Resistance to Sardinia's Guarded Capacity: Multicriterial Mapping for Strategies and Valorization of Abandoned Places

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Abstract. This contribution fits into the context of studies on perspectives for eco-oriented territorial rebalancing involving city networks in inland areas. These areas are characterized by the contrast between socio-territorial disadvantages and opportunities for reusing physical resources within the framework of city redevelopment and the promotion of local identities. This is in response to challenges that lead to the exclusion of both small municipalities and growing cities from territorial, urban, social, and economic communication. In this study, the concept of "reconnection" is glimpsed in the project's potential bring about a return to the land essences and the significance of places through the establishment of new value-based relationships.

The research aims to construct a structured knowledge model focused on identifying and describing the causes and motivations behind the loss of recognizability of urban and territorial forms. This is done to identify possible trends reversals or to justify the motivation for discontinuation. The initial results consist of 1) the formation of an integrated set of maps highlighting the Capacities and resistances describing the profiles of each territorial unit under study, and 2) the design synthesis representing the convergence or divergence of the two forces expressing the willingness of each unit to adopt revitalization strategies for the eco-oriented development of abandoned municipalities.

Keywords: Abandoned places · Aggregated Joint Capacity/Resistance Index · Territorial strategies

1 Introduction

1.1 Territorial Reconnections

The issue of abandonment in vulnerable Italian territories persists despite increased efforts to enhance accessibility through the National Strategy for Inner Areas and energy-efficient building retrofitting in the National Recovery and Resilience Plan (NRRP), part of the Next Generation EU program, and aligned with the United Nations Sustainable Development Goals, specifically Goal 11 and Goal 12 [1].

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Faced with the increasing exposure of the human-nature system to dissipative processes at the eco-socio-systemic level, it becomes imperative to rethink the issues related to urban and territorial planning oriented towards ecological transition, focusing in particular on the issue of 'waste' in territorial, urban (and social) terms, i.e. on certain aspects of the 'closing of cycles' issue concerning the relationship between the value of local resources and their efficient and equitable use [2].

The overarching perspective of sustainability, towards which research has been increasingly consistently oriented for many years, is specified here in the forms of recovering smaller territorial-urban aggregates that carry testimonial and landscape values predominantly linked to local material culture. The recovery of the local material culture, especially in abandoned territories, plays a prioritized role in the dimension of inclusion, i.e., territorial justice [3]. Literature has identified the improvement of quality of life and the enhancement of the attractiveness of places as key factors capable of reversing this trend [4–6]. Recognizing the value of local material culture as a unique and irreplaceable expression of community identity implies reference and "re-affection" towards tangible and intangible resources that have defined and continue to define the distinctiveness of a place [7].

However, in today's global cultural and economic trends, there is resistance to the quiet flow of history in small communities, far removed from metropolitan dynamics. This distance, in the era of crisis and confusion, represents "the opportunity" for the rediscovery of a sense of shared purpose between socio-economic and environmental systems (constructed and natural) [8]. The recognition of the value of the human-nature relationship constitutes the root of the impulse for change to address environmental urgencies that are increasingly at the center of scientific community attention.

The possibility of guiding a return to the land through the creation of new value-based relationships is identified in the concept of "reconnection". If it is true that images inform and shape the preference system, then the task of project and planning choices is to advocate for the ethics of the "aesthetics of sobriety" and the importance of judicious renunciation. When discussing small villages and inland communities abandoned because they are not suitable for contemporary living, what does it mean to intervene for their "revitalization"? Can a dead place come back to life? Considering these reflections, the question of this study is reframed as: what abandoned aspects are sustainable to recover?

In this perspective, the landscape represents a crucial reference element, in terms of both extent and complexity, in analyzing territorial phenomena of both natural and anthropogenic origin. This study aims to capture significant elements – criteria – for evaluating the city's resistance to its essence, i.e., that social identity recognizable in the territorial continuum [6]. These criteria provide a description/representation, through a structured set of metrics and semantics, of the degree of capacity and resistance of the most significant dimensions of the city-territory-landscape system.

1.2 Contents and Aims

With the support of spatial analysis tools (GIS) and based on official data accessible through the portals of relevant national institutions – along with observers providing aggregations for specific purposes – the study provides structured analyses

aimed at a synthetic interpretation of the arrangement of natural, urban, and socio-economic components in the studied area through indices and maps at different levels of aggregation.

The methodology is developed within the perspective of multicriteria analysis, particularly referring to aggregate operational research approaches [9]. The result is the establishment of an interrogable information system that allows the calculation of complex indices for comparing the municipalities of the province. This comparison is done from the perspective of criteria that facilitate the connection between different aspects of the current structure of the territory [10].

The paper is structured into six sections: Sect. 2 (Materials) outlines the study's context, highlighting recent socio-economic resistances in the face of strong capacities within the natural system and the inland city network; Sect. 3 (Methods) presents the descriptive and evaluative model, from the selection and organization of basic information to the setting of significant indices representing the oppositions between resistances and capacities; Sect. 4 (Application and Results) presents the results of comparisons in terms of and proposes interpretations of natural, urban, and socio-economic contexts; Sect. 5 (Discussions and Conclusions) critically analyzes the results, correlating landscape risk and causes of abandonment.

2 Materials

2.1 The Uncontaminated Territory of Sardinia

Sardinia region consists of 377 municipalities divided into four provinces, over 24,100 km^2. The island's geographical position, eccentric to the main routes of the Mediterranean sea, has allowed for natural development protected from contaminations, hybridizations, and constructions. With 1,213,250 hectares, it is the first in Italy for forested area. The essence of the territory is evident in the deserted beaches, endless forests and shrubs, and the rugged hills marked by dry stone walls bordering pasture areas and a few rare farmhouse cottages. Stone is the essence of Sardinia, a resilient and durable material, characterized by magnificent chromatic variations.

