

RESEARCH ARTICLE

An evaluation methodological approach to support the definition of effective urban projects: A case study in the city of Rome (Italy)

Francesco Tajani¹  | Pierluigi Morano²  | Felicia Di Liddo²  | Ivana La Spina¹

¹Department of Architecture and Design, Sapienza University of Rome, Rome, Italy

²Department of Civil, Environmental, Land, Building Engineering and Chemistry, Polytechnic University of Bari, Bari, Italy

Correspondence

Felicia Di Liddo, Department of Civil, Environmental, Land, Building Engineering and Chemistry, Polytechnic University of Bari, Bari, Italy.

Email: felicia.diliddo@poliba.it

Abstract

The urban policies for the sustainable development of the territories are focused on the definition of effective regeneration projects. Within the design and ideas competitions, the evaluation of the proposals constitutes a crucial step in the decision-making processes. During the last decades, the participatory approach has played a central role for the selection of initiatives in line with the changing framework of the communities' needs. The present research aims to propose and test an evaluation methodological approach to support choice processes for the identification of the "best" project solution among different hypotheses. The methodology is articulated in seven phases and integrates different tools (context analysis, econometric technique, strengths, weaknesses, opportunities, and threats analysis, A'WOT method). It addresses the various subjects involved in the mechanisms of identifying the initiatives to be implemented in the territory, that is, (i) the Public Administrations to guide the selection of the most suitable scenarios based on the reference context, (ii) the planners to provide guidelines for the formulation of intervention plans that are effective and appropriate for the reference context, and (iii) the private investors to carry out financially feasible initiatives. The implementation of the proposed evaluation approach to a case study regarding a district in Rome (Italy) allows to test its user-friendliness in the processes of project alternative selection, in which different proposals are provided. The practical implications of the tool concerns its ability to support the determination of the criteria and the relative weights to be considered in the calls for the project competitions.

KEYWORDS

assessment models, A'WOT, decision-making processes, questionnaires, sustainable development, SWOT analysisurban regeneration project

1 | INTRODUCTION

The selection of the urban projects to be carried out on the territory among a set of design solutions constitutes a fundamental issue for

the identification of the most cost-beneficial projects. These should represent investments that not only will determine more benefits than costs, but will be able to maximize the net benefit for the communities and to efficiently allocate the available resources. In the post-

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2024 The Author(s). *Sustainable Development* published by ERP Environment and John Wiley & Sons Ltd.

pandemic European scenario, tools such as the Green Deal and the EU Next Generation support this vision and promote the definition of local planning tools in which to operationalize the new pillars of the sustainable development (defined by the Sustainable Development Goals [SDGs] of the 2030 Agenda [Chenary et al., 2024; Alizadeh et al., 2024]), including the promotion of social inclusion even in the decision-making process of territorial interventions. Although the theoretical paradigm of sustainability provides for the simultaneous achievement of the three dimensions (society, environment, economy), in application practice, this model has often been disregarded in favor of initiatives characterized by the almost total absence of the social component (Verma & Raghubanshi, 2018). This is compounded by a lack of evaluation tools specifically developed with a view to measuring the sustainability (Hossain et al., 2020) and available to public and private stakeholders in a reality where, on the contrary, they should play a key role in the development of sustainable cities, where open, flexible, and participatory processes allow cooperation with the community (Micelli & Scaffidi, 2022).

In this sense, for the evaluation of different urban project alternatives, robust, and valid assessment tools should be developed, in order to explore the specific aspects of each solution, the interactions and possible interference with the *status quo* and the project ability to adequately meet the needs of the communities.

During the last decades, the integrated evaluation approaches have been preferred to the “single” one, given the increasingly relevance of the three fundamental pillars (social, economic, and environmental ones) for the urban sustainable development. An example is represented by the Neighborhood Sustainability Assessment Tools (NSATs), with the main goal of spreading the culture of sustainable design, ensuring, and evaluating the application of strategies to reduce the environmental, social, and economic impacts of the construction sector through a multicriteria evaluation model (Cheshmehzangi et al., 2020; Saiu et al., 2022). The NSATs constitute a means for the evaluation of the multidimensionality of the city sustainability, by highlighting how the (re)development of a neighborhood cannot be measured as an addition of the performance of individual buildings, but rather as a *unicum* set of relationships among the parts and the whole (Sharifi et al., 2021).

Therefore, in the urban projects aimed at pursuing the sustainable development of the cities, a set of evaluation criteria should be properly defined, by addressing the selection phase toward a global vision of the project that overcomes the unique criterion of the “lowest cost” and including the wide aspects range linked to the ecological, energetic, financial, administrative, economic, and social fields. Moreover, the interdependencies among the evaluation criteria selected for the urban solution choice should be analyzed, to establish a dialectic relationship among the sectors involved in the specific intervention area and, in a broader perspective, in the urban context. Starting from the investigation of the changing collective needs' framework, the different opinions of the subjects interested in the urban regeneration processes should be collected to highlight the often-conflicting project issues taken into account by the stakeholders and to calibrate the solutions according to the obtained feedbacks (Juan et al., 2010; Kim et al., 2023; Zhang et al., 2021).

