

Circular Enhancement of the Cultural Heritage: An Adaptive Reuse Strategy for Ercolano Heritagescape

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Abstract. The circular economy paradigm identifies the need for rational use and adequate reuse of all resources, including cultural heritage. This study explores the opportunity to apply a circular economy model to culture-led regeneration processes oriented to cultural heritage valorisation. The methodological process identified tries to structure an integrated approach, able to combine the tools of building renovation and that of multidimensional evaluation to define a circular enhancement strategy for cultural heritage. Starting from the local cultural values and the changing uses of urban spaces related to the case study of the municipality of Ercolano (Italy), the structured decision-making process analyse how to optimise tangible/intangible cultural resources for local and sustainable development; to generate values and activate the engagement of communities through new sustainable uses; to build widespread and capillary complex networks among people, values, and spaces. In this interdisciplinary approach, the role of cultural and creative industries (CCI) is ever more significant, with the ability to create communication between management models, sustainability assessments, deliberative approaches and conservation strategies, regeneration and enhancement of cultural heritage.

Keywords: Circular economy · Culture-led regeneration · Multi-criteria analysis · PROMETHEE-Gaia method

1 Introduction

With the rapid growth of the developing world, the demand for natural resources continues to develop exponentially in the coming decades. As a result, there is an increase in environmental and climate impacts. In this context, the diffusion of a new circular model of production and consumption constitutes an element of strategic importance for achieving the Sustainable Development Goals (SDGs) purposes [1]. It represents, at the same time, a factor in relaunching the country competitiveness. The meaning of "waste" is no longer the traditional one to which we are used concerning production processes, but *waste* can arise from the human transformations implemented in some areas. At the same time, the cultural abandoned heritage can be conceived like a *waste* and can be triggered in a different reconversion process according to a particular value chain [2, 3]. Cultural heritage is, in its different expressions, an integral

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part of the cultural landscape, increasingly expressed through the identification of new values, not only linked to the aesthetic-naturalistic aspect, but also to the conception of the landscape itself as a cultural and historical symbol [4]. In the scientific literature, Mary-Catherine Garden had employed the term "heritagescape" to reference "landscapes of heritage" [5], heritage sites that are understood to exist within wider physical and social expanses. This neologism thus is both a descriptor and a methodology for parsing the living processes that circulate at these historic places: «In thinking of heritage sites as heritagescapes - i.e. as landscapes - it draws attention to their qualities as dynamic, changing spaces. It also offers the opportunity to locate sites in the context of their larger environment and draws attention to the importance of the setting. Accepting the heritage site as a landscape locates these places in their rightful place as a fluid, changing space with which people regularly interact» [5]. Heritagescapes are about the visible, physical place and also about the experiences that people have with that place [6].

Cultural heritage can be seen as a driver for vital and active transformations, stimulating new perspectives for the local community development, using the resources of the environment and nature, regulating human and social relationships [7, 8]. Culture and creativity are essential to promote the innovation capacity of local stakeholders (citizens and public employees, public and private actors, profit and nonprofit organisations, etc.) [9]. They are strictly connected to the concept of resilience [10], because the innovative potential is re-defined as "recovery capacity", and considered as the ability to absorb, adapt, transform and prepare for past and future shocks and stresses to ensure sustainable development, well-being and inclusive growth [11]. This interpretation of the resilience concept is related to a selection of criteria provided by the OECD. The choice could be applied to perceive the potential for innovation within cities: robustness, redundancy, reflexivity, flexibility, resourcefulness, inclusiveness, integration [12]. The relationship between resilience and circularity has been highlighted by numerous authors [13], that identified circularity as an archetype of sustainable business models [14]. Indeed, circularity can be identified as one of several options for promoting the sustainability of a system. These options are seen as beneficial in principle and can also be combined to add earnings or achieve synergies [15], describe circular strategies as an option to increase efficiency or dematerialisation [16], and to generate new values. Value-focused thinking, according to Keeney's theories [17], helps to distinguish between alternatives and values, stating that alternatives are the means to achieve the most fundamental values, while values are the principles used for evaluation. Thinking about values allows for discovering hidden goals [18]. In the framework proposed by Keeney, the strategic objectives, the fundamental objectives and the decision-making context are defined. According to this suggestion, a hierarchy of primary objectives for the circular economy model can be developed by "expanding" the purposes to the three dimensions of sustainability, social, economic and environmental. The integration of the approaches, circularity and sustainability, can be useful in defining a cognitive framework for determining a strategy of urban regeneration of cultural heritage (material and immaterial), able to ensure an integrated decision-making process (Fig. 1). The first level is *Increase the sustainable creation of value*, consisting of the triple-bottom-line subdivision on the second hierarchy level and afterwards unfolding down to level 5. The sorting in this hierarchy is unambiguous,

meaning that each objective has only one relation going out to the next hierarchy level, and there are no relations within a hierarchy level. The increase of the economic performance of the system means to *Increase the decoupling of economic growth and the use of scarce resources as third-level objectives*. The second-level goal to *Increase the ecologic performance of the system* means to *Increase regeneration/valorisation of products, parts and material*. The second-level objective to *Increase human welfare* consists of *an increase in the number of jobs* and the *increase* of *the social standard*. In this perspective, the circular economy [19] can represent a tool for achieving and implementing sustainable development, minimising negative impacts, and producing benefits, related to environmental, economic, and socio-cultural systems [20].