Demographically, Sardinia has always been sparsely populated. It went through a period of intense growth between 1920 and the post-war period, maintaining the highest birth rate in Italy, but with the beginning of the 21st century the trend reversed [11].

Due to demographic, social and economic fluctuations, 317 out of 377 municipalities in Sardinia have been identified as municipalities at risk by the National Strategy for Inner Areas. In line with national and European trends, Sardinia is also characterised not so much by a decline in population as by its transfer from the hinterland to the large metropolitan and coastal centres.

Mining and cork processing in the inland areas, along with salt production in coastal zones, have historically characterized the economies of Sardinia, alongside agro-pastoral activities. However, in the post-World War II period, to revive the island's socioeconomic fortunes and as a measure to counteract banditry, the "Renaissance Plan" was conceived in 1962 (Law 11 June 1962, no. 588). This plan implemented special legislative measures for financing the industrialization of Sardinia, leading to the establishment of the two petrochemical settlement in Porto Torres, Sarroch and Ottana. Today, the economy of

Sardinia is mainly based on the tertiary sector (78%), driven particularly by the tourism and seaside sector [12].

2.2 Selecting the Case Study

The study concerns the urban-territory system of the Sassari Province which since 2016 includes the province of Olbia Tempio (Regional L. 2 /2016), thus becoming the largest province in Italy, covering an area of 7,692 sq. km, and the most populous province in the region with 493,788 inhabitants (see Fig. 1).



Fig. 1. Spatial framework of the study area: the Province of Sassari, Sardinia, Italy.

Some issues of landscape risk such as abandonment of productive activities and migratory phenomena affected the province mainly due to the abandonment of the former productive landscapes: the petrochemical settlement of Porto Torres and the historical area of Nurra, which was reclaimed in the 1950s but never recovered in economic and productive terms; various productive landscapes linked to mining (quarries and mines), such as Argentiera. The district of Gallura is known for the "economic miracle" of the Costa Smeralda, the epicenter of elite tourism, created in 1961 at the behest of the Ishmaelite Prince, the Aga Khan and other wealthy investors. This part of the region can be seen as a separate entity, bucking the economic and demographic trend of the rest of the island, and is therefore interesting to study. On the other hand, Gallura is also known for its cork and granite districts, that flourished until the 1990s and now declined, leaving large parts of the territory profoundly altered and abandoned.

The proposed model, which is presented immediately below, analyses the 92 municipalities of the province (Fig. 2), summarizing for each one the information that characterizes it in terms of its ability to maintain a strong link with the place or, on the contrary, its resistance to the natural transformation of the landforms in harmony with the environment.

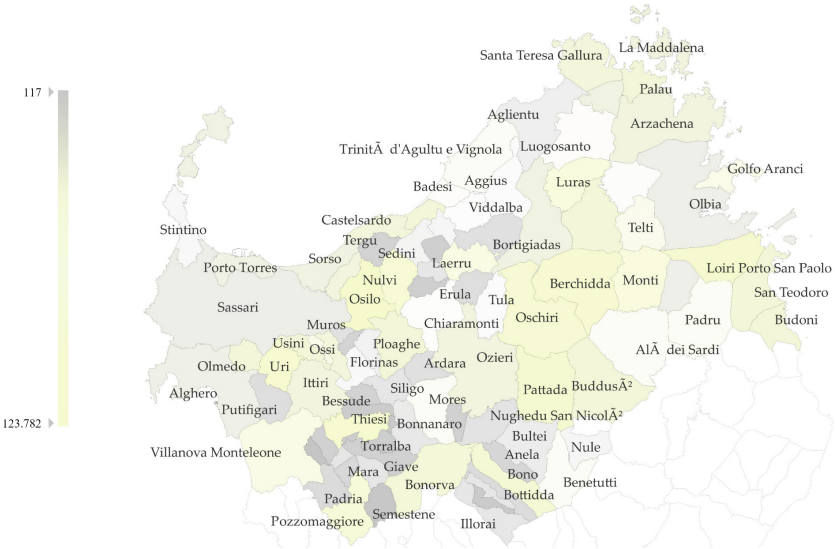

Fig. 2. Municipalities of Sassari Province and resident inhabitants.

3 Methods

3.1 Information-Units and Information-Bearers: Denotation and Connotation

The proposed model coordinates units of information at different levels of description and evaluation. The information system is structured in the form of a database where the records (rows) are the study units (sU) bearing information, and the fields (columns) are the attributes, namely the information units (iU). Attributes are distinguished between denoted and connoted, the former being predominantly descriptive (observations and indices), and the latter being predominantly evaluative. Indeed, the latter constitute value representations of the sU from the perspective of the upstream criteria that describe their value in terms of capacities or resistances to integrated evolutionary processes of the natural, urban, social and economic systems (see Sect. 3.4).

3.2 Denotative Attributes: Official Sources of Data and Indices

The denotative attributes come from the data and indices coming from the following official sources.

1. For the natural context, the Landscape Territorial Plan (PPTR) of the Region of Sardinia, the Geological Map, and the Land Use Map provide accessible information on the Sardegna Geoportal website. These sources highlight the arrangement of systems and provide quantitative data on abiotic and biotic components.
2. The database of the National Institute of Statistics (NSI) was scrutinized for the municipality and Census Section data, using the "8000Census" and "Italy in detail" sections to represent vulnerability and obtain critical data for the social and urban system.

3. Portals such as "Comuni Italiani" were consulted for demographic and income dynamics. The Statistical Atlas of Municipalities, with reference to ATECO data, describes the productive system.
4. The Observatory of the Italian Real Estate Market (OMI) provides information on the arrangement of real estate assets, analysing data for Micro zones and typology.
5. The database of the Regional Plan of Extractive Activities (PRAE) surveys the Sardinian extractive industry in 2004, assessing the anthropization of the territory linked to historical construction and prospects for recovery to preserve local identities.

Additional information related to climate, peculiarities of production processes and the wealth distribution disparity index (Gini Index) were retrieved through platforms like certifico.com and Urban Index.