In theoretical terms, in situations in which the decision-maker has to select the “best” design solution among different proposals, the strategy to be adopted concerns the analysis of the performance ranking of each urban project solution (Morano et al., 2021; Sharifi, 2019), in order to develop a synthetic evaluation index of the goodness of the overall project (Awasthi et al., 2018; da Silva et al., 2022; Ke et al., 2022). In this way, a preference list is developed, and, for each alternative, the most critical features are identified for their improvement.

With reference to the procedure briefly described, the most critical phase concerns the selection of the evaluation criteria to be used for the analysis of each solution (Nikoloudis et al., 2020; Wang et al., 2013) and the comparison among the alternatives and the choice of that to be preferred, as there is no a universal strategy to follow: in fact, the involved subjects (Public Administrations, private investors, institutions, local community, etc.) ordinarily show different interests in the fields of the project to be safeguarded and/or promoted (Rădulescu et al., 2016; Wang & Xiang, 2019). Although the attention paid to the environmental issues (energy saving, minimum consumption of available free land, limited impacts of the built heritage on the environment, etc.) is already consolidated and generally shared (European Parliament, 2023; Tajani et al., 2022; Torre et al., 2017), the definition of the criteria to be considered for the analysis of the projects to be implemented on the territory constitutes an ad hoc step that reflects the specificities of the intervention and of the urban context in which it will be located. In this sense, the categories of components to be examined can be common and correspond to the main widely debated issues aimed at verifying the sustainability of the project from an environmental, socioeconomic and financial point of view, whereas the specific subcategories to be evaluated should be identified on a case-by-case basis.

In the context of design and ideas competitions, the evaluation of the proposals represents a fundamental step in the decision-making process (Rönn, 2010; Rönn, 2011; White, 2014). These competitions constitute the procedures aimed at providing the contracting authorities a plan or a project (design competition) or an idea proposal (ideas competition), selected by a judging Commission, with/without awards (design competition) or to be remunerated with the acknowledgment of a reasonable award (contest of ideas).

The judging Commissions for the competitions examine the plans and projects presented by candidates anonymously and solely on the basis of the criteria specified in the competition call for proposals, by (i) verifying the compliance of the presented solutions with the provisions of the call, (ii) expressing judgments on each project according to the established criteria, with specific motivation, (iii) taking the decisions also by majority vote, (iv) drawing up the minutes of the meetings and the final one containing the ranking (Chupin, 2011; Kazemian & Rönn, 2009).

Therefore, it is essential to define the criteria to be adopted to select the projects connected to the typology of work and the needs for which it should be carried out. Once the evaluation criteria and sub-criteria of the project proposals have been established, the attribution of the weights and the scores to be assigned to each one (the sum must be equal to 100) allows (i) to grade the relative importance

of each aspect compared to the others, (ii) to disaggregate the project into components pertaining to different areas and to evaluate their effectiveness and coherence, (iii) to compare the different solutions on the basis of preestablished judgment elements and to select the preferred solution.

In theoretical terms, the determination of the criteria, sub-criteria and relative weights should be carried out on the basis of the collection of opinions and judgments expressed by (i) experts in the sector (urban planners, architects, sociologists, landscapers, etc.), (ii) local institutions (professional associations, Public Administrations, etc.) and (iii) a sufficiently representative sample of the heterogeneously resident community made up of a consistent number of subjects of different age, socioeconomic level, gender, and education (Kreiner, 2012; Nasar, 1999). In current practice, the operation of identifying the criteria and relative weights is greatly streamlined and, bypassing the phases of data collection correlated to direct surveys on the three groups mentioned, it tries to include the different aspects to be generally considered in the analysis of a project (environmental, financial, economic, social, and procedural ones), declining in the sub-criteria the specificities of the conditions in which the intervention is located (e.g., possible proximity to prestigious areas subject to restrictions and/or protection) and of their intended uses (Abdelmohsen, 2014; Menteth et al., 2016). However, to date there is no generally shared and univocal procedure to be followed for the identification of the evaluation criteria and, therefore, for the assessment of the intervention proposals and a high *arbitrariness* levels is recognized (Berčić et al., 2024).

1.1 | Research question

The present paper is part of the outlined framework.

After having attested the lack of a consolidated method for evaluation phases in design contests, the research aims to propose and test an innovative evaluation methodological approach to support decision-making processes for the identification of the “best” project solution among different hypotheses. The proposed methodology is able to orient the various subjects involved in the mechanisms of defining the initiatives to be implemented in the territory. These are (i) the operators of the Public Administration in order to guide the selection of the most suitable scenario based on the reference context, (ii) the planners in order to provide guidelines for the formulation of intervention plans that are effective and appropriate for the intervention context and finally, (iii) the private investors in the case of forms of Public Private Partnership for the identification of financially feasible initiatives, capable of guaranteeing the sustainability for the subject in monetary terms by considering the investment and management costs and the revenues.

The developed methodology is included in the preliminary phases for the identification of the design alternative to activate in the specific urban context and aims to establish the preferred solution, able to satisfy the needs expressed by the community and to be consistent with the fixed criteria connected to the urban sustainable (i.e. environmental, economic, and social) development.

