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A networking-economic model to enhance the cultural value in small towns

Francesco Tajani and Francesco Sica
Department of Architecture and Design, University of Rome La Sapienza, Rome, Italy
Pierfrancesco De Paola
Department of Industrial Engineering, University of Naples Federico II, Naples, Italy, and
Pierluigi Morano
Department of Civil, Environmental, Land, Building Engineering and Chemistry, Polytechnic University of Bari, Bari, Italy

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Abstract

Purpose – The paper aims to provide a decision-support model to ensure a proper use of the limited resources, financial and not, for the enhancement of the cultural heritage and comprehensive development of small towns from sustainable perspective.

Design/methodology/approach – The assessment model is set up using a multi-criteria method that combines elements of linear planning with a performance indicators system that may represent the complexity of the territory's cultural identity as a result of existing cultural-historical assets.

Findings – The model reliability is tested in a case study in a Municipality in southern Italy. The case study's findings highlight the advantages for the public/private operators, who can consciously choose which preservation and restoration projects to fund while taking into account the effects those decisions will have on the economic, social and environmental context of reference.

Research limitations/implications – Due to the suggested operational approach and the selection of variables for accounting economic, social and environmental impacts by the renewal project, the research findings may not be generalizable. Therefore, it is recommended that researchers look into the suggested theories in more detail.

Practical implications – The study offers implications for designing a user-friendly tool to help decision-making processes from a private–public viewpoint in a reasonable allocation of financial resources among investments for cultural property asset enhancement.

Originality/value – The suggested operational approach provides a reliable information apparatus to depict the decision-making process under small-town development in accordance with sustainability dimensions.

Keywords Cultural heritage, Small town, Multi-criteria analysis, Networking-economic model, Decision-support system

Paper type Research paper

1. Introduction

The stresses of the twenty-first century, notably rapid and unpredictable globalization, are jeopardizing territorial realities that call for modest territorial development, limited number of services and low settlement costs – small towns (Cercleux *et al.*, 2018). These (small towns) suffer a number of diverse challenges, including a reduction in economic activity, deteriorating natural dynamics and high unemployment rates (Jamieson, 1993; Cercleux *et al.*, 2018; Kwiatek-Soltys and Bajgier-Kowalska, 2019; Stoica *et al.*, 2020). Specifically, territorial development policies and practices often prioritize the potential of large urban

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agglomerations, which serve as strategic economic growth centers and catalysts for increased urban density. This focus sometimes comes at the expense of small towns, whose development is hindered by rapid urban dispersion and gentrification (Galster *et al.*, 2001; Throsby, 2003).

In response to the main macro-scale evidence of territorial expansion driven by urbanization, significance is given to small- to medium-sized entities as potential assets of a territory. These entities are to be preserved and valued for strategic and sustainable territorial development (Gillham, 2002; Knox and Mayer, 2013). Worldwide organizations, e.g. UN-Habitat and the European Commission, with examples such as the European Capital of Culture initiative, have suggested progress guidelines and programmatic targets for participating nations, considering the potential strategic role of small towns in terms of the link between urban and rural areas and as a singular driver for directing the territory's growth in sustainable perspective (Williams, 2009; van den Bergh, 2022). The Confederation of Towns and Municipalities of Europe (CTME) addresses the issues pertaining to (1) population concentration and youth brain drain, (2) mobility and the green transition, (3) medical desertification with water distribution, (4) economic attractiveness of all outlying areas, (5) closer political institutions to their constituents and (6) inclusive digitalization to throw territorialism (Brumann, 2015). Small towns are willing to help address the aforementioned problems and participate in post-European recovery programs as the foundation for a new understanding of territorial government for the "after-crisis" periods (Lafferty, 2014). In the wake of the coronavirus disease 2019 (COVID-19) pandemic, people move from highly crowded areas to smaller towns in an effort to live untainted by social constraints and close to natural elements. Small towns might serve as catalysts, directing the development of new territorial configurations and assets in response to changing public preferences. The latter was related to the requirement of working in open places located near/within residential areas, in order to alternate between working and leisure time (Tomaz *et al.*, 2023; Akhavan *et al.*, 2023). Data and statistics regarding the loss in rural population were made public in 2013 by the European Spatial Planning Observation Network (ESPON), which also provided insight into some attempts to improve territorial governance in response to this drop (James and Lahti, 2004; Servillo *et al.*, 2014; Pahl-Wostl *et al.*, 2023; Medeiros *et al.*, 2023). The EU project H2020 ROBUST (Rural-Urban Outlooks: Unlocking Synergies), which identifies, analyses, supports and strengthens policies and governance systems aimed at encouraging mutually beneficial relationships in the rural, peri-urban and urban axis, is of particular interest with regard to the interlinkages between small towns and rural areas (European Spatial Planning Observation Network, 2013; Atkinson, 2019).

The increased focus on small- and medium-sized regions has led to a practical and programmatic response from all of the European countries to the concerns raised by the CTME and ESPON. This indicates a willingness to commit substantial financial resources to the development and conservation of small-scale territorial assets by recognizing the more appropriate and practical slow view. An infrequent inclination that comes up in the context of the study is to promote tourism as a way to preserve cultural assets and increase the local economy (McGregor and Thompson-Fawcett, 2011; D'Andria *et al.*, 2022). For example, the *Strategia Nazionale Aree Interne* (SNAI), which was founded in Italy in 2012, advocated a spatial delineation of interior territories in light of metrics connected to the distance of small towns from significant metropolitan poles (Rastegar, 2018). On the other hand, small towns are viewed as territorial components for encouraging the development of renewable energy communities to support the energy transition of the territory. This is to say, they undergo structural modifications occurring at the level of energy supply and consumption by the community. Additionally, some efforts concentrate on digital renovation through the use of small towns that seem like nodes of a general infrastructure connected to one another (Rossitti *et al.*, 2021). The European Rural Development Network disseminates methods and strategies for rural regeneration while exchanging experiences and information. One of them is the “smart villages” approach, which aspires to convert “marginal” small towns into active and participatory communities in which individual citizens’ will and the use of technology play a critical role in determining new development possibilities (Sager-Klauss, 2016; Visvizi *et al.*, 2019).

Others are still advancing on small towns as components of a single ecosystem that must be well-maintained in order to preserve the biodiversity (Patnaik *et al.*, 2020) and ecological heterogeneity of a region (Croci *et al.*, 2008).

The community frequently ignores the influence of cultural assets on the development of small towns when it does not immediately lead to financial gain (Lazzeroni *et al.*, 2013; Han *et al.*, 2021). Small towns have recently profited from increased public awareness due to their involvement in programs like the European Capital of Culture. This seeks to highlight new, lesser-known cultural cities that, although being small metropolitan centers, may attract interest from around the globe because of their distinctive and avant-garde cultural features that haven’t been well investigated (Montgomery, 1990).

In light of the rising interest in small towns that are preservation-oriented for their potential cultural importance, reference literature discusses the need of supporting programming activities that are focused on both defending small territorial realities – between-view – and promoting those same realities through the planned safeguarding and sustainable use of each small town’s distinctive assets – within-view (Le Blanc, 2010; Frick and Rodríguez-Pose, 2018; Castells-Quintana *et al.*, 2020).

The between-view is intended to aid in the enhancement of cultural-asset aspects in small towns by viewing them as a single element connected to one another within the same/distinctive cultural and geographical ecosystems (Kindlmann and Burel, 2008; Spanowicz and Jaeger, 2019). It brings to mind the theoretical idea of landscape connectedness, which is frequently used to describe the connections among various parts of the same or different natural setting (Poli *et al.*, 2020). On the other hand, the within-view refers to the cultural value of small towns, taking into account the individual aspects and relative qualities of single asset as components of a single cultural-spatial ecosystem (Blaschke, 2006; Qian *et al.*, 2020). Overall, it is best to favor an ecosystems-reading approach (Kay *et al.*, 1999; Ravetz, 2006) for a coherent reading of the small towns as a singular integrated body and is updated by taking into account the implications of the highly dynamic environment that characterizes cultural contexts and in which complexity plays a central role, both from a perspective between and within (Barile *et al.*, 2012; Shefer and Antonio, 2013; Garrod and Fyall, 2000).

