iii) the functionalization of the objects (AH elements and pathways) as means (agencies) through which the regeneration can be realized.

The three components together (subjects and objects interlinked in a plot) produce a narrative of the territorial identity's collaborative reinvention (performed in the previous phases), which drives to the development of transformation scenarios: a reconnection between the intangible, narrative information layer and the physical environment.

This fourth phase shifts from imagination to action through (i) the spatialization of the storylines, reconnecting the selected POIs in a network of physical pathways (edges) and AH components (nodes) and (ii) the definition of renovation strategies, specific functions, and technological solutions for AH to increase its attractiveness and accessibility in order to (iii) activate uses and practices, both for resident and for temporary communities, to enhance the cultural value of AH and activate virtuous preservation and valorization strategies.

Finally, the fifth phase of the workflow consists in the presentation and discussion of the scenarios with the stakeholders, through the organization of events open to the citizens, round tables, and focus groups. This step permits to maintain active

the synergy between the research team and the local community, returning the received information as a clear image of the co-designed transformation scenarios and of the required actions to realize them. Furthermore, in this phase, the digital information system, structured in a multiscalar data model, supports a collaborative decision-making process, permitting to select the prioritized actions and to integrate new data (feedback, parameters, evaluations, etc.) and to adjust the transformation scenarios according to specific requirements.

The presented workflow aims at reconnecting the AH with the local ecosystem at different levels, activating regeneration strategies where its centrality as a driver of transformation attracts cultural, economic, and social interest, valorizing both its tangible and intangible sides.

In this process, the enhancement of physical/cultural accessibility of AH proceeds in parallel with its reconnection through phygital exploration pathways. AH exists in a multilayered and relational dimension, where it is not perceived and represented as an isolated object but as an active part of the human ecosystem, being involved in economic investments, touristic experiences, placemaking, and community-building practices.

The digital information system supports this improved key role of AH, providing the required data infrastructure to maintain the stored information up to date and to generate different digital outputs (geoblogs, location-based mobile applications, augmented reality 3D simulations, etc.), to access different information layers, augmenting the digitalization of AH with a whole, expandable, participatory infoscape.

3.3 Case Study: Calascio (AQ), Italy

The Italian rural inner area of Calascio worked as a case study to test the above-described methodology.

The municipality of Calascio, located in the mid-Apennine mountains in Abruzzo, is recognized by the IANS as an intermediate inner area (type D) (Fig. 3.2). It has a resident population of 122 (20 under the age of 19), whose demographic trends reflect the situation of population contraction at the national (and European)



Fig. 3.2 Data mapping through GIS (Geographic Information System): Municipality of Calascio

level and the growth of the aging index in inner rural areas, with an average age of 51 (municipal resident population, ISTAT, 2022). Located in a cluster of low-density mountain municipalities—in a region where the majority of settlements (and services) are located on the Adriatic coast (more than an hour’s drive from Calascio) (Fig. 3.2)—a large part of the active resident population (40% of the total) is employed in the industrial (29%), commercial (20%), and agricultural (14%) sectors, gravitating around the main city of L’Aquila (Labor Information System, ISTAT, 2017). However, in terms of available jobs, it prevails the tourism sector and, in particular, the food and restaurant one (source: business register, ISTAT, 2021).

The first step of territorial identity framework definition has been developed through a data collection targeted both to institutional (ISTAT, Abruzzo Region) and sectorial digital sources (touristic and real estate Web portals, like Tripadvisor or Immobiliare, social networks, like Flickr) to let emerge the interaction between natural, economic, and cultural systems in terms of accessibility, attractiveness, and narrative (Fig. 3.3).