With regards to the contracting authorities involved in the tender procedures for the evaluation of the most preferable project proposal among different ones, the work objective concerns the development of a procedure structured in steps to support the judging Commissions in the choices about the solution to be preferred. In particular, the methodology intends to guide the stages for the determination of the criteria and the relative weights to be considered in the preparation of the calls for the competitions of ideas and design in the architecture and engineering sector, aimed at defining the design proposal to be examined in the following project levels and, therefore, to be implemented. The methodological approach illustrated in the present research is articulated into a series of phases to be applied in different geographical contexts and with reference to different interventions, in order to define a tool for addressing the planning of interventions on the territory on the basis of the local communities need framework, in the situations in which different design alternatives are proposed.

It should be pointed out that the main novelty of the proposed methodological approach concerns its structuring in different steps to synergically integrate different evaluation tools (context analysis, econometric technique, strengths, weaknesses, opportunities, and threats (SWOT) analysis, AHP model, A'WOT method) in a synergistic way, for addressing the choice processes related to (i) the identification of the urban areas on which a greater attention should be paid by local governors and planners and (ii) the selection of the project to be preferred among different alternatives. In particular, the innovativeness of the proposed evaluation tool is associated to the definition of a rational procedure that pursues to efficiently understand and interpret the judgments expressed by the local communities. With reference to the Esquilino district located in the city of Rome (Italy), for which a significant urgency of urban renewal is currently detected, the proposed methodology is implemented in order to formulate effective guidelines for the definition of one or more intervention strategies within the urban regeneration policies. Starting from four urban projects already elaborated for two urban areas of the district (specifically, two project solutions for each of the two considered areas), the alternative to be preferred has been selected in the analysis on the basis of a set of criteria previously fixed and whose weight in terms of importance has been appropriately established. The technique implemented for the choice of the best project solution—named A'WOT—allows to define an order of priority of the urban regeneration strategies (Della Spina et al., 2023; Kangas et al., 2001; Kisi, 2019) through the combination of the Analytic Hierarchy Process (AHP) multi-criteria technique and the SWOT analysis.

The application of the developed methodology phases has determined a detailed investigation of the case study (the Esquilino district) through the combination of indirect surveys (econometric analysis implementation for the determination of the most influencing factors on the reference residential market, that is, in the selling prices formation processes) and direct ones (administration of questionnaires for the determination of the fixed criteria weights and the selection of design solution to be preferred by means the pairwise comparisons).

The paper is structured as follows: in Section 2 the analysis of the existing reference literature concerning the role of the community's direct surveys for the development of effective and consistent urban

planning policies is carried out. At the end of this paragraph, the contribution of the present research within the reference literature is clarified. In Section 3 the phases of the proposed methodological approach are illustrated. In Section 4, the case study related to the Esquilino district in the city of Rome (Italy) is introduced: a brief description of its main specificities and of the four projects considered in the study is developed. Thus, the methodology is implemented and the results in terms of the “best” project solution according to the fixed evaluation criteria are interpreted. Therefore, in Section 4 the experimentation of the proposed evaluation methodology to the selected case study is performed. In Section 5, a discussion about the consistence between the developed methodology aim and the SDGs is conducted. Finally, in Section 6 a brief analysis of the reached findings is outlined: the identification of the limits and strengths of the methodology is carried out and the further developments are pointed out.

2 | LITERATURE REVIEW

In the decision-making processes aimed at defining the urban regeneration policies to be adopted, an increasingly important role is assumed by “citizens participation.” From the point of view of a multidisciplinary perspective, the application of a participatory approach capable of creating an interactive and dynamic relationship between “expert knowledge” and “common knowledge” (Della Spina et al., 2019) is fundamental in the phases for the selection of projects to be implemented that are effective and consistent with the changing needs of the local community. In this sense, the active participation of the population represents a key factor for the success of regeneration initiatives (Pethia, 2011) and for the individual well-being of the involved residents (Hong, 2018; Li et al., 2020; Wu et al., 2024).

During the last decades, the participatory urban planning has been broadly recognized as the process in which the different involved stakeholders affect the policy formulation, the alternative designs definition, the investment decisions, and the management choices (Åström, 2020; Horelli et al., 2013). It is evident that the inhabitants' involvement in the regeneration implementation (from the project planning to the execution phase) can help to generate a sense of belonging to the “new” place and, at the same time, can orient the design choices toward the current and real needs of the communities, by possibly changing some characteristics of the project or setting mutual objectives on the end users' requests.

In the reference literature, numerous researches have analyzed the participatory approach as an essential component of the urban regeneration. Since the “60s, Arnstein (1969) has dealt with the issue of citizens' participation in the planning dynamics, by using examples from three federal social programs (urban renewal, anti-poverty, and model cities) for determining the role of the different social classes in the involvement in the decision-making of urban plans and/or programs.

The progressively prominence of the citizens participation into the networks of governance oriented toward urban renovation has

been studied in different territorial contexts, as Spain (Parés et al., 2012; Sanchez Medero & Pastor Albaladejo, 2019), United Kingdom (Blakeley & Evans, 2009; Maginn, 2007), Scotland (Pollock & Sharp, 2012), Iran (Pourzakarya & Bahramjerdi, 2021), and Portugal (Falanga, 2020). Furthermore, in the Chinese countries, different Authors have highlighted the crucial role played by the collaboration between the different subjects involved in the definition of sustainable urban regeneration strategies (Li et al., 2020; Liu et al., 2022; Yang et al., 2022), in order to promote an active participation of experts (professional groups, planners, architects, engineers, etc.), Public Administrations (local, regional and national institutions), and communities (habitual and occasional users of the urban areas) (Zhang & Liao, 2022).