3.3 Connotative Attribute: Informative Aggregate System and Hierarchical Evaluation

The evaluative synthesis refers, on the one hand, to the capacities of economic and institutional actors to highlight and valorise the vocations implicit in the landscape combinations of natural data and anthropic substrate; on the other hand, to the manifestations of impoverishment and territorial disadvantage that characterise the hinterland, and to the effects of the superimposition of the real estate and seasonal economy on a production economy with little consistency, especially in the coastal areas; in short, to the forms of resistance to the eco-oriented and inclusive development of the urban-territory-landscape system.

3.3.1 Capacity and Resistance Indexes

The iUs function as attributes, each with a specific explanatory capacity at every level of the WBS to which they are assigned (see Fig. 3). At the first level, they represent the value of the Municipality from the perspective of each System. At the second level, the attributes reflect the aggregated value of the main components into which these systems can be broken down. At the third level, the attributes express the sub-components, and at the fourth level, type and quality specifications. Finally, the fifth level reports the above-mentioned elementary denotative information units.

Natural/Lad System

The natural system capacities are divided into abiotic and biotic components. The former, are represented through the sub-components "soil", "elevation", "water resources" and "climate" of the area under study. The biotic components are disaggregated into "fauna" and "vegetation". The vegetation sub-component is described at the fourth level based on the grouping of the most common spontaneous or cultivated botanical species, considering their importance in view of development patterns and lifestyles aimed at the compatibility of livelihood needs and biodiversity.

The resistances of the Land System are identified as those components that betray local capacities and hinder the *continuum* of the territorial milieu [18]. These include the "abandonment of stone economies", the "abandonment of agricultural economies",

and the "anthropic imprint on the landscape". The latter is calculated based on the environmental footprint of unsustainable development patterns, relating to "productive and urban settlements", "infrastructure systems" and "major facilities".

Urban/City System

The Urban System, conceived as an open system, is defined by the flows of "matter, energy and information" [19] that characterize the territory. The key components of this system are the built heritage, the housing system, and the settled communities. Regarding the built heritage, physical-quantitative and partly qualitative aspects are examined, including "building density", "state of conservation", "use status", and "testimonial" and "material value" related to the age of the buildings and the technological and material coherence of their formal structure. The component related to the state of housing focuses on residential dwellings, evaluating building density and the housing occupancy rate. Finally, the third component describes settled communities in quantitative terms (crowding index) and qualitative terms, considering the family as a reference and home-ownership as a significant aspect of attachment to the city and the territory. The overall score of the system aggregates the three components, recognising the importance of the built heritage - emphasising the physical and symbolic support in which communities recognise themselves - and the owner/tenant ratio for the importance highlighted above.

The resistances to the City System (see Fig. 9) are identified as those components that prevent the system from expressing its landscape ("state of degradation of historic centers"), functional ("state of use of buildings and dwellings"), and identity ("abandonment of the family's housing dimension") capacities.

Social/Community System

The analysis of the resident communities in the studied municipalities aims to identify the demographic dimension of local social realities and the overall skills of their inhabitants. It assesses the demographic consistency of the settlement in relation to its attractiveness, highlighted by intercensal variation. Various aspects of families are explored, considering the presence and consistency of family units, as well as the risks associated with young single-parent families or elderly individuals living alone.

The resistance of Social System is represented from a high index of "intercensual variation", which indicates the inability of the system to maintain identities, and for the same reason a high "index of unemployment".

Economic/Resources System

Lastly, the general concept of the Economic System encompasses all interconnected elements, including actors, resources, technologies, and knowledge, which collectively contribute to the creation of wealth and subsequently to its circulation, use, and accumulation. The observations are organized into three sub-components of production: first, regarding the presence and dimensions of entrepreneurial activities in various sectors (primary, with reference to extraction, secondary, and tertiary); second, concerning the real estate sector, focusing on urban areas; third, regarding individuals and personal income, with specific attention to its distribution.

In contrast, economic resistance is visible in indicators that express aspects of low efficiency and prosperity, as measured by low productivity and low-income indices.

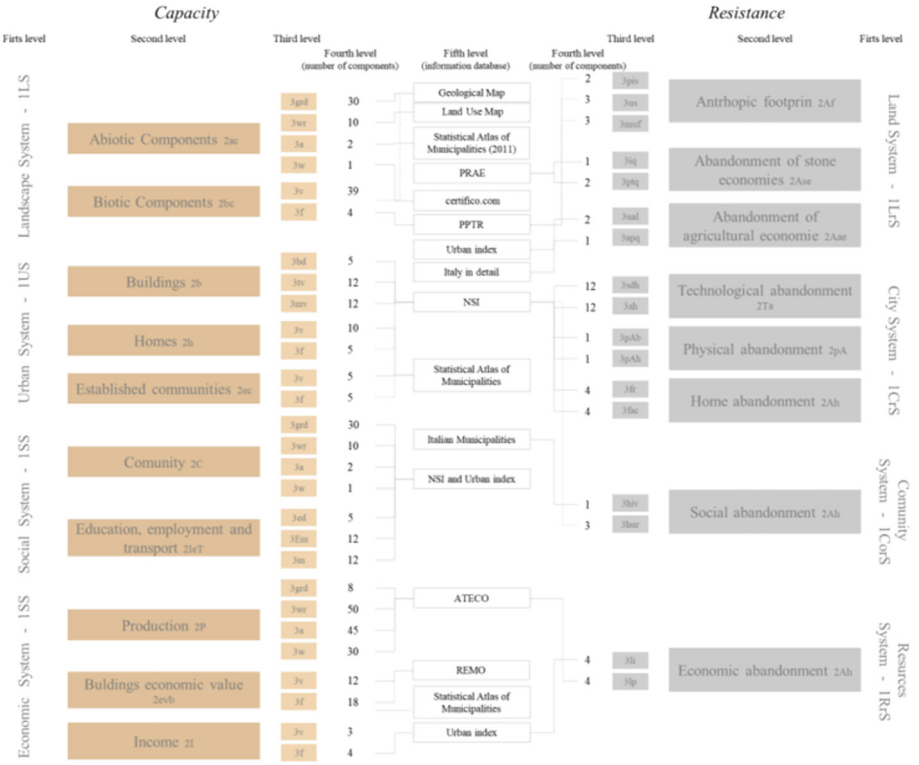

Fig. 3. Dendrogram representing the distribution of the indices od capacity and resistance.