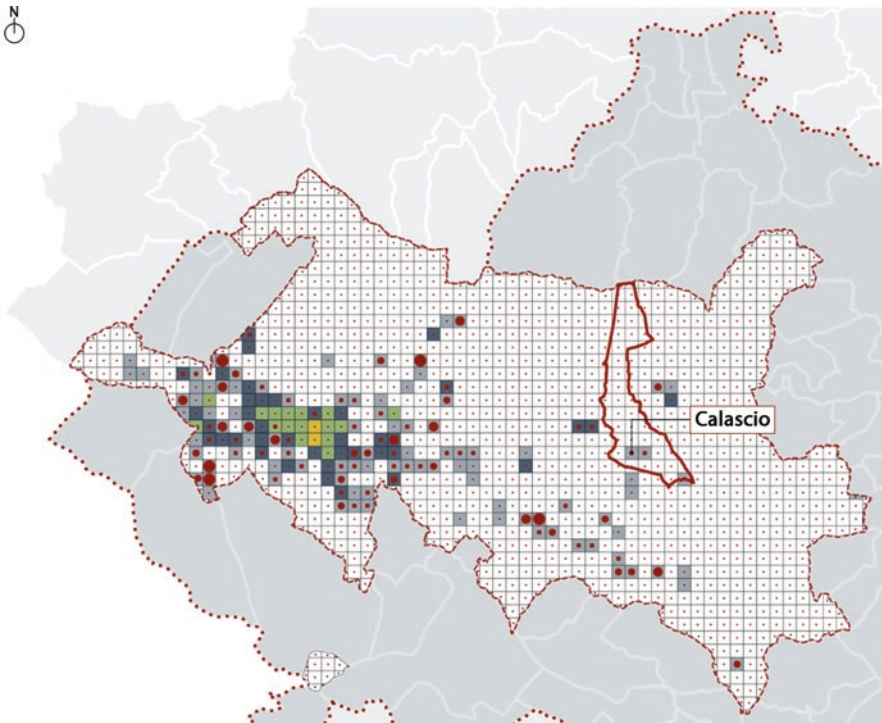


Fig. 3.3 Data mapping through GIS (Geographic Information System). The image shows an index of variety of accommodation, food and wine, and real estate offerings, while the points are sized according to the ratio of the average price and the number of activities/announcements

The accessibility to the village of Calascio—analyzed at different scales, based on the available infrastructure in the 15-, 30-, and 60-minute driving-time isochrones, calculated through the Open Route Service (ORS) provided by the Open Street Map (OSM) project—has highlighted the lack of alternatives to private transportation. For mobility by rail, the railway line does not connect the municipality of Calascio (the nearest station is 40 minutes by car), while for mobility by road, the available public buses do not cover the inner municipalities with a regular daily service, and the only highway connection is 30 minutes away from Calascio.

Moreover, the municipality is not even directly connected to the main existing territorial systems of slow mobility (60 minutes by bicycle, considering the orography, and 15 minutes by car). The main territorial services (hospital, schools, etc.) are at least 60 minutes by car from Calascio, which suffers from the typical isolation of inner areas.

Despite the isolated condition and lack of services, the Calascio area is located in an exceptional environment, both in terms of natural and cultural heritage. It is included in the National Park (Monti della Laga) and in the Protected Natural Area of Gran Sasso and the settlements included in the 15-minute isochrone present valuable elements AH: fortresses, churches, towers, and historic centers. The analysis of data from social media and thematic portals reinforces the idea of a territory populated by tourist POIs (Fig. 3.4).

In particular, the Calascio fortress (Fig. 3.5) represents a prominent element, with numerous reviews and shared photos but isolated and consumed in a short visit experience. This prominent element AH defines the territorial identity of Calascio, increasing the visibility of the area, with the attraction of over 100,000 visitors a year.

As a result of this preliminary identikit of the area, Calascio appears in line with the general characteristics of inner rural areas, due to the lack of services and the depopulation trend—which threatens the built and natural environment, together with the intangible rural heritage—as well as a local historical tradition and an economy linked to sheep farming, progressively abandoned. However, this functional and demographic marginalization does not concern AH: Calascio is part of a network of nearby valuable historical centers, among which it stands out for the presence of its fortress, called the *rocca*: a monumental mountaintop castle built in the tenth century, progressively expanded with walls and towers and abandoned in the twentieth century.