In this framework, in order to verify the level of satisfaction of residents in the Deira Enrichment Project of the city of Dubai to improve the local governance policies, the study developed by Awad and Jung (2022) has aimed to investigate the sustainable urban regeneration planning elements and to evaluate their importance for the goals achievement. In order to select the planning elements, a brainstorming group composed of three experts has been created and, after that, an expert survey has been carried out based on the derived factors, and the importance of the planning factors has been determined. Similarly, Abdalla et al. (2016) have defined a participatory planning tool that determines the residents' preferences, by examining the relationship between the residents' priorities and the current condition of their built environment, to help professionals and decision-makers (i) to study the existing urban settlements and (ii) to design new ones based on the preferences of the residents who participate in an earlier phase of design of urban areas.

For the regeneration of a large residential complex in Rome (Italy), through a qualitative-quantitative analysis that envisages the active participation of the local population and institutions at each stage, a community based approach to create an effective relationship between the collective needs and sustainable solutions has been developed by Battisti et al. (2019).

By examining the Portugal's shrinking cities phenomenon, the purpose of Panagopoulos et al. (2015) research has concerned the determination of the citizens' policy preferences for ascertaining any different preferences, on the basis of which the identification of viable urban regeneration strategies has carried out. A face-to-face questionnaire survey of 701 residents in four case study cities has been structured, mainly referred to the economic revival, the safety and accessibility, the public services, the building interventions, and the environmental actions. The age of the respondents has been found as an influential factor in the priorities expressed, with the economic growth strongly important for the youngest interviewees and the urban safety and accessibility for the oldest ones.

Public participation has widely assumed a critical role in facilitating urban regeneration in Xiamen, Fujian province of China. The citizen involvement has been seen as an effective approach for regeneration, capable of rebuilding residents' confidence and gaining local government support. The survey has suggested to prefer urban projects that target more at the recovery of historic buildings rather

than at the demolition and construction of new ones (Hui et al., 2021).

In general terms, among the alternative approaches aimed at a more inclusive “bottom-up” community involvement in regeneration, the assessment of the residents' preferences is ordinarily carried out through the “willingness to pay” criterion (Chin & Foong, 2006; Choi et al., 2016; Wu & Zhao, 2015). This evaluation tool used within the cost-benefit analysis allows to detect the value that the subject/community attributes to the specific good/service (Lee et al., 2021). The different interests of multiple stakeholders inevitably increase the complexity of urban regeneration projects and, therefore, the collaborative decision-making has gradually been considered as a valid mean to take into account the several points of view and to define the “best” strategy to be implemented. Starting from the American experience of “smart growth” and going toward the increase of the demand of *mixité* in urban settlements, Bevilacqua et al. (2013) have argued that the involvement of the community could define a mixed approach in decision planning process to support urban regeneration toward more sustainable “supply.” The spread of digital information and communication technologies has transformed the traditional top-down approaches (e.g., public meetings or consultations) by providing new tools that enable citizens to take part in a participatory city planning process, for example, through commenting or voting mechanisms on the possible options of a planning proposal provided by city administrations. In this sense, Khan et al. (2017) have developed a knowledge-based citizen participation platform to support smart city decision making. Furthermore, for the smart city projects definition, Berntzen and Johannessen (2016) have outlined an overview of technologies used for participation, highlighting their strengths and weaknesses, and providing recommendations for practitioners to create citizen participation projects in regeneration initiatives. Soomro et al. (2017) have dealt with the participatory governance in smart cities, by presenting three applications to be used by urban, land use, and transport planners for the visualization of development proposals, their share with different stakeholders to obtain feedback and the simulation of socioeconomic activities in response to alternative planning scenarios. In order to identify the key variables for decision-making on urban renewal in China and to sort them by importance, the differing opinions of stakeholders on urban renewal regarding the ecological environment, housing and facilities, social welfare, and commercial activities have been explored by Zhou et al. (2017).

In the same geographical context of China, Tian and Zhu (2015) have discussed the experiences of citizen participation in old city regeneration in Yangzhou, by giving a forward looking perspective and suggestions aimed at enhancing participatory approach as a strategy to promote the sustainable urban regeneration. The strengths and critical aspects of the local participatory policy making have been clarified in (Michels & De Graaf, 2010) with reference to projects in two municipalities in the Netherlands. The Authors have described its positive effects on democracy, that is, greater responsibility for public matters, and thus the public engagement by contributing to a higher degree of legitimacy of decisions. However, one negative effect regards the fact that not all relevant groups and interests are generally

represented. Similarly, Ianniello et al. (2019) have presented a systematic review of the English-language empirical literature about citizen participation to identify the main obstacles to its implementation and the most successful ways to address them, by finding three sets of variables that seem to impact the participatory approach effectiveness, that is, the contextual factors, the organizational arrangements, and the process management patterns.

In the illustrated framework, although the community's role in urban regeneration initiatives is currently very often limited and mainly serving to provide information on the basis of which the government then makes decisions, the importance assumed by the population involvement is ascertained. In fact, Callahan (2007) has highlighted the “universal agreement” of its positive effect on the urban development strategies definition and, at the same time, has attested the absence of generally shared best way to achieve meaningful involvement.