When it becomes necessary to operate small towns as interconnected components of a whole infrastructure system or as singularities that must be preserved and protected, models and decision-support tools are put forth in scientific and gray literature, especially in requests to guide public and private operators in allocating resources among alternatives (diverse small towns, assets culturally distinct in type or components of the same cultural heritage). There is a need for the development of operational techniques as ways for rationalizing decisions based on multiple objectives that take into account not only financial concerns but also elements pertaining to the generation and use of renewable energy (Mosannenzadeh *et al.*, 2017; Lammers and Hoppe, 2019; Krog, 2019), and cultural (Poprawski, 2016; Birkeland, 2015) and environmental (Jankowski, 2009; Yigitcanlar, 2009) issues.

By examining the case studies presented in the relevant scientific literature (Mosannenzadeh *et al.*, 2017; Lammers and Hoppe, 2019; Krog, 2019; Poprawski, 2016; Birkeland, 2015; Jankowski, 2009; Yigitcanlar, 2009), specific challenges-type can be observed: (1) *technical-practical*, linked to the acknowledged need of decision-makers for easily scaled and easily navigable technological instruments of analysis so that they can monitor the small town and/or evaluate cultural services in the context of land-use changes closer to the intervention area or urban/peri-urban enhancement projects (Kremer *et al.*, 2016); (2) *multi-scale*, related to the necessity for more research on the topic of urban measurement, from the metropolitan to the small- to medium-sized realities. Territorial system governance is defined by Tacconi (2011) as the institutions, regulations, procedures and informal decision-making processes that enable stakeholders to direct and coordinate their mutually reinforcing demands and interests and their interactions with the environment at the proper scale; (3) *spatially explicit*, in order to assess and chart the supply of cultural services given by the existence of built components incorporated into the small town, as well as the demand in connection to the socio-economic and market dynamics that define the area of reference (Kremer *et al.*, 2016). According to Hauck *et al.* (2013), theme maps are a useful tool for educating communities about the intrinsic worth of cultural heritage in its current state.

The current contribution aims to address the aforementioned challenges by supporting the transformative potential of a system complex made up of various resources, such as the small town, and fostering the emergence of an interaction network among diverse assets within the same territorial context through a co-participatory and spatially explicit process (Silberberg, 1995; Bedate *et al.*, 2004; Napoli, 2009). Because of budgetary constraints and the planning objectives (relationship between demand and energy production, cultural, environmental and economic) of the territory, a support model for public/private decisions involved in the establishment of investment programs "between-within" small towns is developed. The proposal of a model capable of guiding decision-makers' actions toward the valorization and preservation of small towns by employing an up-scaling logic – from an entity (the small town) composed of various cultural assets to a reality that interacts with the environment as the node of a single territorial infrastructure – responds to the research questions behind this work in conjunction with the previous challenges [(1), (2) and (3)]. Table 1 shows the relationship between the relative challenge and research questions. The latter served as inspiration for the development of functional models that make it possible to address the aforementioned difficulties – technical-practical, multi-scale and spatially explicit. Specifically, the proposed model should facilitate decision-makers' ability to (1) "isolate" the initiatives that have the greatest potential to accomplish the program objectives while accounting for available resources and constraints of various kinds, (2) create a reporting framework that allows making thoughtful and logical assessments, (3) enhance the coherence and transparency of the choices by translating the objectives of the program and constraints within an up-scaling process – from large to small analysis-scale – through the immediate formalization of understandable mathematical relations. The model has been developed using the A Mathematical Programming Language (AMPL) software, by

Table 1. Interlinkage between the research questions and related challenges

Challenge	Research question
Technical-practical	Which user-friendly and functional tool can be provided to public/private subjects to assist them in the programmatic development of small towns?
Multi-scale	How can the transformative potential of a region be expressed while valuing small towns both inside and in relation to the influences from the environment in which they are located?
Spatially explicit	To what extent would it be possible to account for the performance of the initiatives that will be carried out in small towns and the related assets at various spatial levels of analysis?

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combining the Multi-Criteria Decision Analysis (MCDA) and graph-theory linear programming techniques.

The manuscript structure is as follows. Section 2 highlights the dimensions of small towns' cultural value (2.1), the appropriate performance indicators to address specific problems relating to the small towns' transformative potential through practices of cultural heritage valorization (2.2), and the metrics and operative frameworks of various assessment models to support the programming stage of interventions between and within small towns (2.3). The proposed economic model for a reasonable process of resource allocation among renovations of cultural buildings is described in Section 3; the model is tested with reference to a municipality in the south of Italy in Section 4. Section 5 at least provides a summary of the work's conclusions and brief remarks.

2. Materials and method

2.1 The cultural-value dimensions of small towns

A small town's potential as an engine of territorial enhancement has a two-fold structural value: (1) element in communication with the territory made up of other minor territorial realities with their own cultural importance (between-view); and (2) element unique and re-producible made up of diverse cultural assets that are related to one another (within-view).

To define appropriate methods to restore and preserve its existing and cultural value, a small town endowed with duplication and individuality both as a unique and/or as a component of territorial infrastructure has a complex character in terms of multidimensional fields (Tuan and Navrud, 2008). The functions within towns and across small- to medium-sized realities on a territory seem to increase in diversity and complexity not only with the density of settlements but also with their accessibility to hinterland populations (Nijkamp, 1987). It is unsuitable to constrain the analysis to a single, exclusive feature (like one of an economic-financial type); thus, it is important to supply and implement multi-attribute considerations for expressing the many aspects of the small town's value (Nijkamp, 1987).

For the built environment, as well as the natural one, it is possible to restore the quality that a small town may deposit to its intrinsic and functional value. While the latter is directly related to the benefits that the small town can generate in comparison to the territorial reference (*between-view*), the value intrinsically depends on its cultural heritage (Rondinelli *et al.*, 1983; Navrud and Ready Richard, 2002). This last (within-view) takes into account the various categories of cultural assets as well as the respective structural factors within the historical-architectural profile (Mazzanti, 2002).

The criteria that might express resource's intrinsic qualities, such as the small towns' value, depend on the use of individual historic-cultural assets and concern the following qualities: (1) environmental, (2) historical, (3) architectural and (4) internal historic-artistic amenities (Mazzanti, 2002). Those criteria focused on the functional value of the resource (small town) take into account its: (1) current primary importance; (2) potential usability, which is related to a tourist use of the resource; and (3) accessibility/connectivity to the pertinent territorial context (Radziszewska-Zielina and Sladowski, 2014).

Each aspect that defines the small town's intrinsic and functional significance requires a performance indicator. These indicators either independently or in accordance with an integrated logic capture the cultural value of the small town in line with the characteristics of the resources to be valorized. The scientific literature that analyzes small towns using the available performance measures is then thoroughly examined. With a "between-within" small-town lecture, the benchmarking exercise seeks to develop suitable measures for gauging cultural value in two-fold cases.

2.2 Small-town performance indicators

According to what has been stated up to this point (2024), the cultural value of small towns should be considered in terms of a variety of factors, each of which may be expressed through an appropriate criterion and associated measurement indicators. In this case, it is always preferable and advisable to return to a multidimensional systemic approach as opposed to one that is based on single parameters or unique evaluation indices.