The overall outcome of the paper highlighted that through procedural rationality and control systems based on the multi-level strategies could be tested and calibrated in terms of long-term sustainability and resilience.

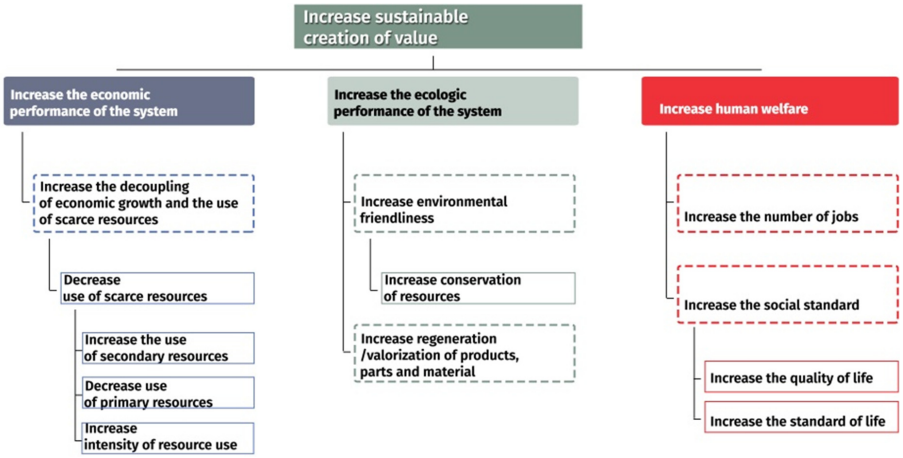


Fig. 1. Fundamental objectives for the circular economy aimed at cultural heritage

To analyse the interaction between cultural heritage enhancement and circular economy, the first part of the paper (Sect. 2) shows the purpose of research and the methodological approach; the second one (Sect. 3) describes the case study for which the methodology has been elaborated; the third one (Sect. 4) analyses the results, and the last part (Sect. 5) concerns with discussion and conclusions about the issues afforded.

2 Culture, Economies, and Creative Processes for Urban Regeneration

Cultural and creative industries [21, 22], with their multidisciplinary nature, can be seen as enabling contexts for the enhancement of cultural heritage. The Creation of Shared Value (CVC) is directly functional to the competitive position and ability to obtain company profits. Optimising and using specific resources and skills, the CVC builds economic value through the creation of social value [23], generates employment opportunities as well as continuous innovation and considers an advanced form of shared responsibility. The latest, from Corporate Social Responsibility (CSR) and Community Social Responsibility (RSC), is configured as Social Responsibility of the Territory (RTD) [24], capable of generating complex social value [7]. Although the role of cultural heritage in sustainable development has been recognised in the international debate (SDGs), it is explicitly mentioned only once in the Goal 11 (Target 11.4) *Strengthen efforts to protect and safeguard the world's cultural and natural heritage* and, to date, only one indicator has been identified about it, as the result of a series of public consultations with agencies and organisations. The selected indicator of Target 11.4.1 aiming at illustrating how financial efforts/actions made by public authorities, at different levels (local, national, and international levels), alone or in partnership (for example, with civil society organisations and private sector), to protect and safeguard cultural heritage, have a direct impact in making cities and human settlements more sustainable. The circular economy approach becomes relevant for cultural heritage as a driver for urban regeneration, increasing the heritage life cycle, creating new value and promoting local development. The Italian Atlas of Circular Economy indicates dimensions, criteria and indicators deemed to be fundamental in the evaluation of the production processes analysed and in which the practices of valorisation of the abandoned or "discarded" cultural heritage play a significant role, implementing the enabling factors recognised by the European Environmental Agency [25]: eco-design, recovery, renewal and regeneration; recycle; economic incentives and financing, business models, eco-innovation, governance, skills and knowledge. Cultural capital is the driver of a regeneration process where the transversal interconnections between the production cycles of the regeneration are related to the management phase and configure a circular process of multidimensional production of value. Indeed, the circular economy model is based on the processes of reuse, recycling, restoration, regeneration of resources, to avoid any form of waste and underutilisation [26]. This is the general perspective in which to place the proposal for reuse and restoration, generating new use and not use values [27]. Reuse is defined as the set of construction and/or reuse interventions of a building and a building system designed to meet new conditions and new requirements [28]. Over time, it has gradually been enriched with arguments relating to cultural, socio-economic and ecological objectives which underline its potential as a driver of more comprehensive strategies for regenerating the context, reducing land consumption and contrasting urban expansion processes. The decision-making process plays a key role and characterises the reuse initiatives [29], also, in the light of an arena that is enriched with new actors and new systems of relationships, new reflections urging on the need for multi-level governance, capable of

supporting these initiatives with a view to territorial regeneration and cultural and social innovation. For the success of the culture-led processes [30], the integration of top-down and bottom-up approaches is necessary, which makes dialogue, mutual exchange and cooperation possible. Thus, a "hybrid" approach emerges [29], which seeks to consider the complexity of a culture-led development process by facing it and managing it through interdisciplinary tools.