Starting from a study carried out in Ghana on the use of the participatory planning approach to address local community development needs, Naku and Afrane (2013) have dealt with the link between the theoretical knowledge of this approach and its practical application, by concluding that some aspects are still unknown, invisible, and denied from the mainstream of practice.

The aim of the present research is linked to the outlined broad issue. In particular, through the structuring and the following submission of a targeted questionnaire based on the direct and active citizens and experts involvement in decision-making processes, this work intends to define a methodological approach for (i) the evaluation of urban regeneration projects and (ii) the selection of the effective initiatives among a set of proposals. The strong relationship between the communities needs framework (clearly expressed) and the public deciders should become the *leitmotiv* of the choice's mechanisms, in order to increase the awareness of the population for the urban spaces, their potentialities and prospective uses and to make the decision dynamics more transparent and reliable. In addition, it should be pointed out that the deep knowledge of the urban area to be renovated constitutes a fundamental step, that is preliminary to the project phases beginning. Also, in this stage the participatory approach could be a winning weapon to investigate the positive and negative issues of the area and its potentialities and threats. People who live an urban territory precisely know its criticalities and, jointly with the indications of experts and governments based on the urban regulatory tools in force, can support the definition of cognitive framework prior to the project implementation. Hereby the present work tries to fill the existent gap in the reference literature and in the current practice concerning the lack of a univocal and generally shared procedure to be followed for the evaluation of the projects that causes high arbitrariness levels and (not unusual) scarce transparency in the decision-making processes.

3 | METHODS

Given an area to be redeveloped and different regeneration hypotheses, the proposed methodological approach is useful for the evaluation

of the various design alternatives, in order to establish the best solution capable of satisfying the expected and preliminarily set objectives.

Within the design and ideas competition procedures, the proposed methodology can be implemented (i) to assign consistent scores to the evaluation criteria and sub-criteria and (ii) to select the design solution to be preferred among the various proposals. In particular, the developed approach consists of seven phases illustrated below.

Phase one aims at gaining knowledge of the urban area in which the redevelopment intervention to be implemented is located: specifically, the morphological, demographic, socio-economic, historical aspects of the area and the existing building stock, and the local real estate market are analyzed, in order to carry out a general preliminary investigation of the area for the identification of its main specificities.

Phase two concerns the identification of the main architectural, historical, and environmental emergencies that represent influential amenities (centers of attraction whose proximity is positively appreciated on the reference market) or disamenities (urban poles or places whose proximity negatively affects the choices of buyers and sellers) on the current real estate price formation dynamics in the reference context.

Phase three regards the implementation of an econometric technique to explain the most influencing factors on real estate prices and to identify the existing functional relationships between the considered *intrinsic* (i.e. those factors that concern the property in analysis) and *extrinsic* (i.e. those factors that describe the infrastructural, environmental, and social qualification of the context in which the property in analysis is located) variables and the detected prices.

Following the analysis performed on the reference urban area (phase one) and in relation to the results deriving from the application of the econometric technique (phase three) for the identification of the most influencing locational variables, in *phase four* the development of the SWOT analysis is carried out.

Phase five aims to study the different design proposals for urban redevelopment.

The main characteristics of each intervention solution are, therefore, highlighted in terms of architectural and compositional quality of the spaces and esthetic quality of the envisaged functional elements, in accordance with the uses and functions introduced and with the general preliminarily fixed objectives of the project.

With a view to an integrated and participatory approach to evaluating the design alternatives for the definition of the preferred one, *phase six* focuses on the structuring of two questionnaires. The first is aimed at quantifying the weights and scores to be attributed to the various evaluation criteria and sub-criteria deduced by the SWOT analysis: it should be submitted to a heterogeneously composite sample of individuals belonging to the local community who are asked to express a judgment on the importance level of each criterion compared to the others. The second questionnaire intends to identify the best design alternative on the basis of the preliminarily established criteria: it should be submitted to a pool of sector experts who are asked to pass a preferential judgment on the alternatives with reference to the different aspects considered. In addition, in the sixth phase the examination of the obtained results of the questions is developed.

In order to obtain the preferred design alternative in relation to the importance assigned to the evaluation criteria and sub-criteria, in *phase seven* the A'WOT hybrid method is implemented. In particular, this technique combines the SWOT analysis and the AHP method belonging to the multi-criteria analysis, to obtain the temporal priority list of the different projects, multiplying the weights of the alternatives by the weights of the criteria with the purpose to select the “best” project solution. The application of the AHP to the SWOT factors allows to systematically assess them and quantify their importance through the assignment of a priority order with the pairwise comparisons (Kangas et al., 2001; Kurttila et al., 2000; Shrestha et al., 2004).

In fact, for each comparison related to each SWOT category and, subsequently, each SWOT element, it is required to establish which of the two compared parameters assumes greater importance, using the semantic (qualitative) judgments that are then converted into numerical (quantitative) values through the semantic scale of Saaty (1980), that is, a scale of absolute numbers from one to nine. Therefore, for each criterion identified by the SWOT analysis, the relative priority is calculated and, for each project alternative, its capacity to satisfy the SWOT criteria is evaluated.