The analysis of the cultural value gained by small-town expansion was based on measurable metrics, which made it possible to fully comprehend how the territorial system performs. Elsevier's Scopus bibliographic database was used to search for peer-reviewed studies. The useful open-access publications have been identified for usage with keywords (KWs), including those on "small towns," "bioindicators," "sustainable development," "rural area," "urbanization," "decision-making," "economics," "Geographic Information System (GIS)" and "land use." Specific details, such as (1) the publication year, (2) the contribution's title, (3) the work's authors, (4) core objective and (5) consistency of the set of tracked evaluation indicators with the affiliation categories and (6) applied analysis method, are reassumed for each of the 10 works from 2021 to 2023 (Fusco Girard, 2009; Otto *et al.*, 2021; Carlow *et al.*, 2022; Mally *et al.*, 2022; Pupphachai and Zuidema, 2022; Tajima, 2022; Zibtseva, 2022 Kireyeva *et al.*, 2022; D'Andria and Fiore, 2023; Zhang *et al.*, 2023) as shown in Table 2. During the considered period, it has been possible to detect how the cultural importance of small towns, particularly based on their spatial interconnections and internal governmental systems that manage the transformative change of historical-cultural assets of a territory, received significant attention as a result of the consistent proposal of indicators to be used in the assessment exercise.

The collection of indicators monitored in the literature has concerned the distinctive characteristics of small towns, as well as the availability of data at the spatial level of investigation. The continued use of criteria that are almost directly tied to the territorial and spatial planning system has been observed, followed by criteria with an economic, social and environmental focus. The following Figure 1 provides a graphic description of the process to personalize some of the key categories as a point of reference, while analyzing small towns' value from cultural point of view: (1) governmental system, (2) economy, (3) nature and biodiversity, (4) territorial-spatial planning and (5) well-being by the community.

As a function of the number of indicators available for each subcategory, a set of specialized indicators may be allocated to each primary category from (1) to (5) (see Figure 1). For instance, in (1), the use of indicators such as the number of stakeholders involved has been outlined; if the goal of revitalizing the small town is part of a network project, and the Participation in European Climate Action Award, the number of industrial activities and the total investment per capita metrics are examples of metrics related to (2). At the Nature and Biodiversity dimension, (3) indicators such as access to safe drinking water, preservation of green space, and air quality improvement have been considered. In (4), there are parameters, e.g. distances to the nearest neighbors, accessibility and built heritage features. Lastly, in (5), the access to selected social services and inclusive education.

The key categories may be contextualized in a between-within logic for reading the small town. Other than the territorial-spatial planning, which is specifically related to the functional features of the small town, the governmental system, economy, nature and biodiversity, and community well-being may all be linked to the intrinsic and functional significance of the small town in equal measure. If it is assumed that the between and within visions of the small town are represented by horizontal and vertical axes, respectively, the aspects of the governmental system, economy, nature and biodiversity, and community well-being can be placed along the two bi-axes, as meant of equal valence in relation to the between-within lecture. The territorial-spatial planning category represents the exception, which must be

ID	Year	Title	Core objective	Spatial level of analysis	Categories	n.indicator	Analysis methods and tools
1	2023	Multi-hierarchical spatial clustering for characteristic towns in China:An Orange-based framework to integrate GIS and Geodetector	Characteristic towns in China and investigates the primary environmental and human factors influencing spatial heterogeneity in small towns	China	Geographical indicators	5	Cross-platform analytical framework (GIS + Geodetector) + Multi-hierarchical cluster analysis (Orange data mining)
					Non-geographical indicators	5	
2	2023	The RI.P.R.O.V.A.RE. Project for the Regeneration of Inland Areas: A Focus on the Ufita Area in the Campania Region (Italy)	Theoretical–methodological contribution to the implementation of the National Sustainable Development Strategy, as well as operational tools to promote sustainable and resilient development processes	Italy	Geography of contraction: defined by the demographic dynamics of inland areas, whose decline is becoming more and more substantial and pressing. The depopulation phenomenon has significant consequences, especially on the productive fabric, which is unable to find resources and labor to employ and tends to shrink compared to more populated areas	2	Content analysis
					Geography of marginality: Inland areas, as they are characterized by problems related to accessibility – not only physical, but also digital – and by the poor or inadequate quality of infrastructures and services, suffer from social isolation but also, and above all, from economic isolation	4	
					Geography of fragility: risks factors, natural and anthropic, to which the territories are subjected	3	
					Geography of quality: based on the cultural value	2	
					Geography of innovation: novelty in the industrial-economic productive sector	1	
					Geography of migration: opportunities by the movement of the foreign families toward the inland areas	2	
					Geography of relationships: capacities of territories to network	1	

(*continued*)

Table 2. Results of the publishing screening between 2021 and 2023

ID	Year	Title	Core objective	Spatial level of analysis	Categories	n.indicator	Analysis methods and tools
3	2022	Action Research on a Locally Oriented Sustainable Product	Locally oriented products contribute to social sustainability by localizing them according to the social context of the region on a global scale	Nagara Town, Chiba Prefecture, Japan	N.A.	1	Socio-Relation Map (SRMap) to quantitatively measure the social relations of a product by counting the stakeholders involved. SRMap comprises stakeholders involved in product planning, manufacturing, and dissemination
4	2021	TOPOI – A method for analyzing settlement unitsand their linkages in an urban–rural fabric	Integrated analysis and description of settlement units in an urban–rural setting. Understanding of the built environment by clustering and describing settlement units of similar characteristics with view their physical form, function and connectivity	Germany	Form Function Spatial linkages	4 5 3	TOPOI method for detecting, describing and functionally, physically and morphologically classifying settlement units according to their properties
5	2022	Tree species Biodiversity in small Ukrainian towns	The species richness of trees both between the studied towns and between its central part and the whole territory of the town was compared	Mixed forests (Polissya) and forest-steppe, and administratively, in Chernihiv and Kyiv regions Ukraine	Biodiversity	6	Inventory of greening
6	2021	Changes In (Sustainable) DevelopmentOf Slovenian Small Towns	Findings from a study of the level of sustainability in 32 Slovenian small towns, as assessed using a set of twelve economic, social, and environmental indicators of sustainable development	Small towns in the Slovenian urban system	Economic indicators Social indicators Environmental indicators	4 4 4	Accounting of sustainable development indicators enabling a comprehensive view of the functioning of the urban system
7	2021	Are small municipalities prepared to use SIs? The case of Thailand	Investigate how the Thailand Sustainable Cities Indicators' (TSCI) is prioritized, used, and translated into local impact	Thai municipalities, Tayland	Livable City Happy Citizens Sustainable Environment	7 9 6	Built up analytical framework

(*continued*)

Table 2.

ID	Year	Title	Core objective	Spatial level of analysis	Categories	n.indicator	Analysis methods and tools
8	2022	Assessment of the socio-economic performance of vulnerable and depressed territories in Kazakhstan	The study aims to propose a methodological approach to assessing the socio-economic performance of vulnerable	Towns and settlements in East Kazakhstan, North Kazakhstan and Zhambyl regions. Thesample comprises the following groups: (1) small towns with a population under 50 thousand people; (2) monotowns, whose development depends on their town-forming enterprises; (3) strategically important towns in border areas located 50 km or less from Kazakhstan's national border; (4) villages and the so-called "base rural settlements"	Social	11	Performance accounting throught parameters and indicators measurement
					Economic	11	
					Infrastructural	7	
					Environmental	5	
9	2021	Are cities prepared for climate change? An analysis of adaptation readiness in 104 German cities	Overview of climate adaptation in 104 German cities	German cities classified by their size	Local political leadership	3	Cluster analysis based on index construction (adaptation readiness index) + adaptation readiness approach
					Institutional organization	4	
					Adaptation decision-making	2	
					Availability of usable science	2	
					Implemented measures	1	
10	2021	Challenges to climate change adaptation in coastal small towns: Examples from Ghana, Uruguay, Finland, Denmark and Alaska	Analysis of developing management and adaptation strategies to climate change	Five case studies of coastal small towns, USA	Local economy	1	Analysis by selecting pilot-case of study
					Data and information access	2	
					Decision-making	1	

Source(s): Created by authors

Table 2.