3 The Methodological Approach

The methodological process is outlined within a place-based approach [31, 32], to include a plurality of local actors in the decision-making process and building a sustainable and circular development strategy, that recognises the central role of social capital and tangible and intangible cultural capital of the territory. This approach underlies a systemic interpretation of the territory, aimed at a non-punctual but widespread enhancement, which identifies as an essential prerequisite the strengthening of the relationships between the physical components and the cultural, social and economic components to trigger new development trajectories. The first part, therefore, proposes a data collection approach (Fig. 2), which connects culture, economies and reactive processes for urban regeneration. The second part explains an ex-post evaluation of some creative experiences, applying the multi-criteria method PROMETHEE-GAIA to analyse the results from different perspectives and find a balanced decision system that considers the role of each criterion. The third section concerns the elaboration of a meta-strategy through the re-elaboration of potentials and critical aspects of the different strategies. The meta-strategy has been elaborated for the Ercolano case study. Subsequently, through the ex-ante evaluation, it has been possible to move from the methodology identification to its application to the case study.

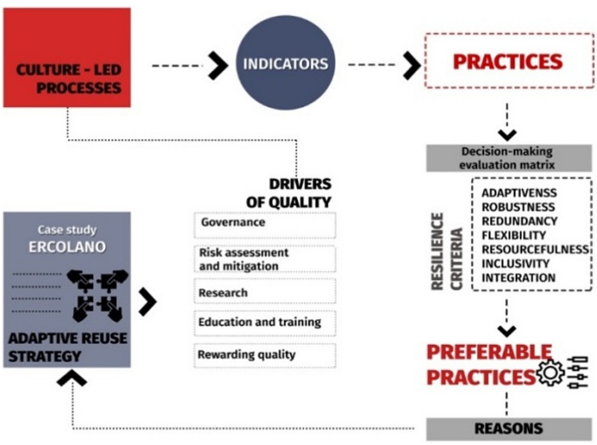


Fig. 2. The methodological workflow

The ex-post evaluation is interpreted as an objective and systematic assessment of an ongoing or completed project, practice, programme or policy, its design, implementation, and results [33]. This approach is comprehensive, and it relates to many types of assessment, from socio-economic evaluations to business-value evaluations, and from holistic approaches to performance measurement evaluations [34]; some examples include: ex-post recalculations of ex-ante cost-benefit analyses; assessments based on the principles of corporate finance; multi-criteria evaluations as a combination of quantitative/qualitative approaches. On the other hand, usually, the ex-ante evaluation is applied before the ex-post one, as the ex-ante evaluation is a broad initial assessment aimed at identifying which alternative will yield the most significant benefit from an intended investment. Indeed, in an ex-ante evaluation, much must be based on assumptions because fewer facts are available [35]. For this reason, concerning the Ercolano case study, the ex-post evaluation has been used before, as its goal is first and most importantly, to assess the lessons learned in an undertaking. The motivation for using ex-post assessment is principal that it contributes to double-loop learning. Finally, in this case, to strengthen the methodological process, the two approaches have been merged, as the information deriving from the ex-post evaluation reinforces the structure of the ex-ante evaluation defined for Ercolano.

4 From an Ex-Post Evaluation to an Ex-Ante Evaluation for the Heritagescape of Ercolano

4.1 Learning from the Best Practices

Taking into account the considerations made so far, an ex-post evaluation of five creative practices of regeneration and adaptive reuse process throughout Italy has been implemented in order to identify some relevant criteria, able to put some theoretical concepts into practice and making them explicit. An inventory of the different types of approaches that could be used in similar contexts concerning all the issues addressed was structured, analysing the critical aspects and the potentials related to the decision-making process, actors involved, economic and human resources and results. The five practices were chosen considering three examples from Southern Italy (two in Naples and one in Puglia), an example from Central Italy, and an example from Northern Italy: the FOQUS “Spanish Quarters Foundation” in Naples; the Catacombs of San Gennaro in Naples; the Ex Fadda, Urban Laboratory in San Vito dei Normanni (Br); the Oz “Officine ZERO” in Rome; the Basic Project - Ex Ansaldo in Milan.

The selection of the above practices was based on the following criteria deemed significant:

- *Characteristics of the context*: the initiatives took place in degraded contexts, with great potential linked to cultural heritage and relations between the inhabitants, thanks to the presence of associations, widespread talents and deep-rooted traditions.
- *Component of social and cultural innovation:* in the context of the selected initiatives, essential elements of cultural innovation must be considered: artistic

sensitivity, managerial know-how, social responsibility, while for social innovation: promotion of actions based on principles of cooperation, practical sustainability, civic entrepreneurship, assumption of responsibility, knowledge and training.
– *Circularity and sustainability component:* practices are focused on the reuse and use of all "waste resources" in the area, resulting in a "drag and drop" effect that favours the evolution and development of the social and cultural capital of the community.

From the analysis and evaluation of good practices and by using criteria and indicators selected from the scientific literature, an evaluation matrix has been elaborated (Table 1). It considers the seven resilience criteria reported by the OECD [10] as criteria to assess the sustainability of the processes (applying the previous considerations on the circular economy and sustainable development). Based on their definitions, the indicators, divided by typologies, have been inserted for each criterion, considering the cultural dimension of sustainable development, also taking into account the circularity objectives (Fig. 1) [18], linking cultural activities with social, economic and cultural impacts. These indicators concern cultural inclusion, resources, skills and cultural policies.