The methodological approach developed in the present research allows to objectify the process of choosing the project hypothesis to be examined in the subsequent levels of the design phase, by making the entire process—through (i) the determination of the criteria and sub-criteria on the basis of which to evaluate the effectiveness of an intervention solution and (ii) the selection of the initiatives to be implemented in the area—more transparent and reliable.

Furthermore, the logical succession of operative phases to be carried out allows the replicability of the decision-making process and the consistency verification of the procedure with the purposes of each step. Moreover, the methodology will make it possible to fully understand the potentialities and the weaknesses of the urban area in which the initiative will be located and to identify the best project solution among the identified hypotheses on the basis of the real needs of the community. A central role of the stakeholders involved in the urban processes is consequently given in line with the increasing current need to active participatory processes within the territorial transformation strategies. In this sense, the illustrated approach represents an evaluation tool capable of guiding the drafting of guidelines for the definition of effective urban regeneration interventions to be included among the range of ordinary implemented assessment model. In particular, the methodology assumes the econometric technique as a mean used in the preliminary phase for the identification of warning areas (i.e. the city portions for which a higher attention should be paid from Public Administrations within the strategies of urban redevelopment). This technique is preparatory to the following step of the evaluation methodological approach that is carried out through the A'WOT hybrid method and is aimed at the choice of the intervention solution to be preferred.

On the basis of the two different purposes of the elaborated assessment method, in Figure 1 the two main techniques to be applied are reported.

The flow-chart in Figure 2 shows the seven phases into which the proposed methodological approach is articulated.

4 | CASE STUDY

The case study concerns the Esquilino district (Figure 3) located in the city of Rome (Italy) (Morano et al., 2023).

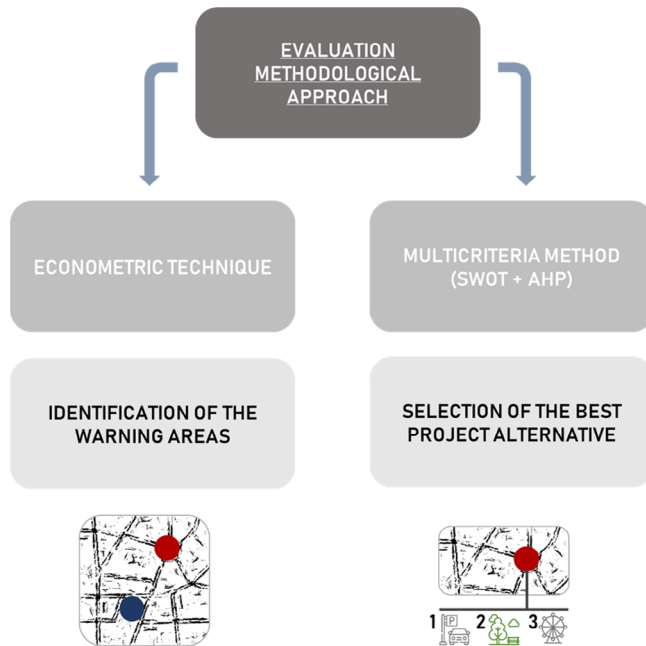


FIGURE 1 Main goals and techniques of the proposed methodological approach.

4.1 | Phase one—Analysis of the urban area to be renovated

The historical investigations related to the existing built heritage in the Esquilino district have shown a substantial correspondence between the current configuration of the urban area and that reported in the Town Plan of 1883 in which the Esquilino is mentioned as “under construction.”

The urban tissue is regular and in repeated rectangular and square-shaped blocks, for the most part of the same dimensions with an orthogonal grid (Altarelli et al., 1983; Insolera, 1993) which deform both in the presence of the infrastructures. The construction age of most of the buildings is prior to 1919 with 81.5% of them included within the study area have four or more floor levels typical of the 19th–20th century expansion fabric per block of the neighborhood. With reference to urban transportation connections, the inauguration of line A of the subway in 1980, thanks to the Manzoni, Vittorio Emanuele, and Termini metro stops, not only favors the accessibility to the city services in the district, but also represents a valid solution capable of reducing vehicular traffic. The Termini railway station, the numerous squares, markets, monumental buildings, and the extreme proximity to historic and monumental center of Rome have allowed the Esquilino district to constitute an important point of arrival for commuters, tourists, and immigrants (Montuori, 2007).

In this sense, the progressive introduction of the foreign component from countries with strong migratory pressure (from Bangladesh, Philippines and, above all, China) has contributed to determining situations of discomfort, also of a housing type (Carbone, 2020; Farro, 2019; Serpi, 2009), increasing the subjective perception of insecurity in most of the areas of the district. The trend of the quotations reported by the Real Estate Market Observatory