This AH element has produced, from one side, an economic transformation, generating working places in the touristic sector, but on the other side, the massive and temporary consumption of this place affects the attractiveness and accessibility of Calascio for a more stable, resident population.

The second phase of community engagement has been realized in the form of a 2 months' living lab (LL), which has involved public administration, researchers, and local community. The workshop "Inhabiting the past. Regeneration strategies and architectural/archeological heritage reuse: the case of Calascio" was the first kickoff of this participatory experience. It lasted 1 week, and it offered the opportunity for a first encounter between the research community (a group of graduating master students, three researchers and one professor) and the local one, represented

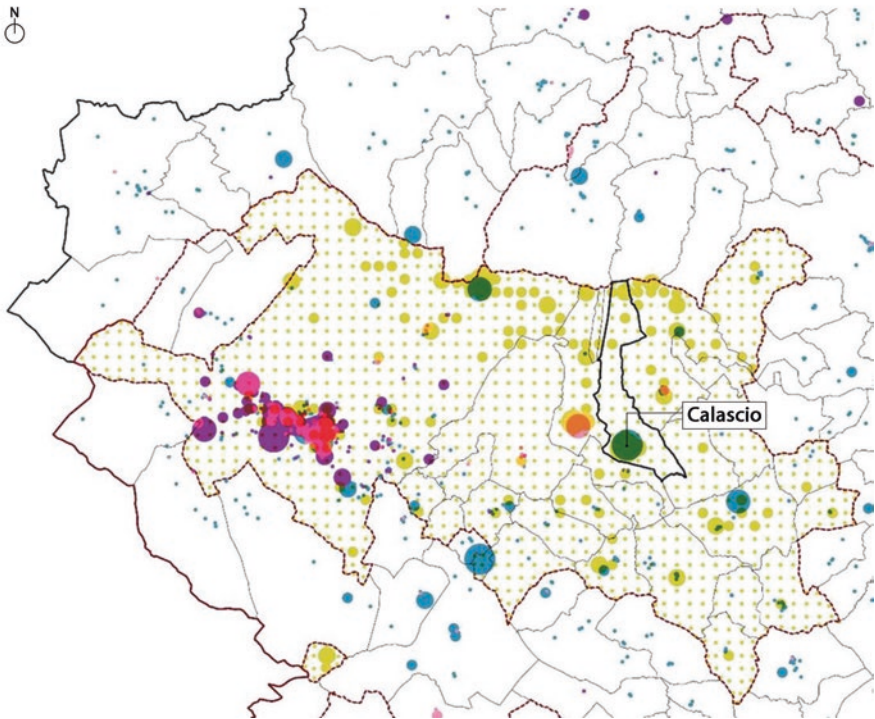


Fig. 3.4 Data mapping through GIS (Geographic Information System): Spatial distribution of social activity and related points of interest, reconstructed from Tripadvisor and Flickr

by majority of the municipality, the technical office chief, members of the cultural associations Italia Nostra, Cittadinanza Attiva, Natura e Comunità, and local farmers and traditional food makers.

During the workshop, the outcomes of the first phase have been presented, through maps and data visualizations, and discussed with the participants, to understand information achievements and limitations of the preliminary distant reading of the territory.

The debate let emerge the paradox of having, from one side, the *rocca* as an internationally well-known monument, generator of relevant touristic fluxes and incomes, and, on the other side, an average condition of poverty for the population (below the medium national and regional level).

This condition produced a general idea of tourists as invaders, with their temporary and inappropriate use of the territory, connected with a problem of communication (and mediation) with the locals. On the other side, there emerged the lack of public investments and of an equilibrium in real estate dynamic, which nowadays is characterized by a fast buy and sell trend, without attracting long-term communities.



Fig. 3.5 The Calascio fortress

In this sense, the main need expressed by locals was related to the setup of activities, chains, and services coherent with the rural identity of the village and supported by an effective model of development. The integration of the promotion of the local products (wood, saffron, lentils, cereals) in a glocal perspective and a network of active economic actors would be a key to trigger a gradual process of repopulation and a fairer synergy between the nearby villages, e.g., to find a new territorial balance between the role of Santo Stefano di Sessanio, which monopolizes the touristic infrastructure compared to the lack of long-staying attraction points in Calascio.