Table 1. Evaluation matrix

Criteria	Characteristics	Categories of indicators	Indicator	UM
Robustness	Robustness depends on a system which is well-designed, built and managed to absorb the impact of a shock and continue to operate	Type of partnership	Private	Yes/No
			Social	Yes/No
			Public	Yes/No
			Public-social	Yes/No
			Private-social	Yes/No
			Public-private	Yes/No
		Type of management industry	Social industry	Yes/No
			Cultural and creative industry	Yes/No
			Hybrid industry	Yes/No
Redundancy	An urban system able to meet the need for spare capacity when faced with unexpected demand, a disruptive event or extreme pressure	Finance research methods	Private financing	Yes/No
			Public financing	Yes/No
			Self-financing	Yes/No
		Cost of the investment	Construction costs	Euro
		Financial intermediaries	Agreements made with attentive parties	Number

(*continued*)

Table 1. (*continued*)

Criteria	Characteristics	Categories of indicators	Indicator	UM
Adaptiveness	An adaptive urban system manages uncertainty by evolving, modifying standards, norms or past behaviour, using evidence to identify solutions and applying the knowledge gained from experience when making decisions about the future	Tables for monitoring changes	Tables for monitoring changes	Number
		Development oriented policies	New enterprises	Number
			Private enterprises involved	Number
			Public enterprises involved	Number
			Social enterprises involved	Number
			New jobs	Number
		Capacity building	Training courses for economic and social development	Number/Year
			Participants in training courses	Number/Year
			New highly specialised jobs	Number
Flexibility	A flexible urban system allows individuals, households, businesses, communities and government to adjust behavior or actions in order to rapidly respond to change	Recovery of abandoned building heritage	Building units recovered	Number
			Percentage of spaces used	%
			Surface of buildings recovered	Square meters
		Recovery of the environment	Green surface recovered	Square meters
			Meeting places integrated into the green system	Number
		Tourist offer	Receptive exercises	Number

(*continued*)

Table 1. (*continued*)

Criteria	Characteristics	Categories of indicators	Indicator	UM
Resourcefulness	A resourceful urban system can effectively and quickly restore the functionality of essential services and systems in a crisis or under highly constrained conditions	Initiatives enhancing the cultural heritage	Occasional events	Number/Year
			Training courses	Number/Year
			People involved	Number/Day
		Communication strategies	Social media management	Number
			Social accounts	Number
Inclusivity	An inclusive urban system ensures that diverse actors and communities are fully consulted, engaged and empowered in the policy process	Type of decision-making process	Top-down	Yes/No
			Bottom-up	Yes/No
			Hybrid process	Yes/No
		Local wealth through social inclusion	Volunteers involved	Number/Year
			Disadvantaged people involved	Number/Year
Integration	An integrated urban system promotes a co-operative and a collaborative approach to policymaking and programming that transcends sectoral and administrative boundaries	Differentiation of the actors	Private actors	Number
			Social actor	Number
			Public actor	Number

Data collection was obtained through the interview of referents of each practice and from the sources of the web (websites, newspaper articles, etc.). Once the matrix has been completed for each practice, the evaluation has been carried out through a multi-criteria analysis [36], implementing the Preference Ranking Organisation METHOD

for Enriched Evaluation (PROMETHEE-Gaia) method [37]. The PROMETHEE-GAIA method is based on the computation of pair-wise preference degrees (scored between 0 and 1), which rank all the alternatives from best to worst for the decision-maker. The pair-wise comparisons of the alternatives are based on three preference flows for consolidating the results: Phi+ (f+): the positive flow; Phi− (f−): the negative flow; Phi (f): the net flow. The PROMETHEE-GAIA points out how the decision-maker perceives the difference between the objective evaluations (often measured) on every criterion. The preference degree is computed for each criterion, rescaling or enriching the assessment of the actions through preference information.

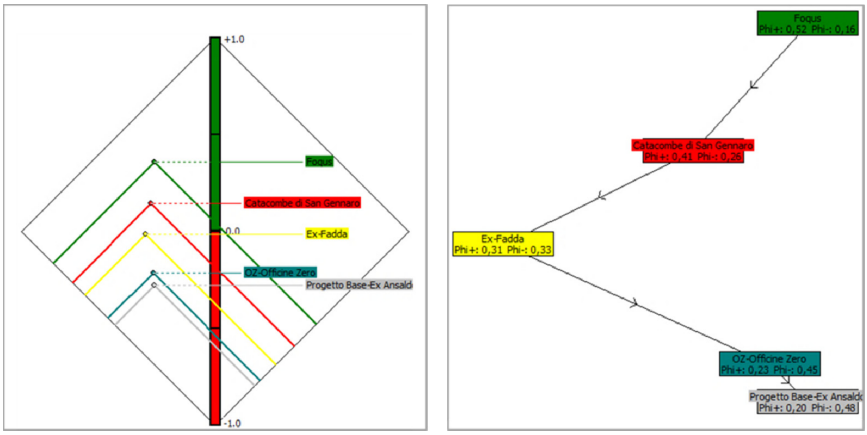


Fig. 3. Evaluation of alternatives (a) PROMETHEE Diamond (b) PROMETHEE Network (source: authors' elaboration of PROMETHEE results)

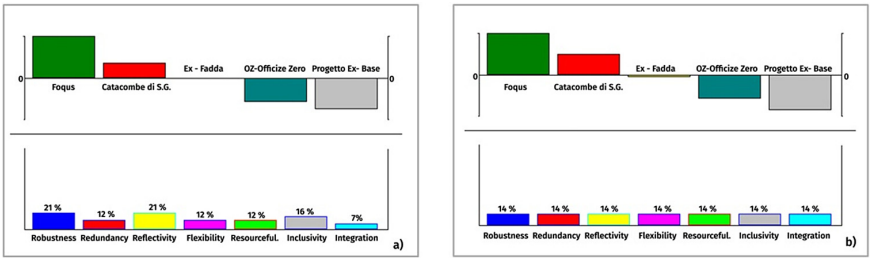


Fig. 4. Sensitivity analysis – Walking weights for: (a) Practices' criteria weights