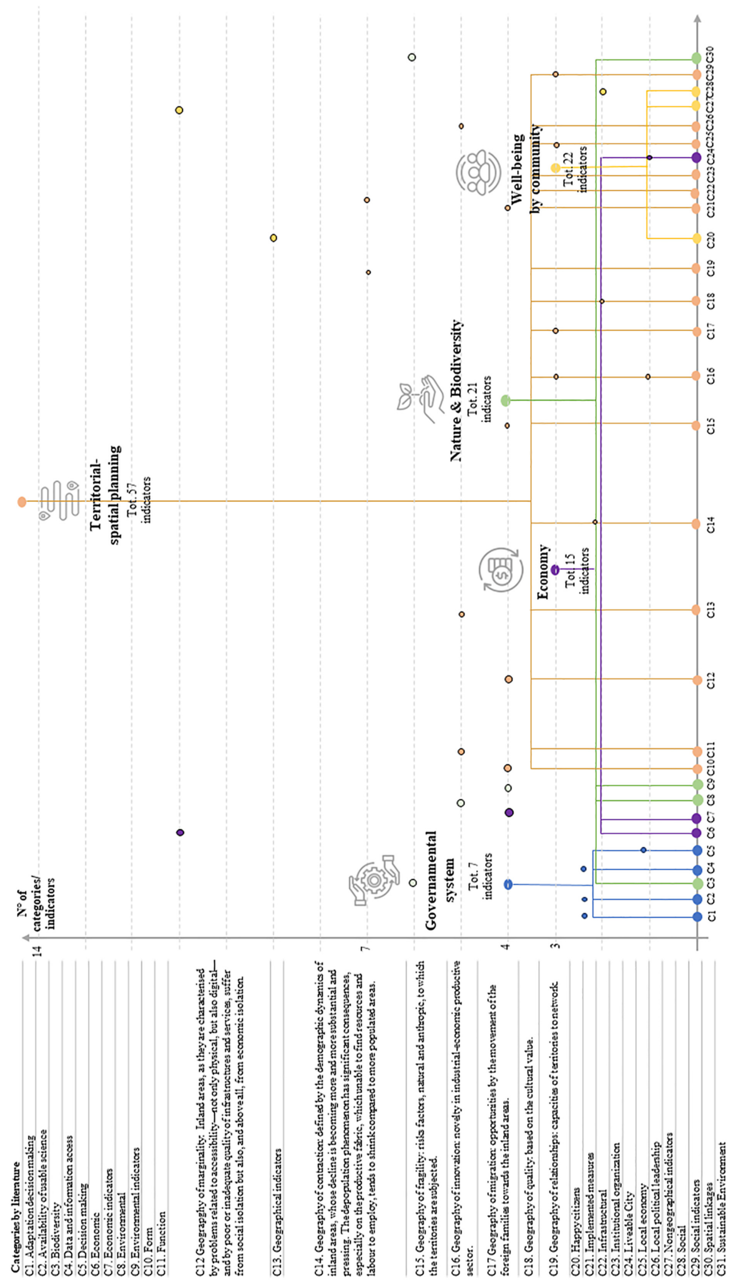

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Figure 1.
Literature-based individualization of the main categories for small-town assessment values

firmly situated on horizontal axes via their own indicators that reflect both a small town's internal and exterior layout. The preceding explanation is provided graphically in Figure 2.

Some of the indicators related to the main categories identified by the literature are employed to assess the suggested decision-making tool. Throughout the inquiry and description of the reviewed paper, three criteria in mind that indicators needed to fulfill in order to be included in the proposed model have been kept: (1) the indicator must be useful for measuring the level of the cultural significance of the small town; (2) data collection must be possible; (3) the data must be publicly available so that the study may be reproduced and the results compared in the future.

The theoretical framework of the suggested model is detailed in the next subsection, followed by its specific features (Section 3) in perspective of valorizing the cultural value "between-within" small towns.

2.3 Theoretical basis of the suggested small-town assessment model

From the quick review activity, the authors of the reference literature used a diversity of methods to study the trends and prospects of development and assessment of small-town cultural value. The choice of methodology generally depends on the goals and subject matter of each particular study (Fusco Girard, 2009; Otto *et al.*, 2021; Carlow *et al.*, 2022; Mally *et al.*, 2022; Pupphachai and Zuidema, 2022; Tajima, 2022; Zibtseva, 2022; Kireyeva *et al.*, 2022; D'Andria and Fiore, 2023; Zhang *et al.*, 2023). Fusco Girard (2009) undertook research to investigate the key environmental and human causes driving spatial variability in small

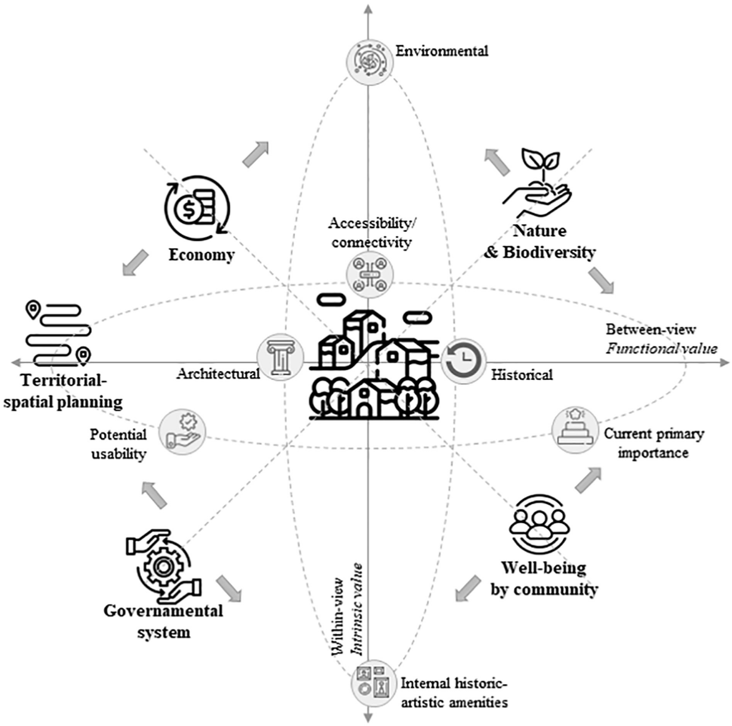

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Figure 2. The primary categories in a between-within viewpoint

towns using a cross-platform analytical framework and multi-hierarchical cluster analysis. Other authors created a Socio-Relation Map to quantitatively measure social relations in small towns by counting the stakeholders involved in transformative change processes (Zhang *et al.*, 2023); a cluster analysis to create an index of small town's adaptability to sudden events, such as climate change, has been also implemented (Otto *et al.*, 2021; Kireyeva *et al.*, 2022).

All of these approaches were presented and tested to address sectorial objectives in small towns, and many of them referenced the requirements of the cluster analysis. It is used to categorize items according to how similar or unlike they are. The three main categories of cluster analysis are represented by partitioning techniques, approaches that permit overlapping clusters and hierarchical techniques (divisive or agglomerative). There are several distinct techniques and algorithms that fall under each category of approach. Arguably, the agglomerative hierarchical cluster analysis is the most common kind of analysis. Instances of this are the Cross-platform Analytical Framework and the Multi-hierarchical Cluster Analysis, which allow to identify particular steps in the associated process when the operator's technical-practical abilities compromise the realization of a logical and systematic approach.

Other authors have discussed the potential use of analytical tools to assess real estate assets by automated value models, with some applications in the Apulia Region (Tajani *et al.*, 2018; Fitton *et al.*, 2021). Significant focus has been placed on the necessity of improving small towns to begin with abandoned structures viewed as catalysts for local small-town development (Tajani *et al.*, 2017).

Two main kinds of evaluation techniques used to emphasize the cultural significance of small towns may be determined by the article screening activity. They are as follows:

(1) Those compositions that are explicitly economic-financial in nature are aware of the characteristics of investment to make in small towns.

(2) Multi-criteria methods that examine each of the qualities of the resource (small towns) under consideration independently or in conjunction manner, e.g. by the proposal of a valuation index (Radziszewska-Zielina and Sladowski, 2014).