3.3.2 The MAVT Model

A multi-criteria analysis model based on the Multi Attribute Value Theory (MAVT) has been developed to characterize and compare various key information units (tUs) based on different capacities to provide value, i.e., different evaluation criteria [13–15].

The proposed evaluation model is part of the operational research tools in the field of multidimensional analysis to support decision-making processes, extending utility knowledge to the sphere of values. Among these, the MAVT provides methods for structuring and analysing decision problems through Work Breakdown Structures (WBS) [16] according to the relative importance of different and sometimes conflicting criteria [17]. The two WBS schemes (one for capacities and one for resistances) used for the informational organization of this study are represented in the dendrogram in figure.

The overall value of each sU is the weighted average score of all attributes, progressing from the elementary level to the highest level of aggregation.

$$V_k = \sum_{i=1}^{n} w_i v_{iU_i} \tag{1}$$

The (1) refers to the aggregation of level 5 of the model where each information from official sources is transformed into a standard score and associated with an elementary weight. This elementary weight is calculated as the product of the weights at the higher levels as follows:

$$w_i = w_h w_g w_f w_e; \sum_{i=1}^{n} w_i = 1 \tag{2}$$

where w_h is the weight of the corresponding iUs group at level 4, w_g the weight of the corresponding iUs group at level 3, w_f for the level 2 and w_e for the level 1.

3.4 Joint Capacity/Resistance Index

The results of the first level of territorial capacities, on the one hand, and of resistances, on the other, converge in the planning synthesis, i.e. the JCRI; the latter measures the attitude of each tUs to a revitalisation profile that can be defined between the two extremes of transformation and conservation. JCRI is calculated as the product of the two previous indices, the Capacity Index and the Resistance Index.

1. A JCRI below the second quartile of the total sample indicates either 1) a situation where modest capacities are not able to overcome even a slight resistance from a territorial context that is nevertheless promising; 2) or a situation where high capacities are not able to emerge from a highly degraded and therefore highly resistant environment. The municipalities in this band are those in which: 1) or the territorial system is in a state of "downward" equilibrium; 2) or significant capacities – such as attachment to the place and a favourable socio-economic condition – do not support the recovery of an old town that is inaccessible, severely degraded and consequently abandoned in favour of suburbs of low architectural-urban value and significant landscape impact.
2. A JCRI equal to or greater than the third quartile indicates a general state in which both forces are above their mean and one of them is at its maximum: 1) if the best capacities meet with little resistance – as in the case of a community with a strong territorial identity that is confronted with an urban and landscape context that is not severely degraded – an ecologically oriented redevelopment model can be driven by local resources and initiatives; in this case, the development model will be coherent with the local economic, social or urban trends, in which the disused resources will find a new location (medium-low conservation); 2) if the capacities are not excellent, especially in local communities in slight socio-economic and demographic decline, confronted with highly valuable local resources, it is likely that an eco-oriented development can only be sustained by public incentives and/or external investments, with the risk of transformations that are not always controlled. In this case, planning is called upon to revise the development model, which must be redirected in the circular logic of the recovery of territorial relations (medium-low transformation).

3. A JCRI between the second and third quartile reports a condition in which one of the two forces records a medium-high value while the other a medium-low value. In this case, if the medium-low value concerns capacity, the project effort will be minimal and will have to adhere to local guidelines (medium-high conservation); if the medium-low value concerns resistance, a radical intervention is required to consolidate the renewed relationships of the human-nature system (medium-high transformation).
4. A final and illustrative consideration concerns the hypothesis of the highest value of JCRI, which refers to a solid and thriving community and a spatial, urban and landscape system of absolute value; this is the condition in which ecologically oriented development and self-centred development are mutually supportive, requiring neither incompatible transformations nor external interventions that interfere with local capacities.

4 Applications and Results

4.1 Evaluation Synthesis

Capacity

The investigation into the natural system of the examined territory focuses on the physical characteristics of the area as described in Sect. 3.3.2.

In the ranking (see Fig. 4), Alà dei Sardi is at the top, followed by Berchidda, Arzachena, Olbia and Ozieri. In fact, Alà dei Sardi is situated in a mainly hilly and mountainous environment, often covered by Mediterranean vegetation, and it hosts natural reserves that contribute to the conservation of the local flora and fauna. Not far away is the municipality of Berchidda, which reflects the local agricultural traditions. Ozieri scores well for the importance of its water resources, which is lacking in the other municipalities, of which only the last quartile has above-average values. Arzachena and Olbia, already more urbanised, add to the landscape values the advantages of the coastline. At the bottom are the municipalities of Tissi, Semestene, Muros Borutta and Valledoria. This is explained by the small size of the municipalities, whose boundaries tend to coincide with those of the urbanised area, overlapping with the natural component.

For the Urban System, the resulting ranking (Fig. 5) places the Municipality of Sassari in the first position, followed by Olbia, Alghero, Porto Torres, and Ozieri. The first four are indeed the most developed cities in northern Sardinia characterized by their historical significance (Sassari, Olbia, and Porto Torres) and linguistic diversity (Alghero and Ozieri). With very low scores are the cities of Semestene, Bulzi, Romania, and Tergu, with few buildings and, by now, few inhabitants.