By the implementation of the PROMETHEE-GAIA, the selected practices were first analysed overall to have a general ranking and, then, the individual profile of each practice. The PROMETHEE Diamond (Fig. 3), a two-dimensional representation of two classifications (partial and complete), where every alternative is represented as a point in the plane (Phi+, Phi−) angled at 45°. In the PROMETHEE Network, actions are instead symbolised by nodes and arrows drawn from emerging preferences.

The results of the two analysis show that FOQUS and Catacombs of San Gennaro are preferable, while Ex-Fadda occupies a position in the middle of the ranking. The final ranking was verified through the sensitivity analysis too, by Walking weights tool (Fig. 4), and underlines that FOQUS is characterised by a preferable strategy for a culture-led regeneration process. The study of the general classification data suggests that FOQUS has a preferred strategy for a culture-led regeneration, in particular from *reflexivity*, *inclusivity* and *integration*. The example of the Catacombs of San Gennaro is better for *flexibility*, *inclusivity* and *integration*. The preferable characteristics of Ex Fadda are *resourcefulness*, *redundancy* and *inclusivity*. Officine Zero compared to other practices, have not found good results; their strategy has focused on enhancing *flexibility* more. The preferable characteristics of the profile of the Ex-Ansaldo BASE Project are *resourcefulness* and *robustness*. In light of the results obtained, we can determine the meta-strategy.

4.2 A Culture-Led Regeneration Process for Ercolano

The area of interest, Ercolano, lies at the western foot of Mount Vesuvius, on the Bay of Naples, just southeast of the city of Naples. Figure 5 frames the focus area, which extends over the coast of the Tyrrhenian Sea.

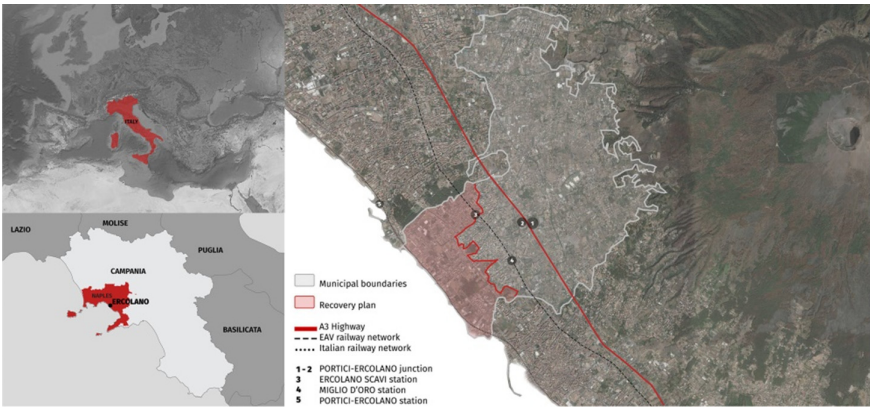


Fig. 5. The area of Ercolano

Ercolano is well known for one of the most important archaeological sites in Italy (Archeological Site of Herculaneum), for the National Park of Mt. Vesuvius created in 1995, for the Miglio d'Oro, the Corso Resina (the old Strada Regia per le Calabrie) and the peculiar street market of Pugliano. However, most resources are not fully enhanced, and others are abandoned. The inhabitants are 53,843, and population density is approximately 2,700/kmqs. The unemployment rate is 27.3%, while the young

unemployment rate is 60.6%. During this phase, the methodological process consists of soft and hard data collection to know the settlement system. The *meta-strategy* scheme (Fig. 6) is divided into strategic actions, and punctual actions declined in *who*, *how*, *and what* and *duration* of the action. This scheme applied to the case study has resulted in an adaptive reuse strategy for Ercolano, taking into account what emerged from the knowledge of the settlement system. In analysing the settlement system, we classified cultural heritage based on its potential for reuse. There is a type of *heritage* [9, 10] that is enhanced, and this category includes the Archaeological Park with the Excavations; however, underutilised compared to their potential, and other particularly significant resources used on rare occasions such as the Villas of Miglio d'Oro, mostly on events such as festivals. However, they are resources that, although not or inadequately valued, have their own precise identity, due to their cultural and symbolic value. Then a large number of historic buildings, public places, green areas are concretely abandoned, without intended use. The territory affected by our analysis is made up of many *waste-assets*, of a *heritage*, which for the most part, is abandoned or not used to its full potential.