Particularly, multi-criteria methodological methods have the advantage of simultaneously taking into account many objectives and/or criteria, represented by suitable units of measurement, which are necessary to determine the social utility of the proposed initiative toward sustainable targets.

The recognition of the existence of multiple objectives within the decision-making process entails a reformulation of the utility writing (objective function) that, in contrast to what occurs in the usual type of analysis, takes into account various levels of reading in relation to the multidimensional nature of the small town at the light of the environmental, social and economic sustainability (Morano *et al.*, 2021). Three basic approaches behind the multi-criteria methodology implementation for evaluating the sustainability of the transformative change in small towns may be distinguished within the multi-criteria methodological methods: (1) life cycle approach, (2) flow between systems approach and (3) triple bottom line approach (Morano *et al.*, 2021). A design-process mindset throughout the life cycle of the territorial system to be designed is frequently stressed by authors (Romero and Rehman, 2003; McAloone and Tan, 2005). To (1), this condensed explanation states that all activities throughout the life cycle can be divided into three categories: those produced prior to the provision of the service, those connected with the provision and those completed following the provision (Chiu and Chu, 2012). With regard to (2), this approach assumes that any sort of system is made up of connected product and service systems, among which there is a flow of activity. Additionally, one foreground system (FS) can be referred to as the main or "core" system, while many background systems – or systems that assist the FS during its life cycle – can be referred to as "satellite" ones (McAloone and Tan, 2005). At least, with regard to (3), this strategy bases the sustainability of a territory on a study of its three dimensions: social, economic and environmental ones (Muñoz *et al.*, 2020).

Both economic-financial models and multi-criteria ones can be related indifferently to these three fundamental measurements. Instruments and analytical tools can typically be assigned to each of them for practical use. Figure 3 lists mail analysis tools that have been applied in the case of the articles examined for evaluating the performance of small towns from sustainable perspective. The degree of adaptability and application to each of the previously outlined multi-criteria approaches was assessed for each of them. A heat map was made with an immediate reading of the frequency of the analytical tools in relation to the general usage of methodological approaches, as in Figure 3.

Accordingly, the three approaches described above are better covered by multi-hierarchical analysis due to its ability to create systems that can support decision-making by developing models that are readily adaptable to real-world circumstances (Fusco Girard, 2009), e.g. when it is necessary to choose among project-related initializations with respect to available budgets, as in the case of recovering historic-monumental assets in small towns (within viewpoint) or in the condition of creating infrastructures involving dislocated small towns in a same territorial plot (e.g. with the objective to define the boundaries of suitable cultural district in diverse territorial scale of analysis considering a between viewpoint).

From the perspective of multi-hierarchical analysis, a decision-making problem, like the one that involves a small town, can be represented by figuring out the changes (graphs or networks) that are acceptable among the assets targeted for intervention and valuing each one of them according to specific criteria chosen while keeping the objectives in mind. The graphs make it possible to ascertain the order in which a particular action results in terms of direct and indirect impacts as well as, conversely, the collection of actions that, when combined, caused one or more effects that significantly impacted the different territorial systems. In order to provide the highest possible investment portfolio for both public and private subjects, graphs can used to provide mathematical assistance for decision-making in circumstances such as scheduling initiatives on different cultural assets in small towns

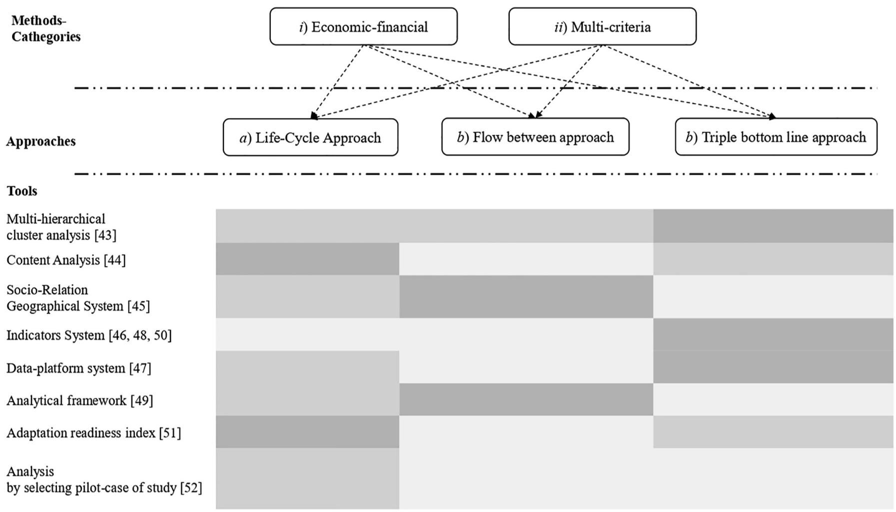

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Figure 3. Viewing the analysis tools' heat map

(Elkington and Rowlands, 1999; Koenig and Battiston, 2009). The terms graph and network will be used interchangeably in the following.

Given this potential, a collaborative model for co-creative networking is put forth, which is based on the multi-hierarchical analysis's underlying graph theory. The purpose is to assist small- to medium-sized territorial realities in implementing appropriate enhancing initiatives. This pertains to the necessity of including diverse stakeholders and/or residents in the planning and development process of several programs that seek to enhance small towns by demonstrating a "win-win" approach by leveraging multiple preexisting interests. Section 3 describes a decision-support model (network-based) that employs "between-within" reasoning in a mathematical face to assist in determining the best potential portfolio of territorial requalification measures affecting small town's historic and cultural assets.

3. The networking-economic model for enhancement interventions in small towns

Coming to a mathematical formalist perspective, the objective is to develop a practical decision-supporting tool that is motivated by a multi-hierarchical approach using a graph representation ("between-within" viewpoint) that may take into account multiple selection criteria (with $j = 1, \ldots, m$) for evaluating the cultural performance of the i-th node (with $i = 1, \ldots, n$) in which the small-town cultural assets to be valorized exists with the k-th connection pathway (with $k = 1, \ldots, t$). By developing an algebraic expression (objective function) and taking into account the aspects that will affect the decisions to be made in light of the small town's cultural valorization, the assessment criteria for the i-th node and k-th linkage have been chosen. The flexibility gained from selecting appropriate criteria and accompanying indicators allows the suggested theoretical framework to be adjusted according to a variety of situations, allowing it to form models with varying degrees of consistency. Therefore, it depends on the available data and the spatial scale of study that influence the impact of the cultural valorization initiative. The objective function searches for the suitable solution by identifying the path within the network-structure of the small towns that maximizes a specific parameter (such as time or travel cost), and a multi-criteria data function that expresses the overall effects of the valorization action on the i-th cultural-asset element.

The following general mathematical formulation could describe a general problem impacting small towns' enhancement from a "between-within" perspective:

$$\begin{cases} max\,(or\,min\,)U = f(x_i, A_{ij}, D_{ik})_{with\,i=1,\ldots,n;j=1,\ldots,m;k=1,\ldots,t} \\ x_i \in R \\ subject\ to\ (s.t.): S < \ \geq \psi \end{cases} \tag{1}$$

in which:

U represents the objective function that is depending on:

A_{ij}: the matrix of multiple criteria analysis for the i-th node (with $i = 1, \ldots, n$) that was evaluated using the j-th criteria (with $j = 1, \ldots, m$);

D_{ik}: the set of the distances k (between with $k = 1, \ldots, t$) the i-th node expressing their linkage, physical or not;

x_i: the decisional variables, which assume values in R-set number

S separates the set of provided constraints while adhering to a predetermined target (ψ) by applying linear algebraic expressions. When it comes to choosing existing recovery and improvement initiatives that are evaluated in light of the time and/or costs of linkage, (1) these could determine the proper pathway to connect two nodes at a specific distance according to, for example, the time range for visiting or the maximum allowable travel cost; or (2) they could represent constraints of a different kind, such as the financing of some projects, according to the availability of the financial resources.