The analysis of population characteristics is particularly significant, reflecting the vitality, plurality, and heterogeneity of settled communities. The ranking (see Fig. 6) confirms the residential well-being in the municipalities of Olbia, Ozieri, and Sassari, while highlighting challenges in smaller municipalities such as Padria, Monteleone Rocca Doria, Bulzi, and Semestene, characterized by high unemployment and low population density. The ranking of the Economic System (see Fig. 7) places Olbia, Sassari, and Porto Torres among the top positions, confirming the strength of their territorial system from all four perspectives. On the other hand, Alà dei Sardi, Romana, Monteleone Rocca Doria, Nule, and Borutta occupy the last five positions, confirming the disadvantage of

smaller municipalities located in the rugged territories of the Sardinian hinterland and thus "removed" from infrastructure, digital, economic, and social communication.

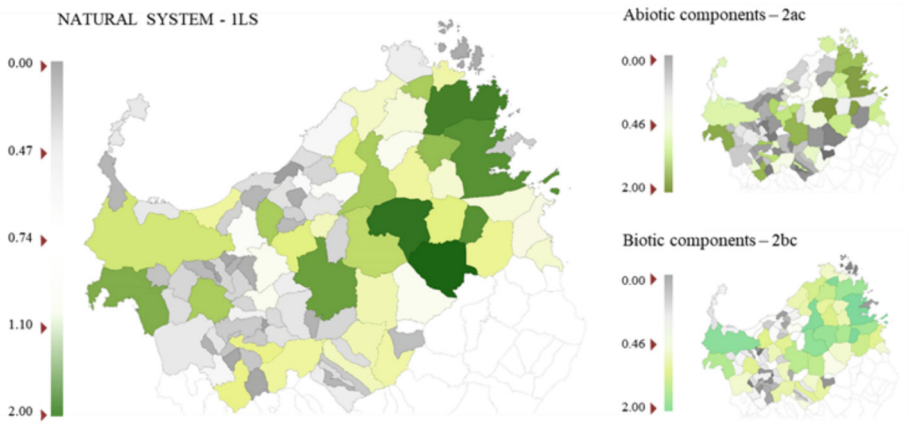

Fig. 4. Map of the capacity scores of the municipalities in the Natural System with mapping of the aggregate values at the second and third level.

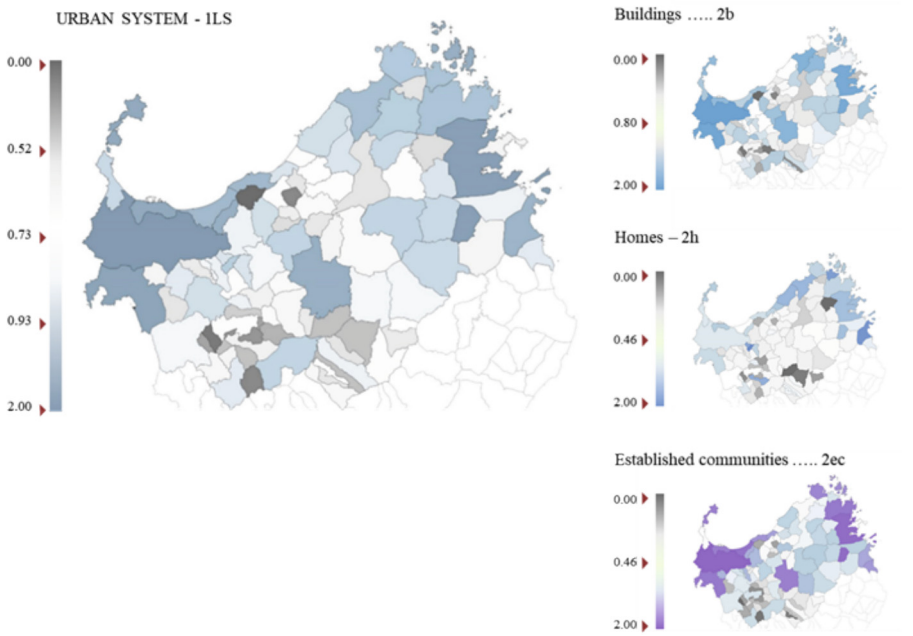

Fig. 5. Map of the capacity scores of the municipalities in the Urban System with mapping of the aggregate values at the second and third level.

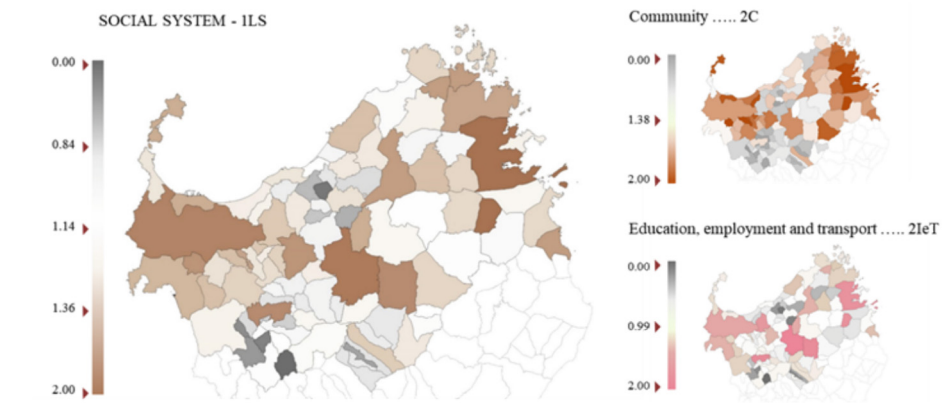

Fig. 6. Map of the capacity scores of the municipalities in the Social System with mapping of the aggregate values at the second and third level.