WHAT: STRATEGIC ACTIONS	HOW: TO REACH THE ACTION	TYPE OF ACTION	WHO: ACTORS	DURATION
RECOVERY AND REUSE OF BUILDINGS DISPOSED OF IN THE AREA AS CATALYSTS OF THE PROCESS	Establishment and placement of a management company / entity operating in the cultural and creative sector on the hybrid model	Process actions /Governance	ENTITIES AND ASSOCIATIONS THAT OPERATE IN THE AREA WITH THE INSTITUTIONS	Long term
	Public-private-social partnership between the actors operating in the area in dialogue with the institutions	Process actions/Governance		Long term
	Establishment of permanent tables for the evaluation and monitoring of changes	Process actions/Governance	INDUSTRY EXPERTS	Long term
	Establishment of financial agreements	Process actions /Governance	FINANCIAL BETWEEN PARTIES LOOK TO PROMOTE EMPLOYMENT IN AREAS OF DEVELOPMENT OF SUSTAINABILITY / SOCIAL RESPONSIBILITY	Long term
	Adjustment of the project site	Material actions	INDUSTRY EXPERTS	Middle term
	Location of training courses	Material actions	INSTITUTIONS AND ASSOCIATIONS OPERATING IN THE AREA UNDER THE CULTURAL AND CREATIVE	Middle term
PROMOTION OF CAPACITY BUILDING AND CREATION OF SPECIALIZATION OPPORTUNITIES	Organization of training workshops for the creation of opportunities for economic and social development	Intangible actions	ENTITIES AND ASSOCIATIONS THAT OPERATE IN THE TERRITORY IN THE FIELD OF TRAINING	Middle term
ENHANCEMENT OF THE COMMUNITY AND CULTURAL HERITAGE	Organization of cultural events and manifestations	Intangible actions	INSTITUTIONS AND ASSOCIATIONS OPERATING ON THE TERRITORY IN THE FIELD OF EDUCATION	Short term
	Activation and training courses (periodicals) for the promotion and enhancement of the community and cultural heritage	Intangible actions		Middle term
INCLUSION OF DISADVANTAGED PERSONS	Organization of activities carried out periodically for social inclusion	Intangible actions	INSTITUTIONS AND ASSOCIATIONS OPERATING IN THE AREA IN THE SOCIAL FIELD	Short term
	Use of the share capital of Ercolano in the new established activities (agricultural, productive-textile, tourist)	Intangible actions		Long term
OPTIMIZATION OF RESOURCES IN THE AREA	Courses in the field of tourism training	Intangible actions	ORGANIZATION MANAGEMENT FORMAT BY ASSOCIATIONS IN THE AREA	Middle term
	Activation of communication campaigns	Intangible actions		Short term
RECOVERY OF GREEN AREAS	Organization of activities and events related to the recovery of the environment	Intangible actions	INSTITUTIONS AND ASSOCIATIONS OPERATING IN THE FIELD OF SOCIAL AND CULTURAL	Short term
	Creation of meeting places	Material actions		Long term
	Recovery of urban greenery through planting	Material actions		Long term

Fig. 6. Meta-strategy scheme



Fig. 7. Map of the settlement system resources

These resources have great potential to activate regeneration processes which, by putting into play the components analysed so far, can generate economic and non-economic values, improve commitment and involve communities through new sustainable uses by building complex capillary networks between people, values and spaces. The culture-led regeneration and adaptive reuse are linked to the fact that there is a significant amount of *abandoned landscape*, which can become drivers of vital and attractive transformations. This is classified in the map (Fig. 7) that shows the state of affairs in categories, such as green areas, buildings and public spaces.

The following map (Fig. 8) shows the classification of the different resources according to their potential as use and non-use allow us to identify opportunities for an adaptive reuse strategy and therefore able to develop new uses.



Fig. 8. Map of the potential for adaptive reuse

After the phase of the settlement system knowledge, through the collection of data, the detection of preferences, a fairly clear picture of the state of affairs is obtained. The adaptive reuse proposal for Ercolano derive from the information relating to the settlement system and the results obtained through the evaluation of the good practices analysed previously.

An incremental strategy has been developed in order to create an interpersonal network spread over the territory, reinforcing the urban fabric.

The main functions of this strategy start from a cultural hub (Palazzo Tarascone), where a managing entity is located, continuing to incorporate other resources, promoting their circularity and sustainability. Palazzo Tarascone is the ideal starting point of a cultural hub because it is situated in a strategic position concerning some points of great interest such as the Archaeological Park, the MAV, the Vesuvian Villas, the Reggia di Portici, as well as the Pezze di Pugliano market and other waste resources with great potential for reactivation. The strategic actions previously identified have been applied to the entire settlement system (Fig. 9), creating a network of actors and functions (Fig. 10).