The workshop has also been the opportunity to perform a participatory exploration of the area, involving locals and researchers. This experience has revealed the physical detachment between the *rocca* and the main built environment, where critical conditions for physical accessibility emerged, due to abandonment and under maintenance of some paths and the presence of several stairs (Fig. 3.6).



Fig. 3.6 Community engagement: identification and mapping of critical elements in terms of physical accessibility (stairs) within the center of Calascio

The exploration has been tracked and mapped through GPS/GIS technologies, which have also enabled the collection of geolocated field notes and photos. Furthermore, the experiences and memories shared by the local participants during the walks let emerge a network of hidden POIs in the built environment, connected to significant episodes or events of the local history. These emerging AH elements have been mapped, identified, and linked, in the digital information system, with photos and audio/video recordings, building up a new virtual information layer.

This material worked as a base for the further development of the third narrative phase. The image of Calascio composed during the workshop was far more complex than the initial idea of a simple intermediate inner area with an attractive, outstanding AH element.

First of all, the AH recognized by the local community was not condensed and isolated in the *rocca*, but it was spatially distributed in the built environment and temporarily linked to different historical phases (not only the medieval one but, e.g., the Renaissance age of Antonio Piccolomini, nephew of Pope Pius II, or the progressive development of pastoralism as a trainant economic sector).

Furthermore, the general current condition of isolation, depopulation, and touristic consumption revealed a more layered socioeconomic and cultural history, where the settlement's roots were interlinked with the pastoral rituals and practices, their nomadism, and their economic cycle, deeply connected with the natural environment, and their contemporary survival in the form of some high-quality small food productions.

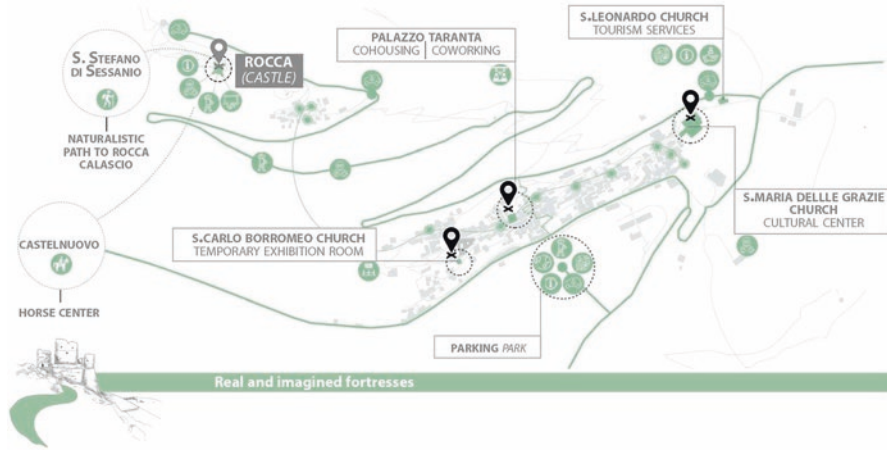


Fig. 3.7 Development of territorial strategies: The real and imagined fortresses system

The systematization of these heterogeneous information layers in a structured narrative has been developed in three main storylines: one leverages on the imaginary related to AH (real and imagined fortresses), the second opens an innovative perspective on traditional practices (wool way), and the third valorizes the intangible heritage related to food making (food and memory).

The real and imagined fortresses plot (Fig. 3.7) moves from the deconstruction of the monolithic image of the *rocca*, activated by the exploration of its multilayered infoscape. In fact, a deeper analysis of data on its perception, performed through the content and semantic analysis of the pictures and hashtags shared on Flickr (2563 photos and 8472 unique words), locates the *rocca* in a semantic cluster related to a medieval and fantasy literary and cinematographic imaginary, which includes Calascio along with some nearby historical centers.