Based on (2), to pursue the goals necessitated by the requirement to take action on the existing patrimony so as to preserve and value it, the selection problem between *n* projects that are not all feasible within budget constraints and that draw on resources from various territorial cultural assets is taken into consideration. The *i*-th node of the reference network is where the *n* projects that needed to define the historical-cultural building of interest are referenced.

A solution to such an issue can be found by returning to mathematical tools where the perspective is to enable the conversion of the win–loss relationships into a straightforward polynomial.

Wherever the challenge is the selection of a project portfolio, optimization algorithms capable of solving complex decision-making problems using a mathematical formalism similar to system (1) are extremely useful (De Paula, 2017). Because a single project cannot be framed, proprietary Discrete Linear Programming (DLP) techniques, such as Branch and Bound, appear to perform better when resolving selection problems utilizing multi-criteria logic (Dümcke and Gnedovsky, 2013; Nesticò *et al.*, 2018; Du Cros, 2001; Tweed and Sutherland, 2007).

A model defined by the DPL algorithm can aim to assure the optimum distribution of restricted resources, of financial type or not, among projects for recovery on major culturally significant buildings in small towns. In the specific instance of valuing a territory's historic and cultural heritage, it is possible to solve a case of selection via DPL algorithm and networking view by means of the following steps:

(1) Structuring the choice problem as a graph where the acts that must be taken on cultural building reflect the network's nodes

(2) Formalization of a multicriteria-matrix (A) for each *i*-th node based on appropriate assessment criteria and that (D) including the mutual *k*-th distance between the network's nodes

(3) Structuring of the analysis model, likely the (1), as a case of DLP in response to the selection issue to achieve

(4) Individualization of algorithm problem-solver via appropriate software and results-collecting

The optimizing logic of multi-objective analysis, supported by a multi-attribute approach via a networking-based method, is the foundation of the multi-criteria analysis model we want to propose, which seeks formal organization based on the AMPL software's attributes. It has been decided to apply AMPL because:

(1) AMPL allows to create a parametric model (file.*mod*). The file.mod is written without specifying the data used, which are instead written in another file (file.*dat*)

(2) The problem elements (projects, assessment criteria and routes) are treated as a group (*set*)

(3) the unacknowledged – the projects – have a binary value (*var* x binary)

(4) the *objective function* is a linear expression that maximizes the ability of investors to pursue the numerous goals related to an asset, e.g. recovery and preservation projects in small towns

Table 2 displays the file.mod structure.

The n historic-cultural resource recovery projects (set PROJECTS), connected to one another by k linkages (set DISTANCES), are assessed using m criteria (set CRITERIA).

The numerical values that specifically define the targets that need to be considered within the framework of the decision-making system are listed in the PARAMETERS section. These values include the available budget (param BUDGET); the multi-criteria matrix where the i-th node is evaluated (param A); the D parameter represents the set of the mutual distances between i-*th* node; the investment costs for each project concerning the single cultural capital element (param COSTS); and the T parameter, or alternatively, the amount of time that is meant for the i-th node's intended visitation.

Once the problem's unknowns are established (var x_i), the objective function is then written:

$$\text{maximize } \textit{objective function} : \text{sum}\ \{i \text{ in projects}, j \text{ in criteria}\}\, \text{A}\,[i,j] * \text{x}[i].$$

Finally, the section on the problem's constraints, which directs the search for the optimal value returned by the objective function, is relevant. Depending on the reference condition system, it can be customized in a multitude of ways. In particular, it may be understood from several perspectives of various kinds (e.g. regulatory, governance, financial and spatial planning). The following relationships are among those that the suggested model takes into account:

(1) the financial constraint regarding the available funding

$$\text{s.t. constraint\_0} : \text{sum}\ \{i \text{ in PROJECTS}\}\text{COSTS}[i] * \text{x}[i] <= \text{BUDGET};$$

(2) the one relating to the desired course's temporal limit, which connects the interventions in the respective i-th node:

$$\text{s.t. constraint\_1} : \text{sum}\ \{\, i \text{ in PROJECTS}, \text{k in DISTANCES}\}\, \text{d}\,[i,k] * \text{x}[i] <= \text{t}.$$

It should be emphasized that the model in Table 3 bases its application on the premise that the decision-maker accords equal weight to each of the criteria. To accommodate for different weights, certain coefficients may be multiplied by the values provided by the projects

Table 3. The network economic model (file.*mod* structure in AMPL environment)

Sets
set PROJECTS (with $i = 1, \ldots, n$);
set CRITERIA (with $j = 1, \ldots, m$);
set DISTANCES (with $k = 1, \ldots, t$);
Parameters
param BUDGET;
param A {PROJECTS, CRITERIA};
param COSTS {PROJECTS};
param D {PROJECTS, DISTANCES};
param T;
Variables
var x {*i* in PROJECTS} binary;
Objective function
maximize objective function: sum {*i* in PROJECTS, *j* in CRITERIA} A [*i*, *j*]*x[*i*];
Constraints
s.t. constraint_0: sum {*i* in PROJECTS} COSTS [*i*]*x[*i*] <= BUDGET;
s.t. constraint_1: sum{*i* in PROJECTS, *k* in DISTANCES} D [*i*, *k*]*x[i] <= T;
Source(s): Created by authors

evaluated in reference to the criterion *j*-th. This provided some variety and adaptability to various decision-making scenarios for the suggested analytical procedure.

4. Case study

A set of 16 projects for public financing aimed at restoring historic and architecturally significant properties are being considered, namely a set of historical public buildings to renewal via innovative transformative action in the *Fisciano* Municipality in the *Salerno* Province of Italy. The goal of the suggested networking-economic model is to support the funding of those initiatives that can yield the best financial, social, cultural and environmental outcomes on the land while managing financial constraints and geographically interdependent relationships. Given the relationship between geographic analysis and effect concerns, the suggested operational apparatus exhibits a high degree of adaptability to various territorial contexts with relative economic, social and environmental features.

To assess the viability and utility of the proposed model, it is assumed that the Public Administration (PA) would have a budget of €15,00 million available to distribute among the 16 initiatives. In addition, the PA is focused on revitalizing historic districts within the local community by valuing the area's existing historical and cultural fabric through cultural excursions that allow visitors to stop at any particularly interesting territorial resource, such as the historic buildings. As a result, it is assumed that programmatically determined cultural polarities will be defined through tourist routes lasting, for example, three hours, or 10,800 s, which will be taken into account when determining which initiative for requalification to favor before others in the context of analysis.

The infrastructure and topographic features of the area of interest lead to the creation of a graph that links the interventions according to the region's existing roadways, as shown in Figure 4. The analytical graph of reference is created from the relationships between the individual components of the cultural capital asset of the study. Overall, an analysis graph with 16 nodes and 35 links can be reproduced.

Each suggested intervention for the identified properties (16) in the *i*-th node is assessed by means of the primary literary theme categories (see above Section 2.2): (1) governmental system, (2) economy, (3) nature & biodiversity, (4) territorial-spatial planning and (5) well-being by community. It is fundamental for the construction of the multi-criteria matrix A.