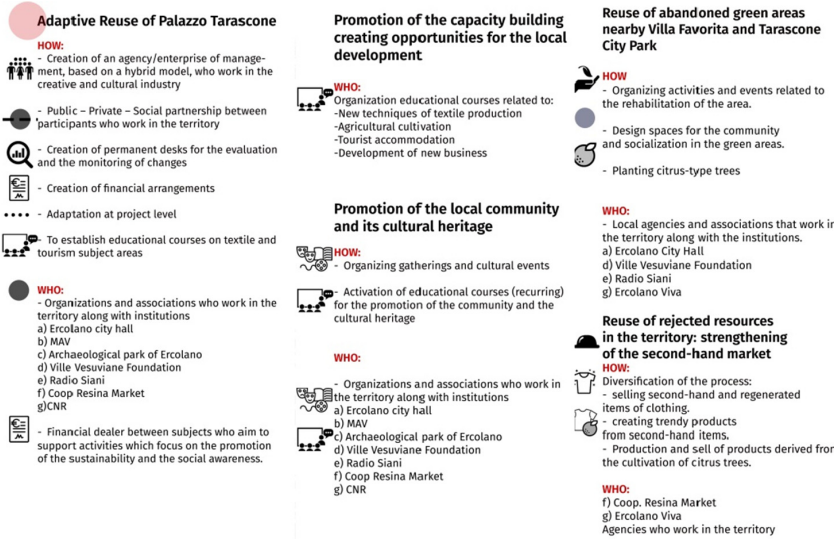


Fig. 9. Actions of the strategy: how and who

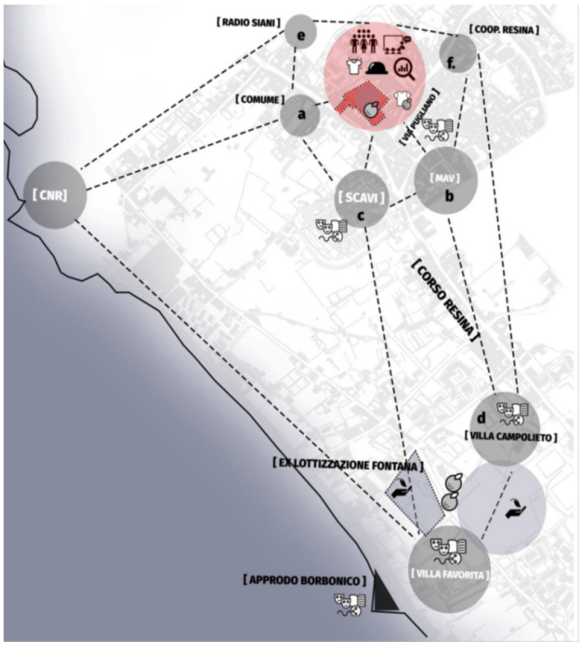


Fig. 10. The localisation of the strategy actions

5 Conclusions

The identification of a system of values, models and indicators has made it possible to select practices of culture-led urban regeneration where culture is conceived as a driver for circular and sustainable transformations. The elaboration of an adaptive reuse strategy for the city of Ercolano has been possible through the analysis and the ex post evaluation of selected practices. The knowledge of the settlement system and the detection of preferences have been proved to be essential elements to authentically describe the context and specifically decline the adaptive reuse strategy for Ercolano.

This methodological process enabled the use of an adaptive territorial strategy that connects the various resources and cultural heritage, developing in a comprehensive manner throughout the territory. A strategy that exploits the analysed components has been reconstructed backwards once the theoretical issues had been identified through the study of the literature and the analysis of the good practices of adaptive reuse. Through the practices, some typologies have been identified by making theoretical concepts explicit. Based on this, an inventory of the different types of approaches that could be used in similar contexts has been found. In fact, within this kind of "inventory", just the factors already tested have been kept to be eventually used in future strategies. This kind of adaptive reuse strategy keeps all the components analysed, and it is very useful for a process of regeneration of cultural heritage as sustainable as possible. So, it has been possible to apply this strategy to the case study Ercolano. In this kind of context, those *waste heritagescapes* have been identified to systematise all

the issues of the settlement system. Therefore, through this strategy, it would be possible to enhance not only a degraded context as Ercolano, but also other sites in similar conditions to promote the economic, social and cultural development to the benefit of the entire community. The promotion and strengthening of cultural and creative clusters, through the spatial concentration of cultural and creative industries (CCI), could constitute an effective approach in support of policies for urban regeneration and the attraction of talent and intellectual capital, as well as forms of capacity building in historic cities and metropolitan areas. At the same time, there is a need to activate creative governance processes, intended as a tool capable of supporting not only metropolitan cities but also small towns. The interaction between research, experimentation and learning in the different levels of governance, allows combining strategic, tactical and operational approaches through a systematic and integrated process in the fields of institutional innovation, social cohesion, promotion of new local economies, by supporting the ability to self-organise the community and reducing the distances between people and institutions.

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References

1. United Nations (UN): Transforming our World: The 2030 Agenda for Sustainable Development. United Nations, New York (2015)
2. Fusco Girard, L., Baycan, T., Nijkamp, P. (eds.): Sustainable City and Creativity: Promoting Creative Urban Initiatives. Routledge, London (2012)
3. Fusco Girard, L., Nijkamp, P.: Le valutazioni per lo sviluppo sostenibile della città e del territorio. Franco Angeli, Milano (2012)
4. ICOMOS: Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011). https://www.icomos.org/world_heritage/HIA_20110201.pdf. Accessed 03 Feb 2020
5. Garden, M.-C.: The heritagescape: looking at landscapes of the past. Int. J. Heritage Stud. **12** (5), 394–411 (2006)
6. Di Giovine, M.: The Heritage-Scape: UNESCO, World Heritage, and Tourism. Lexington Books, Lanham (2009)
7. Cerreta, M., Daldanise, G., Sposito, S.: Public spaces culture-led regeneration: monitoring complex values networks in action. Urbani izziv **29**, 9–28 (2018)
8. CHCfE: Cultural Heritage Counts for Europe (2015). http://blogs.encatc.org/culturalheritagecountsforeurope/outcomes/. Accessed 03 Feb 2020
9. KEA European Affairs: The economy of culture in Europe, European Commission Directorate-General for Education and Culture, Brussels (2016)
10. OECD: Guidelines for Resilience Systems Analysis. OECD Publishing, Paris (2014)
11. Sugahara, M., Bermont, L.: Energy and Resilient Cities, OECD Regional Development Working Papers, No. 2016/05, OECD Publishing, Paris (2016)