Thus, this storyline imagines the activation of a synergy with these municipalities, reconnecting Calascio with a territorial system of AH elements (towers, walls, fortified towns), becoming the ideal scenario for historical and fantasy novels, movies, or TV series.

Cultural associations, film festival organizers, along with professional filmmakers, producers, and cinephiles become potential agents of a transformation which include the *rocca* as a driver but involves specifically the old churches in the built environment, rethought as cultural spaces for exhibitions or events, and the refunctionalization of the public building Palazzo Taranta Frasca as a flexible coworking/cohousing space dedicated to medium term residents (e.g., operators in the movie-making workflow, event organizers, etc.). The settlement of Calascio becomes an infrastructure to host temporary communities of professionals, reusing and re-adapting abandoned buildings for specific destinations of storage or technical labs, evolving the image of the *rocca* in the opportunity of setting activities related to audio-visual productions.

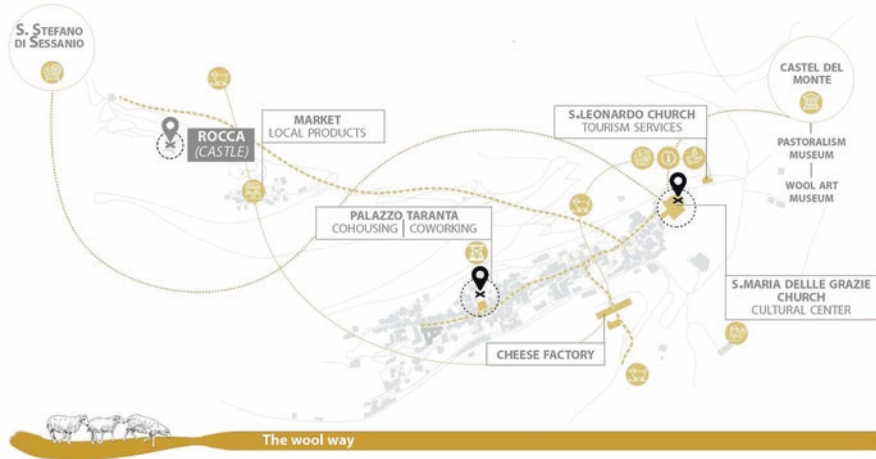


Fig. 3.8 Development of territorial strategies: the wool way

The second storyline reinterprets the pastoral tradition in a contemporary and digital perspective. The wool way (Fig. 3.8) is based, from one side, on innovative models of farming and on the lifestyle of contemporary highly specialized shepherds and, on the other side, on the digital nomadism as a new driver for populating a settlement with nomadic origins (connected to transhumance practices). Rethinking the idea of traditional *transumanza* (transhumance), this storyline emphasized the values of rural life in connection to the needs of contemporary trends. Indeed, this narrative intercepts the double potential agency of qualified migrants, which look for a healthier and slower lifestyle than the urban one, imagining adequate spaces for a km0 food chain, from production to distribution of local high-quality products, and the renovation of residential buildings to support the permanency of digital workers. The imagined transformation and innovation of the pastoral activity aims at supporting the renovation of the local farms—found and mapped during the in-place physical exploration phase—the safeguard of the landscape, characterized by the presence of large pasture, negotiating a new balance between rural activities, as expression of local economies, and touristic flows.

The third storyline (Fig. 3.9) moves from the innovation of traditional practices to their preservation and valorization. The interconnection between food and memory has produced intangible heritage valuable elements related to the food-making process. The core of this storyline regards the transmission of traditional practices in contemporary ways, activating educational and experiential flows that involve enogastronomic students, tourists, and professionals and generating economic chains not only targeted to the local community. The intersection of different sectors (education, production, tourism, agriculture, animal farming) and of different scales (local, regional, global) requires a heterogeneous system of interrelated spaces (labs, students accommodation, storages, exhibit places, etc.) and a platform of