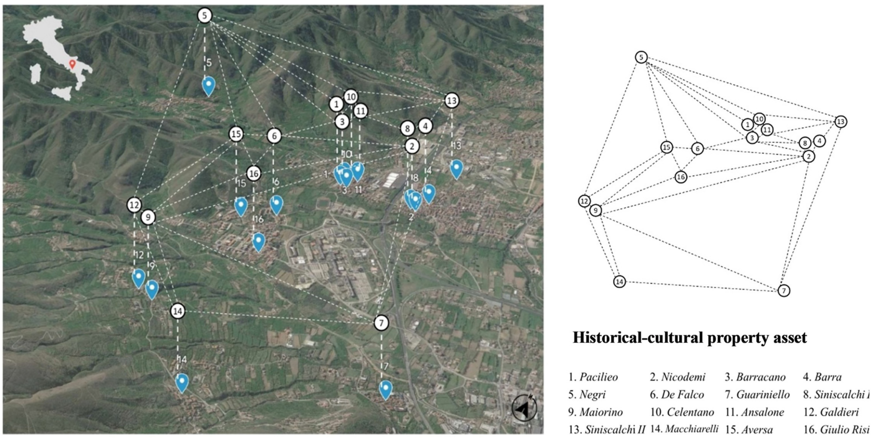

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Figure 4. The graph behind the decision-making system of study

The related performance indicators from the literature review activity are listed below for each category:

(1) The total Number of STAkeholders (N.STA.) involved across the design-process of the renewal action

(2) The Internal Rate of Return (IRR) per effect of the investment project

(3) The creation of GREEN spaces (GREEN) for building users through the project is measured in terms of how much surface area is allocated to remaining permeable and covered by natural elements (trees, shrubs, water body, etc.). The success of the project increases with the amount of green space available for the community to utilize the benefits and services provided by the ecosystem

(4) The geographical DISTANCE between each building in terms of the duration of arrival

(5) The number of People EMPLOyed (P.EMPLO.) as a result of the proposed initiative for each historical building by means of the economic services offered to the collectivity

Table 4 displays the matrix A with the indicators values (1), (2), (3) and (5), and the investment costs for the 16 projects located on the *Fisciano* territory. Investigating the documents made accessible by the *Fisciano* Municipality, which concern each renewal action under consideration, allowed for the measurement of all indicators.

Concerning (4), Table 5 provides matrix D where the measurements of the relative distances between the *i*-th node of the analysis network are specified. Using the ArchMap program, the distance between the *i*-th node is calculated as the amount of time (in seconds) required to travel between nodes x_{i-1} and x_{i+1} to reach node x_i.

The obtained values must be evaluated using a common assessment scale in order to be comparable among them. The normalization operation is carried out by reporting each attribute for its maximum value. The normalized matrix of Table 6.

The issue is addressed by treating the projects that need to be chosen as binary variables with values of 0 or 1, depending on whether the project in question is included (value = 1) or

ID node i-th	Historical-cultural property asset	COST [thousands of €]	N.STA. [n.]	IRR [%]	GREEN [sqm.]	P.EMPLO. [n.]
1	Pacileo	1,500	0	4.50	87.00	2
2	Nicodemi	1,755	3	5.30	55.00	6
3	Barracano	575	1	6.12	36.00	4
4	Barra	2,200	2	9.20	70.00	8
5	Negri	1,135	0	7.10	120.00	6
6	De Falco	3,600	0	6.02	250.00	1
7	Guariniello	2,555	0	4.05	312.00	3
8	Siniscalchi I	1,320	1	5.12	520.00	4
9	Maiorino	2,900	0	8.66	80.00	2
10	Celentano	1,600	0	7.54	480.00	2
11	Ansalone	360	2	9.55	654.00	6
12	Galdieri	750	2	10.02	712.00	0
13	Siniscalchi II	4,200	0	11.10	63.00	7
14	Macchiarelli	3,750	1	5.37	470.00	5
15	Aversa	2,360	2	6.25	650.00	5
16	Giulio Risi	1,700	0	8.54	95.00	2

Source(s): Created by authors

Table 4.
Matrix A of the case-study

Table 5.
Matrix D of the case-study

ID node i-th/Distance k-th	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	0	60	0	2,580	0	0	0	0	120	0	0	0	0	0	0
2	0	0	600	180	0	1,500	2,280	0	3,000	0	0	0	0	0	0	1,740
3	60	600	0	0	2,520	1,020	0	480	0	120	120	0	0	0	0	0
4	0	180	0	0	0	0	0	180	0	0	0	0	360	0	0	0
5	2,580	0	2,520	0	0	2,580	0	0	0	2,040	0	3,840	0	0	2,280	0
6	0	1,500	1,020	0	2,580	0	0	0	0	0	0	0	0	0	360	240
7	0	2,280	0	0	0	0	0	0	2,040	0	0	0	2,700	1,440	0	0
8	0	0	480	180	0	0	0	0	0	0	660	0	0	0	0	0
9	0	3,000	0	0	0	0	2,040	0	0	0	0	120	0	720	1,620	1,080
10	120	0	120	0	2,040	0	0	0	0	0	120	0	1,020	0	0	0
11	0	0	120	0	0	0	0	660	0	120	0	0	1,020	0	0	0
12	0	0	0	0	3,840	0	0	0	120	0	0	0	0	900	1,500	0
13	0	0	0	360	0	0	2,700	0	0	1,020	1,020	0	0	0	0	0
14	0	0	0	0	0	0	1,440	0	720	0	0	900	0	0	0	0
15	0	0	0	0	2,280	360	0	0	1,620	0	0	1,500	0	0	0	420
16	0	1,740	0	0	0	240	0	0	1,080	0	0	0	0	0	420	0

Source(s): Created by authors

Table 6. Normalized matrix A unless the cost of i-th project

ID node i-th	Historical-cultural property asset	N.STA.	IRR	GREEN	P.EMPLO.
1	Pacileo	0.00	0.41	0.12	0.25
2	Nicodemi	1.00	0.48	0.08	0.75
3	Barracano	0.33	0.55	0.05	0.50
4	Barra	0.67	0.83	0.10	1.00
5	Negri	0.00	0.64	0.17	0.75
6	De Falco	0.00	0.54	0.35	0.13
7	Guariniello	0.00	0.36	0.44	0.38
8	Siniscalchi I	0.33	0.46	0.73	0.50
9	Maiorino	0.00	0.78	0.11	0.25
10	Celentano	0.00	0.68	0.67	0.25
11	Ansalone	0.67	0.86	0.92	0.75
12	Galdieri	0.67	0.90	1.00	0.00
13	Siniscalchi II	0.00	1.00	0.09	0.88
14	Macchiarelli	0.33	0.48	0.66	0.63
15	Aversa	0.67	0.56	0.91	0.63
16	Giulio Risi	0.00	0.77	0.13	0.25

Source(s): Created by authors

not (value = 0) in the investment plan. The following algebraic notation most likely corresponds to system 1 structure in Section 3 and is the mathematical formulation of the evaluation problem:

$$
\begin{cases}
maximize \sum_{i=1}^{n} \sum_{j=1}^{m} (N.STA + IRR + GREEN + P.EMPLO.) * x_i \\
\sum_{i=1}^{n} C_i * x_i \leq 15{,}000 \\
\sum_{i=1}^{n} \sum_{k=1}^{t} DISTANCE_{i,t} * x_i \leq 10{,}800 \\
x_i \in \{0{,}1\}
\end{cases}
$$

4.1 Results

In the AMPL programming environment, the file.dat is linked to the file.mod (see Table 3), and it contains the results of the multi-criteria analysis conducted for each individual recovery project in the *i*-th node. By the Cplex solver that implements the Branch & Bound algorithm behind the DLP problem, like that of the case study, the best combination that may be obtained is made up of the following interventions:

$$2 - 3 - 5 - 6 - 9 - 12 - 15 - 16$$

With a total investment cost of 14,775 million of Euros, the available budget of 15,000 million Euros is nearly entirely expended. Taking into consideration the other elements (N.STA, IRR, GREEN and P.EMPLO) connected to the set of nodes recovered by the model implementation, the average values of N.STA, IRR, GREEN and P.EMPLO are, respectively, equal to 1, 16.54%, 250 sqm and 4. The model yielded a sub-set of interventions whose average values, as shown by the following indicators, are greater than those of the original set of projects: +18.78% (N.STA), +33.16% (IRR), +14.60% (GREEN) and +16.06% (P.EMPLO). The individualization of projects with a large IRR value (9.*Maiorino*; 12.*Galdieri*; 16.*Giulio Risi*) and a pertinent P.EMPLO value (2.*Nicodemi*; 3.*Barracano*; 15.*Aversa*) constitutes the model's primary output. The GREEN and N.STAT variables exhibit consistent values in the situations of *Galdieri* and *Nicodemi*. The standardized values of the variables corresponding to each intervention that were obtained following the model's deployment are shown in Figure 5. Each variable's trend function is also displayed.