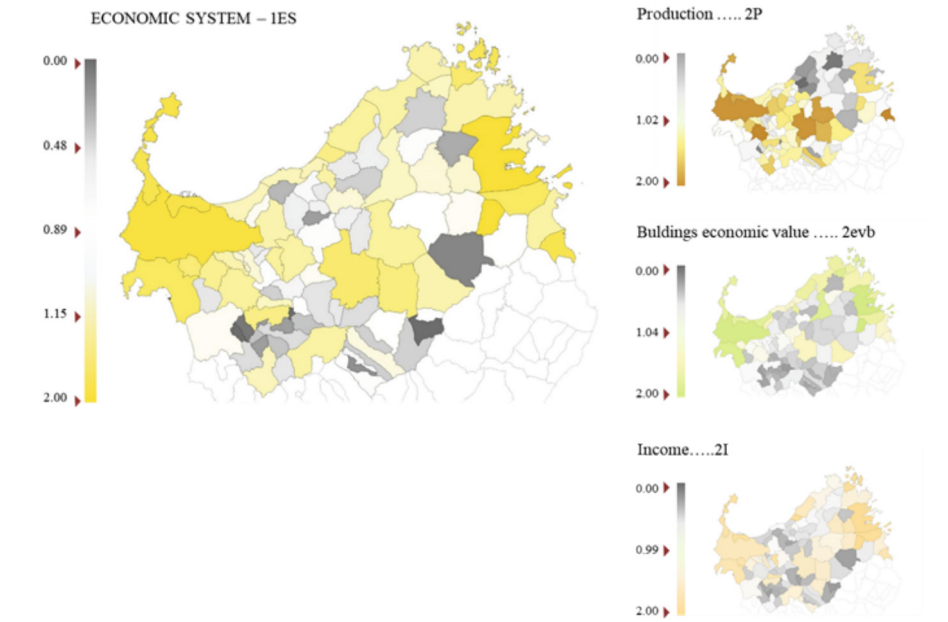

Fig. 7. Map of the capacity scores of the municipalities in the Economic System with mapping of the aggregate values at the second and third level.

The property sector is characterised by the disparity between the average market values of the most prestigious coastal towns and those of the inland municipalities. This phenomenon indicates the prevalence of external demand for high-value property, which cannot be met by internal demand.

Resistance

Regarding land system resistance, Fig. 8 shows that Costa Smeralda's economic shift contributed to abandoning agricultural economies in municipalities like Aggius, Luogosanto, Aglientu, Calangianus and Sant'Antonio di Gallura. It has also affected the "stone economies" of Palau, Berchidda, Monti and Trinità d'Agultu e Vignola, as well as other municipalities southwest of the study area.

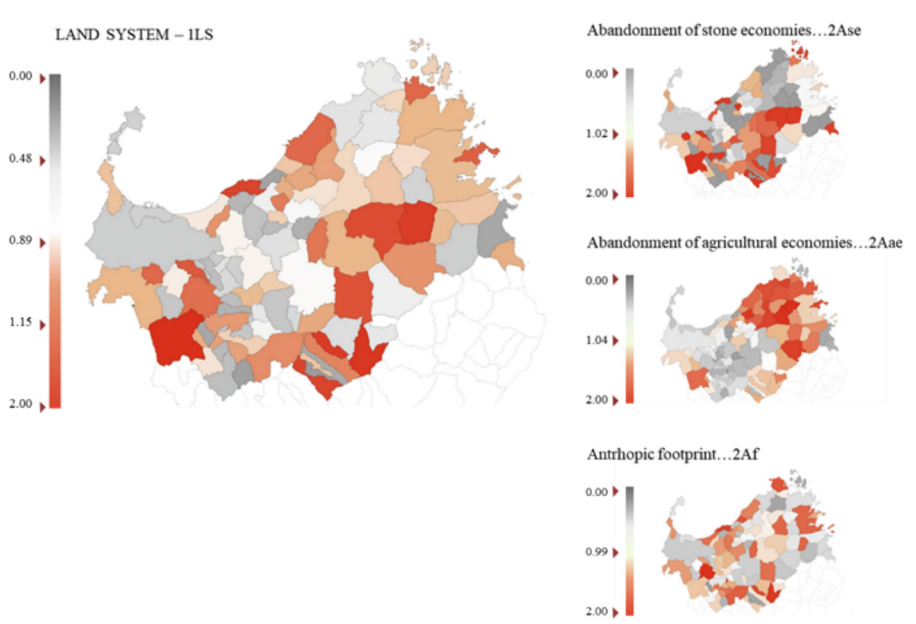

Fig. 8. Map of the resistance scores of the municipalities in the Land System with mapping of the aggregate values at the second and third level.

Concerning the resistance of the City System, "technological abandonment" mainly affects the hinterland. As for "physical abandonment" and "home abandonment", the situation is difficult to classify clearly. Some interesting considerations involve, for example, the municipalities of Sassari and Arzachena, which report low values of physical abandonment but high rates of housing abandonment. This means that occupancy is high but mainly non-resident, unlike Stintino and Porto Torres, which keep both indices high despite not reporting serious technical problems.

The resistances to the community system are identified in the components describing intercensal variation and the unemployment rate, while those of the resource system are represented in the indices of low income and low productivity (see Fig. 10).

Despite the demographic problems already mentioned, in some cases there has been growth, as in Golfo Aranci (due to the opportunities offered by industrial development linked to the port) and Olmedo (due to the spill-over effects of the real estate sector of the nearby and more important area), while in most cases it has been constant and significantly decreasing, as in the cases of Ardara, Benetutti and Pattada. Thematic

maps representing the second dimension highlight the profound transformation of the economy in many centers in northern Sardinia (see Fig. 11), which has increasingly become tertiary, confirmed by a generalized population growth around the two economic poles of Sassari and Olbia.