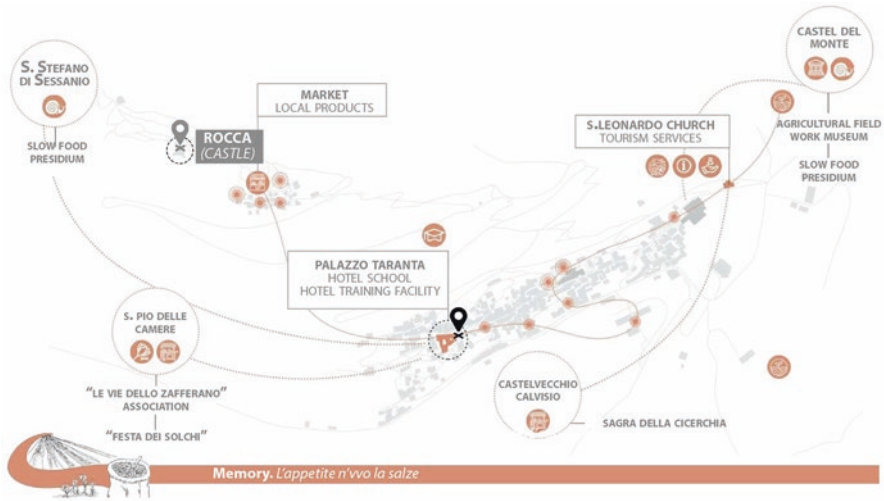


Fig. 3.9 Development of territorial strategies: the food and memory system

services to make efficient the whole food chain, to revamp the traditional food rituals according to a contemporary perspective of circular and sustainable economies, empowering local excellences and synergies (Slow Food Presidia. Accademia Niko Romito).

These three data-driven storylines reimagine the territorial identity of Calascio considering a plurality of engaged actants. According to the narrative approach defined in the methodology, the actants are distinguished in two groups: the “users” (receivers) as target group of the regeneration promoted by each storyline and the “activators” (senders) as the actors involved in the development of the transformative scenarios, defined through a stakeholder mapping.

Thus, for each storyline, it has been selected a pool of local, national, or international partners who might be interested in the transformation: cultural associations involved in film festival organization and sustainable tourism promotion, startup connected to the textile industry and wool production chain, local saffron farmers, and associations active in the valorization of traditional agriculture and high-quality products.

Furthermore, the foreseen “users” of Calascio have not been limited to tourists, including several potential small-, medium- and long-term residents.

Their identification has been developed through the user experience persona method, aimed at creating and designing the profile of the potential users/citizens, letting emerge their main characteristics and purposes.

The six personas range from the short-staying (approximately 1 week) experiential tourist, who escapes from the ordinary urban dynamics looking for an authentic rural and sustainable immersion, to the medium-staying (approximately 2–3 months) digital nomad, attracted by a comfortable and interconnected working environment,




<p>NETWORKS</p>	<p>Real and imagined fortresses</p> 	<p>The wool way</p> 	<p>Memory. L'appetite n'vvo la salze</p> 
<p>PARTNERS</p>	<ul style="list-style-type: none"> - Associazione <i>Pecunia per la Valorizzazione della Lana</i>: association that aims to support the rural world linked to the wool supply chain. - <i>Wauls</i>: company of young people under 30 who want to make the quality of Abruzzo wool known by producing sustainable and recyclable basic garments. 	<ul style="list-style-type: none"> - Associazione culturale <i>L'idea di Cleves</i>: association that has been organizing film festivals in Abruzzo for years. - <i>Il Bosso Società Cooperativa</i>: company that operates in Abruzzo in the environment and tourism sector through promotion projects and knowledge of the area for responsible tourism. 	<ul style="list-style-type: none"> - Slow food Abruzzo: international association committed to restoring value to the agri-food biodiversity heritage. - Associazione <i>Le vie dello zafferano</i> promotes the cultivation of saffron, its traditions and its territory.
<p>PERSONAS</p>	<p>DIGITAL NOMAD</p> <ul style="list-style-type: none"> - Origin: National/International - Period of stay: 2-3 months - Characteristics: work performed remotely, need to connection with transport national and international <p>FAMILY</p> <ul style="list-style-type: none"> - Origin: National/International - Period of stay: indefinite - Characteristics: interest in an alternative educational model to the urban one 	<p>EXPERIENCE TOURIST</p> <ul style="list-style-type: none"> - Origin: National - Period of stay: 1 week - Characteristics: sensitive to issues of rural culture; goes in search of traces of time <p>CINEPHILE</p> <ul style="list-style-type: none"> - Origin: National/International - Period of stay: 1-2 weeks - Characteristics: curiosity about the places and scenarios where films were shot, interest in festivals and events on the subject 	<p>FOOD/WINE TOURIST</p> <ul style="list-style-type: none"> - Origin: Local/National/International - Period of stay: 1-2 days - Characteristics: search for quality foods and of tasting experiences <p>STUDENT</p> <ul style="list-style-type: none"> - Origin: Local/National/International - Period of stay: 1-3 years - Characteristics: interest in the professions of the hospitality and catering sector