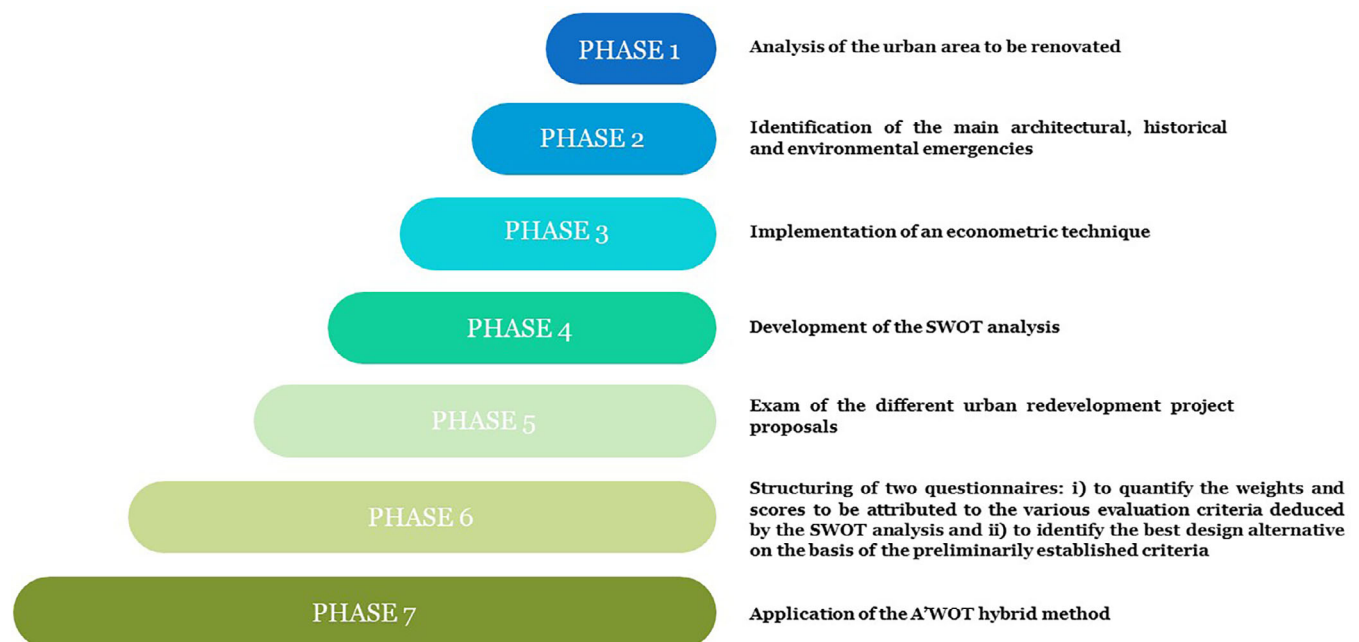


FIGURE 2 The phases of the proposed evaluation methodology for the selection of the best project alternative.

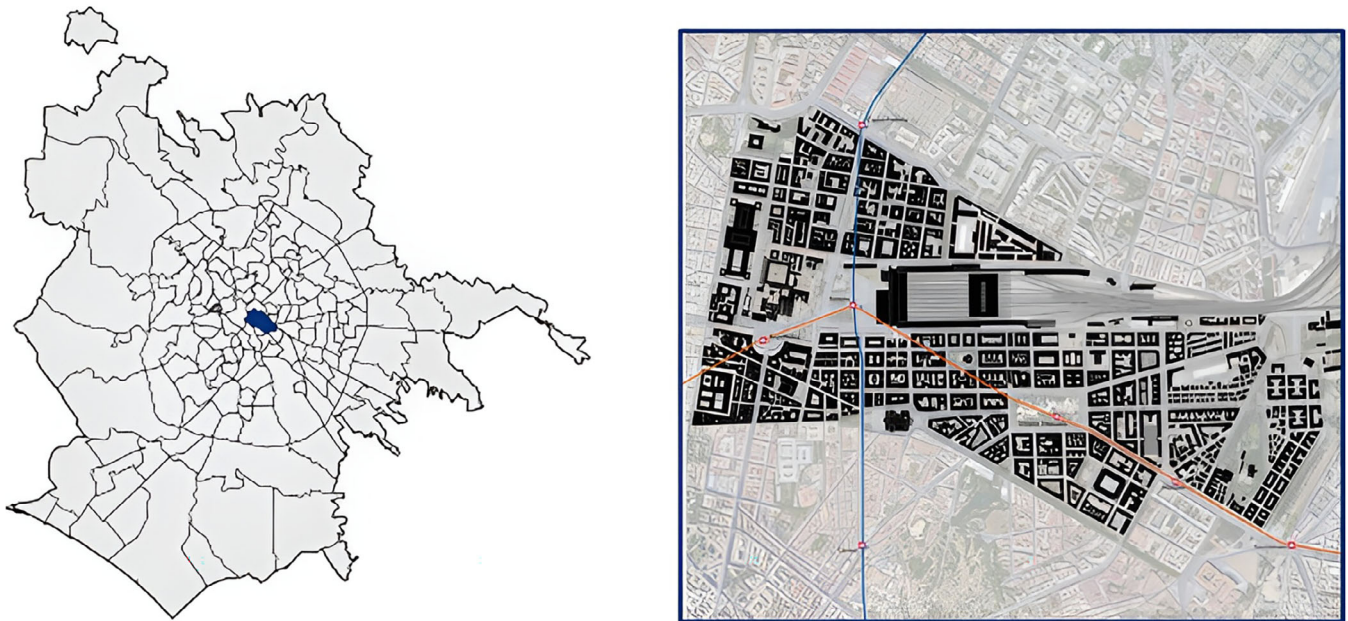


FIGURE 3 Localization of the Esquilino in the urban context of the city of Rome (on the left in blue) and the perimeter of the district (on the right).