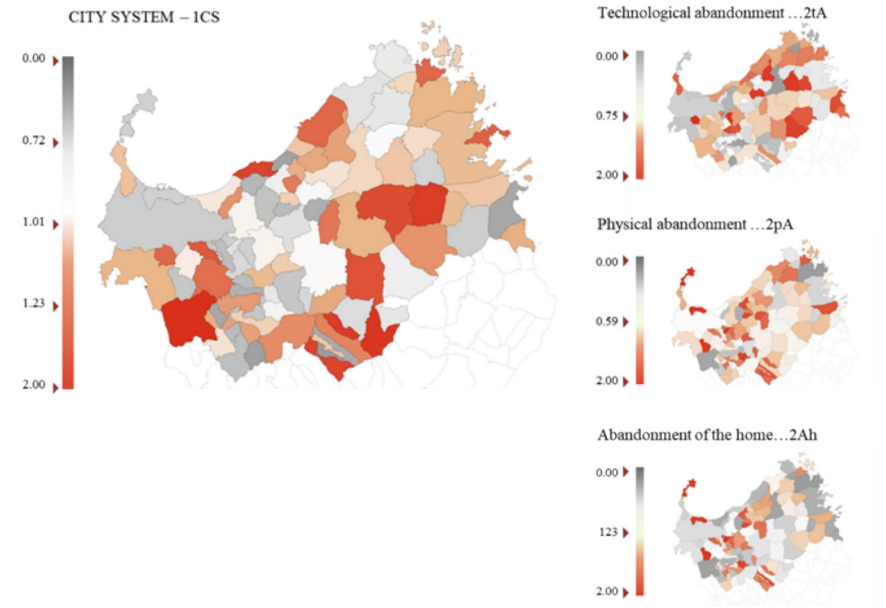

Fig. 9. Map of the resistance scores of the municipalities in the City System with mapping of the aggregate values at the second and third level.

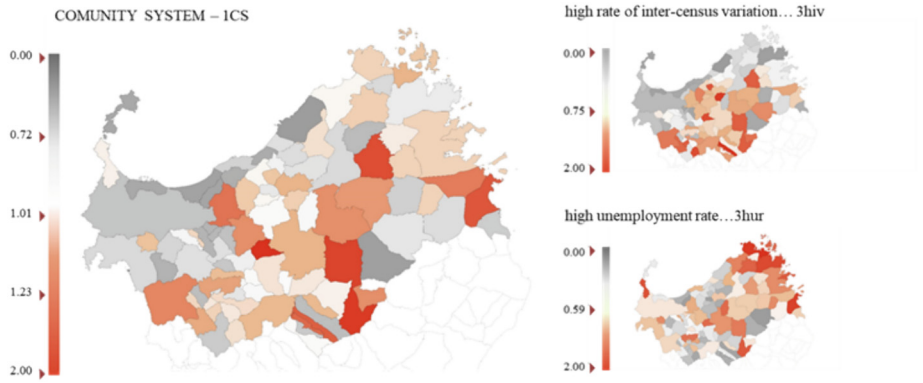

Fig. 10. Map of the resistance scores of the municipalities in the Community System with mapping of the aggregate values at the second/third level.

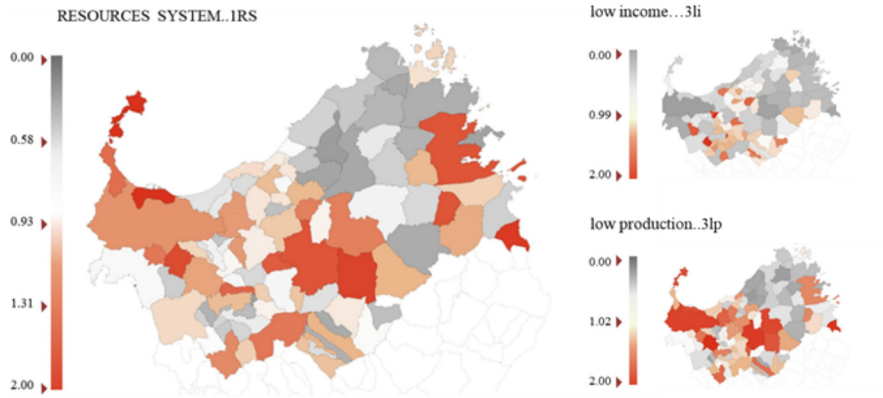

Fig. 11. Map of the resistance scores of the municipalities in the Resources System with mapping of the aggregate values at the second/third level.

4.2 Design Synthesis

The results of this critical observation are summarised in the JCRI. Figure 12 shows that the municipalities most capable of preserving natural capacity are concentrated in eastern northern Sardinia, Sassari, Alghero and the entire central area, which includes the municipalities of Ozieri, Chiaramonti, Erula and Nulvi. The synthesis of the two indices reveals the high capacity of the natural system and the almost total absence of resistance to the expansion of its maximum potential. Thus, in the case of the coastal municipalities, it can be observed that the potential for integrated development has been almost fully exploited. On the contrary, for the above-mentioned municipalities, the very lack of traditional economic development suggests opportunities for implementation of place-based models.

The low scores reflect the combination of low capacity and high resistance, particularly in the municipalities of Villanova Monteleone, Illorai, Aggius, Benetutti, Bono and Tergu. Moreover, these municipalities are in inaccessible areas, so that agricultural and pastoral production activities have always been limited. These same municipalities are also more characterised by significant forms of urban resistance. Located in the most rugged part of the territory, most of them suffer from accessibility problems that make it difficult for the local population to stay. On the other hand, from a social point of view, except for a few municipalities (such as Buddusò and Bortigiadas), resistance is concentrated in inland areas, which are typically less accessible and less urbanised, and therefore lack the facilities and services that typically characterise metropolitan and coastal areas. The best performing systems are those of Sassari, Trinità d'Agultu e Vignola, Buddusò, Puttifigari and Budoni. Apart from Sassari, where the social capacity is strong thanks to the work and research pole that the city represents, the other municipalities are examples of care and affection for the place, despite the conditions of degradation. The economic resistance of the inland municipalities is similar to the previous case, while in terms of capacity, the municipalities of the Costa Smeralda stand out.