12. Concilio, G., Tosoni, I. (eds.): Innovation Capacity and the City. SAST. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-00123-0
13. Fabbricatti, K., Biancamano, P.: Circular economy and resilience thinking for historic urban landscape regeneration: the case of Torre Annunziata, Naples. Sustainability **11**(12), 3391 (2019). https://doi.org/10.3390/su11123391
14. Bocken, N.M.P., Short, S.W., Rana, P., Evans, S.: A literature and practice review to develop sustainable business model archetypes. J. Clean. Prod. **65**, 42–56 (2014)
15. Weissbrod, I., Bocken, N.M.P.: Developing sustainable business experimentation capability. A case study. J. Cleaner Prod. **142**, 2663–2676 (2017)
16. Geissdoerfer, M., Savaget, P., Evans, S.: The Cambridge business model innovation process. In: 14th Global Conference on Sustainable Manufacturing, GCSM, Stellenbosch, 3–5 October 2016 (2016)
17. Keeney, R.L.: Value-focused thinking: identifying decision opportunities and creating alternatives. Eur. J. Oper. Res. **92**(3), 537–549 (1996)
18. Velte, C.J., Scheller, K., Steinhilpera, R.: Circular economy through objectives – development of a proceeding to understand and shape a circular economy using value-focused thinking. In: 25th CIRP Life Cycle Engineering (LCE) Conference, Copenhagen, Denmark, 30 April–2 May 2018, Procedia CIRP, vol. 69, pp. 775–780 (2018)
19. Preston, F.: A Global Redesign? Shaping the Circular Economy; Chatham House Briefing Paper, EERG BP 2012/02. Chatham House, London (2012)
20. Cerreta, M., Panaro, S., Poli, G.: A knowledge-based approach for the implementation of a SDSS in the Partenio Regional Park (Italy). In: Gervasi, O., et al. (eds.) ICCSA 2016. LNCS, vol. 9789, pp. 111–124. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-42089-9_8
21. Micelli, E.: Modelli ibridi di partnership pubblico-privato nei progetti urbani. Scienze Regionali **8**(2), 97–112 (2009)
22. Solima, L.: L'impresa culturale: processi e strumenti di gestione. Carocci, Roma (2005)
23. Porter, M.E., Kramer, M.R.: Creare valore condiviso. Harvard Bus. Rev. Italia **1**(2), 68–84 (2011)
24. Del Baldo, M., Demartini, P.: Responsabilità sociale di territorio, network sinergici e governo locale. Piccola impresa/Small Bus. **3**, 1–28 (2016)
25. EEA – European Environment Agency: Circular Economy in Europe. Developing the knowledge base. EU Low and Publications (2016)
26. Boulding, K.E.: The economics of the Coming Speceship Earth. In: Henry, J. (ed.) Environmental Quality Issues in a Growing Economy, pp. 3–14. John Hopkins Press, Baltimore (1966)
27. Cerreta, M., Daldanise, G.: Community branding (Co-Bra): a collaborative decision making process for urban regeneration. In: Gervasi, O., et al. (eds.) ICCSA 2017. LNCS, vol. 10406, pp. 730–746. Springer, Cham (2017). https://doi.org/10.1007/978-3-319-62398-6_52
28. Hasnain, H., Mohseni, F.: Creative ideation and adaptive reuse: a solution to sustainable urban heritage conservation. IOP Conference Series Earth and Environmental Science, vol. 126, 012075, pp 1–8 (2018). https://doi.org/10.1088/1755-1315/126/1/012075
29. Misirlisoy, D., Günçe, K.: Assessment of the adaptive reuse of castles as museums: case of Cyprus. Int. J. Sustain. Dev. Plann. **11**(2), 147–159 (2016). https://doi.org/10.2495/SDP-V11-N2-147-159
30. Sacco, P.L., Pedrini, S.: Il distretto culturale: mito o opportunità. Il Risparmio **51**(3), 101–155 (2003)
31. Huggins, R., Clifton, N.: Competitiveness, creativity and place-based development. Environ. Plann. A **43**, 1341–1362 (2011)

32. Pugalis, L., Bentley, G.: (Re)appraising place-based economic development strategies. Local Econ. **29**, 273–282 (2014)
33. Samset, K.: Project Evaluation: Making Investments Succeed. Tapir Academic Press, Trondheim (2003)
34. Olsson, N.O.E., Krane, H.P., Rolstadås, A., Veiseth, M.: Influence of reference points in ex-post evaluations of rail infrastructure projects. Transp. Policy **17**(4), 251–258 (2010)
35. Samset, K., Christensen, T.: Ex ante project evaluation and the complexity of early decision-making. Public Organ. Rev. **17**(1), 1–17 (2015). https://doi.org/10.1007/s11115-015-0326-y
36. Torre, C.M., Attardi, R., Sannicandro, V.: Integrating financial analysis and decision theory for the evaluation of alternative reuse scenarios of historical buildings. In: Gervasi, O., et al. (eds.) ICCSA 2016. LNCS, vol. 9789, pp. 177–190. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-42089-9_13
37. Brans, J.P., Mareschal, B.: The PROMETHEE methods for MCDM. The PROMCALC, GAIA and BANKADVISER software. In: Bana e Costa, C.A. (ed.) Readings in Multiple Criteria Decision Aid, pp. 216–252. Springer, Heidelberg (1990). https://doi.org/10.1007/978-3-642-75935-2_10