From a macroeconomic-sustainable perspective, these data points show how much the environmental, social and economic systems of the *Fisciano* municipality may be improved in absolute terms as a result of individual enhancement initiatives. A modality to assess the sustainability of the initiative's program obtained through the application of the model is to analyze the value of the objective function, which comes out to be 13.95. The variables that represent the sustainability domain for the case study under examination have an impact in the following order during objective function computation: 19.14% (N.STA), 37.32% (IRR), 20.07% (GREEN) and 23.37% (P.EMPLO). Despite the equal weighting of the analytical aspects, the economic component weights more consistently to respect the other sustainability features of the case study: community well-being, nature and biodiversity, and governmental system.

The spatial connection among the identified nodes and the funded interventions describe a range of scales, from the most external, which connects nodes 2, 3, 5, 12 and 9, to more in-depth territorial subdivisions and surface areas that subdivide the most external area of the map into closely spaced-out community contests. In the present example, eight culturally significant sub-basins are formed that should be taken into consideration in the programming of cultural actions from a networking point of view. This supports the small town's integrated sustainable growth through a localized and co-processed action of cultural-historical revitalization. Figure 6 depicts the resulting graph from the selection of interventions.

5. Discussions and conclusions

It is important to think of cultural heritage preservation not only as a way to maintain the built environment and cultural values but also to promote cultural variety, a feeling of place and sustainable economic growth, especially when dealing with territorially circumstanced realities like the small towns. In this case, particularly, cultural heritage and its preservation can have a variety of positive economic effects. Historic structures and landmarks contribute to the product distinctiveness of communities by creating income, employment and training possibilities. The enhancement of cultural heritage preservation can generate an increase in property prices and promotes heritage tourism, city center revitalization, import substitution

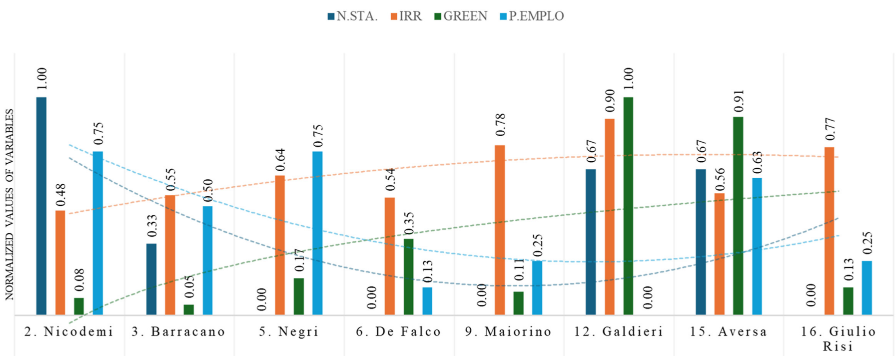

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Figure 5.
Distribution diagram displaying the normalised values of the variables for every intervention instance detected through model's application

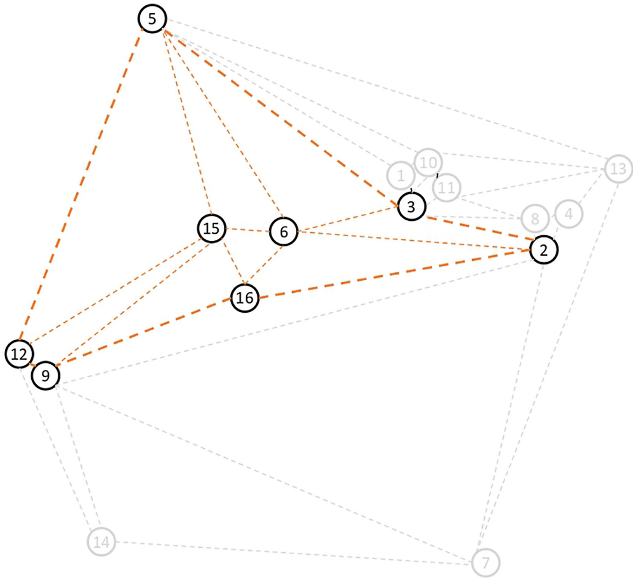

Figure 6.
Model's selected interventions network

Source(s): Created by authors

and city center renewal. Historic sites encourage the emergence of small businesses and are conducive to modernization and the changing demands of contemporary society.

The worth of historic buildings must be acknowledged in order to encourage their restoration and regeneration rather than their replacement or construction on unoccupied land. This is necessary in order to implement sustainable development policies, through the recognition of historical environments and cultural heritage as vital resources and growth catalysts of the small town.

With the assistance of the proposed economic model, it is possible to determine which projects would be most effective when combined in restoring important historical and cultural assets, as well as the best course of action to connect them through the use of a between-within logic to act. The proposed networking-economic model pursues different and conflictual goals that support the protection and valorization of cultural assets, focusing on the primary components that contribute to the small town's cultural value. As a result, the model can address a variety of decision-making issues, such as the best allocation of resources among numerous choices to be analyzed and selected in response to programmatic and strategic development aspirations.

Behind the sense outlined before, the using of the DLP, which is based on fundamentals of the graph theory, allows for the clear and understandable writing of the valuation model that reflects the meaning of seeing the small town under the view of the cultural value in between-within perspective. Polynomial algebraic expressions are used to describe the objective function and valuation requirements of the proposed model. By then, the economic network theory aids in understanding those economic phenomena where it is crucial to consider how territorially anchored components, including historical and cultural assets of the small town, are in their relationships, both geographically and not.

The case study, which concerns the selection of investment projects for the restoration of historic properties in the *Fisciano* Municipality (Southern Italy), attests to the simplicity of the implementation of the analysis scheme. It is useful for determining the best combination of initiatives to choose from in relation to the available budget, as well as for demonstrating the most advantageous course of action that relates to the identified assets based on a timeframe for completion.

All projects submitted for funding are evaluated using both multi-criteria by means the indicator systems and single-parametric criteria (territorial complementarity distance) that allow for compromise among several goals of sustainable and suitable growth of the territory in analysis. Single-parametric criteria are concerned with the location of the specific asset, in relation to the referenced context. In order to determine the best course of action, consideration is given to the time it takes for each of the interventions to move through it, allowing for the identification of the path to take in relation to a fixed time limit.

The proposed analysis model is a first attempt to systematize a decision-making apparatus based on the historical-cultural enhancement of small towns, which deeply characterizes this type of reality. The arbitrariness of indicator selection in the analysis model, the equivalence of weighting among the indicators used and the evaluation of distance in terms of time of arrival identify limits to the proposed operational approach. Taking these limitations into account, further insights of the research will focus on the application of the model to various scales of analysis, by examining the town's utility from a sub-urban scale to a large area of analysis, as well as keeping the problem of interest in mind while assessing alternative indicators and additional expressions of specific constraints. In concrete terms, in order to implement and validate the model on investments that allow to demonstrate innovation and real-world usefulness, the proposed mathematical procedure will be integrated with a variety of operative-analysis tools, GIS and/or BIM, to allow for more efficient data tracking for indicators-accounting. In order to automate the data collection regarding the geolocation and the information at the building size inside a special decision-making system, GIS and/or BIM may be employed. In fact, hyperlinks to data gathering and processing with optimization algorithms for solving particular evaluation cases can be established between the operational interface of operational search optimization models, like the one proposed, and GIS and/or BIM information environments. The use of information systems at the building and landscape scale strengthens the mathematical apparatus's resilience and directs technicians and other types of operators to carry out more effective impact ratings, reintroducing programmatically and strategically relevant information data about the territorial context as a result.

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Corresponding author
Francesco Sica can be contacted at: francesco.sica@uniroma1.it