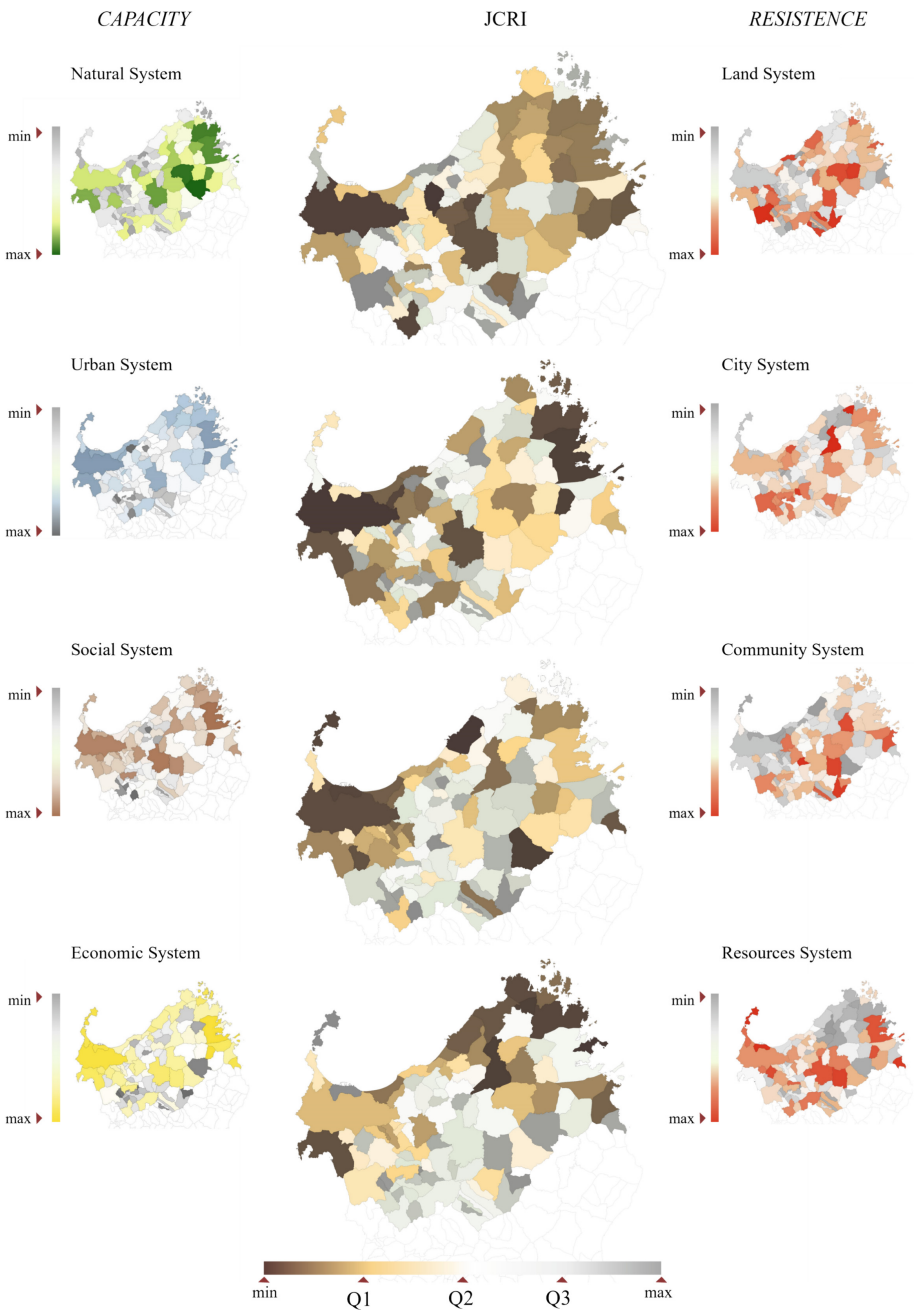

Fig. 12. Map of the Joint Capacity/Resistance Index of the municipalities.

5 Discussions and Conclusion

This study has provided a framework for observing and interpreting the phenomenon of abandonment in term of its complexity and articulation in the territorial context of Northern Sardinia. In line with the cognitive path structured by means of a Multi Attribute Value Theory-based approaches, the results consist in having defined and delimited two converging syntheses, the evaluative one and the design one.

In the evaluation synthesis, capacities were identified the factors which could prefigure integrated development lines between human and natural capital. On the other hand, resistances were identified in all the conditions and processes, whose inertia and dissolving power hinder the above-mentioned redevelopment paths.

This conceptual framework coordinates: 1. The critical observation of the capacity of actors to highlight the possible integration of natural datum and anthropic substratum; 2. The dialectic between settled communities and their original territorial contexts, manifested in the impoverishment and territorial disadvantage of the hinterland in relation to the metropolitan and coastal areas.

On the basis of these results, the design synthesis by means of the joint capacity/resistance index has made it possible to show how, in some cases (in the coastal areas of some important urban centres), the effects of this overlap have been metabolised by the capacity system, which has been able to overcome the resistance due to the change in the relationship between the resident population and the seasonal tourist flows and the loss of some of the original landscape characteristics; on the other hand, in some inland areas, although the capacities of the original urban and natural landscapes have been preserved, the resistance due to the fragility of the local economy and the consequent neglect of the built heritage makes it difficult to plan integrated regeneration strategies.

Furthermore, this index have measured favourable conditions for integrated development in the inland areas of Gallura, also showing how the natural capacities – in particular those due to the geological character that has shaped the granite landscapes and that is reflected in the forms of the urban landscape through the architectural languages – have overcome the resistance due to the partial transformation of the economy of local production, in particular the abandonment of the "stone economy".

The evaluation and design syntheses also identified the areas where the prevalence of resistance claims economic and territorial policies aimed at infrastructure and equipment. In the light of these findings, the reflection on values focuses on the possibilities and ways of mediating between the codes of the land and those of modernity.

Furthermore, the JCRI highlighted situation in which the coexistence of low capacity and high resistance, can make inaction acceptable as a conscious choice of a possible way to interpret sustainable development policies [20].

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