Fig. 3.10 An outline of the potential stakeholders and users for each system

and the long-staying (1–3 years) students, attracted by the curiosity for excellent food production chains (Fig. 3.10).

The three storylines also identify physical components in the built environment, signified by the new functional meaning required by the agents to perform their action in the narrative plot.

The POIs, mapped in the previous phase, become active nodes in the fourth step of the workflow, aimed at developing regeneration strategies through the design of transformation scenarios. These nodes physically correspond to historical public buildings (like Palazzo Taranta and Palazzo Taranta Frasca) and churches (San Leonardo, Santa Maria delle Grazie, San Carlo Borromeo), open public spaces (the parking area), and private ones (a farm specialized in cheese making). For these valuable AH elements, the transformation scenarios propose new functions, according to their role in the third phase’s narratives and to a deeper analysis of their physical characteristics. They are refunctionalized as coworking spaces, residential buildings, cultural spaces, museums, markets, schools considering both the intangible network built up by the storylines, and the technical feasibility of the imagined transformation.

Thus, the spatialization of the narratives, shifting from an imaginative to an operational phase, let emerge on the map their distribution and overlapping as a system of nodes and phygital exploration pathways, where the imagined agents move and act to achieve their specific objectives (working, living, learning, or being part of a touristic experience).

This activation requires a physical renovation and adaptation of the AH elements to the new imagined functions, requiring the shift to an architectural scale. The selected nodes have been analyzed in terms of dimensional, constructive, technological, and administrative properties, evaluating their current condition and suitability to transformation, hypothesizing a systemic renovation of the building.

In this process, the information system developed through GIS technology supported the organization of a multiscale data model inclusive of information, at different levels of detail (LoD), about the present status, the foreseen transformation, and the interconnection with the infoscape related to the three storylines.

Thus, in the information system, each node has been enriched with the required information to develop and evaluate the feasibility of different design solutions, considering not only the physical characteristics of a single volume but the whole chain of actions related to stakeholders' engagement, investment attraction, refunctionalization, and architectural renovation.

In the fifth phase, this base of knowledge, inclusive of both the imaginative level of the narratives and the operative development scenarios, has been presented to the public administration, as an outcome of the LL, to be discussed in specific focus groups with stakeholders and local community.

The shared information system has provided an AH management system to plan its renovation as a systemic action, inclusive of both its tangible and intangible elements. This open digital archive is supported by a geospatial infrastructure to collect and elaborate data, to monitor changes through the analysis of temporal series, and to share notes and comments from stakeholders, locals, and communities.

The data related to the selected POIs have been modeled according to a basic structure of attributes at different LoDs: dimensional (area, volume, height, type roof, material), qualitative (typology, year, use, type of property), evaluative (dimension of space availability, pedestrian accessibility, vehicle accessibility, green areas, level of decay, type of installation, installations integrability, outdoor transformation level, indoor transformation level), and potential (network, partners, functions) integrated by a photographic documentation.

This geospatial information system, bridging the data on the tangible components of the built environment with the intangible narratives, supports an operational design process in which the information on the single node is integrated in the network of storylines and transformation scenarios.

This structured information level supports the reading of the settlement's potential through parameters, which enable a system for measuring the feasibility of the projects, to fix times and priorities.

The combination of the evaluation of current state and the transformation scenarios lead to a comprehensive masterplan, where the interventions on the AH elements have been organized in a diachronic sequence, through the definition of

priorities coherent with the general regeneration strategy. The masterplan worked as a dialogic tool for presenting and comparing the three narratives, and the solutions designed in the operative scenarios, aiming at supporting the decision-making process with a synthetic vision of the transformation and with a detailed evaluation of its economic, technological, and temporal feasibility.

The hybridization of a data-driven approach with participatory practices and narrative imagination has permitted to think about AH management and transformation, both in its tangible and intangible sides, in terms of cooperation and complementarity, rather than on isolation and fragmentation, moving from the centrality of the *rocca* to the enhancement of Calascio as a territorial system. In this sense, the renovation of AH is part of an activation action targeted to physical, digital, and glocal networks.

3.4 Conclusion

Considering the contemporary people-centered approaches, AH receives a renovated attention as drivers of attractiveness and accessibility, enhancing or reestablishing the interlink between the context of rural inner areas and local communities, through both its tangible and intangible components.

However, the specific and fragile equilibrium between cultural, natural, and built environment in rural inner areas requires adequate approaches and methods to minimize the transformation impact and maximize the effectiveness of the counteraction against negative trends like depopulation, rural abandonment, economic crisis, and loss of cultural identity.

The digital transition offers an opportunity to develop innovative regeneration strategies focused on the enhancement of AH accessibility, not only concerning the physical elements but also regarding the intangible and experiential dimension.

However, to avoid collateral effects on the local social, economic, cultural, and natural ecosystem, the introduction and application of digital technologies need a critical approach and a hybridization with human-centered practices.

In the presented case study, the development of a territorial digital information system worked as a mediation tool to activate a collaborative imagination process with the aim of engaging the community in the development of regeneration strategies.

The LL's experience confirmed the key role of digital technologies (in particular of GIS) for collecting, storing, and sharing data and for supporting participatory activities. Furthermore, the transdisciplinary integration with narratology, and the use of maps as data visualization tools, has helped set a clear communication framework for stakeholders and community engagement.

However, digital technologies do not reduce the complexity of the preservation, renovation, and management of AH, which requires a systemic long-term vision to be supported by the activation of a synergy between public administration, local community, private investors, practitioners, and researchers.

In this sense, the result of the presented methodology's application, according to the experience of the case study, opens the road for this transformation process, providing the necessary base of knowledge for imagining and evaluating different development scenarios.

The LL in Calascio should have had a further development in the direction of creating different location-based digital experiences (short stories, soundwalks, augmented reality), derived from the available information system.

This output was recognized during the LL as a low-impact strategy to enhance the AH's intangible side accessibility, generating innovative emotional/immersive exploration experiences and activating new forms of cultural transmission, both among the local community and between residents and temporary users. Furthermore, this process should have created working opportunities in the creative industry sector, taking advantage of the knowledge exchange between the research team and the local partners.

However, the difficulty to turn the initial curiosity for innovative digital products into a more stable interest and partnership for their further development left this potential evolution of the project at an initial state, maintaining the focus of the collaboration between the research team and the stakeholders on the solutions proposed in the transformation scenarios.

The digital transition is a slow process, not only dependent on a technical transformation but also concerning a cultural shift that, in fragile ecosystems like the inner rural areas, has to be considered and respected, providing adequate solutions for facilitating the management, maintenance, and valorization of the built environment and its AH's elements.

Accessibility involves material and immaterial aspects, socioeconomic and demographic factors, current and desired habits of people with different movement, and intellectual, cognitive, and emotional capabilities, along with values and meanings that every generation links to cultural heritage. Furthermore, accessibility concerns all the innovative actions in the direction of an ever more active role of citizens and community in all the phases of conservation and valorization processes, from planning to management, shifting from simple final target to main actors of transformation (Germanà 2021).

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