(OMI) of the Italian Revenue Agency (<https://www.agenziaentrate.gov.it/portale/web/guest/schede/fabbricatiterreni/omi/banche-dati/quotazioni-immobiliari>) demonstrates that, for the years 2014–2020, the average market values, for the residential, commercial, and tertiary intended uses, have declined. Although the observed trend is consistent with that of the neighboring urban trade areas, among the reasons that led to the drop in real estate values, the presence of different poles included in the perimeter of the district which represent negative factors influencing the processes of formation of prices and specific urban phenomena (e.g., the proximity to the Termini railway station, the areas of greatest architectural “deterioration” and social insecurity, such as Piazza Vittorio Emanuele II and the several assistance centers and meeting places for immigrants) could be included.

From the outlined framework, the urge to activate a regeneration process of the entire district is high, in order to enhance the existing architectural and cultural emergencies, to monitor and mitigate the social degradation, by reducing the presence of current unsafe and degraded places. In Figure 4 two contrasting situations of the district are reported: the first is related to the presence of a relevant heritage of historical, artistic, and cultural interest, the second is represented by the widespread urban decay in some areas.

4.2 | Phase two—Identification of the main architectural, historical, and environmental emergencies

According to the indications provided by the main operators of the local real estate market and the general collective consent regarding

the architectural, historical, and environmental emergencies falling within the Esquilino district, Figure 5 shows the main landmarks considered in the analysis. It must be highlighted that, in this phase, the landmarks are already classified in amenities or disamenities according to the perceptions of the main users of the places (residents, workers, students, etc.) and that the belonging to one or the other category could then be validated or refuted by the results of the econometric analysis. Among the selected landmarks, squares, historic buildings, urban parks, churches, ministerial buildings, the most important theaters, hospitals, universities, monuments, museums, railway stations, underground stops are included.

Furthermore, it should be outlined that some urban poles closer to the Esquilino district but located outside the district perimeter have been considered among the landmarks to be analyzed, as these likely (positively or negatively) influence the selling prices dynamics and their exclusion could determine an evaluation error.

4.3 | Phase three—Implementation of the econometric technique

By recalling the research carried out by Morano et al. (2023), in this phase a study sample consisting of 400 residential properties sold in second half of 2021, located in the Esquilino district and whose the selling prices and some specific factors are known, has been collected. The total selling price (P), expressed in Euro, represents the dependent variable of the econometric analysis. The intrinsic characteristics mainly and frequently indicated by the local real estate operators as the most influencing factors appreciated by the potential buyers in the reference market are summarized in the Table 1.



FIGURE 4 The Esquilino district: The photographs clearly attest the strong contrast existing between the beauty of some historical and cultural emergencies located in the district and the severe urban decay that causes the perception of poor safety and significant neglect of some public places.



FIGURE 5 The main architectural, historical, and environmental emergencies (landmarks) considered in the analysis.

With reference to the extrinsic variables considered in the analysis, the distance of each study sample property from each landmark previously identified in the phase two and shown in Figure 5, expressed in kilometers it takes to walk to it, has been calculated.

In addition to the extrinsic factors assessed in terms of distance between each residential unit and the selected emergencies, the conservative state of the building asset near to each sample individual has been analyzed. In particular, the number of buildings whose facades are characterized by an excellent/good/bad maintenance conditions has been taken into account and, for each category, three detection ranges have been considered for evaluating the different influence

that the closeness can have on final selling prices (from 0 to 100 m, from 100 to 300 m, from 300 to 500 m), by assigning three different weights (3, 2, 1) according to the localization of the buildings.

The input data (intrinsic and extrinsic variables) have been normalized by the maximum value found for each variable, in order to obtain a unique range of variation between 0 and 1. The econometric analysis has been implemented by using a technique able to connect the best features of the numerical regression with the genetic programming.

A polynomial model in which the dependent variable is the total selling price (P) and the independent ones have been selected among

TABLE 1 The intrinsic factors considered in the analysis and selected on the basis of the indications provided by the main operators of the local real estate market.

Variable	Acronym	Unit Of measurement
Total gross floor area of the property	S	m ²
Presence of the lift in the building in which the property is located	L	Dummy variable [0 = absence; 1 = presence]
Floor on which the property is located	F	n.
Bad maintenance state of the residential property	Mp	Dummy variable [0 = absence; 1 = presence]
Good maintenance state of the residential property	Mg	Dummy variable [0 = absence; 1 = presence]
Excellent maintenance state of the residential property	Me	Dummy variable [0 = absence; 1 = presence]

n, number of floor level.

the intrinsic and extrinsic preliminary identified factors has been chosen among the set of generated models. The explanation of the econometric technique application to the case study has been detailed in Morano et al. (2023). The model generated by the econometric technique (named EPR) and used for the next analysis is shown in Equation (1) in the Data S1.

By considering the collected study sample, the developed econometric analysis has allowed to explain the most relevant factors on real estate prices in the specific analyzed context and to identify the functional relationships that link the considered intrinsic and extrinsic variables to the observed prices.

Among the 46 explanatory variables (intrinsic and extrinsic) initially considered in the analysis, 20 factors have been included in the model, as considered the main influencing in the housing prices formation processes in the Esquilino district.

The obtained results (widely discussed in [Morano et al., 2023]) are summarized in Table 2: the most influential variables according to the econometric analysis, the typology of the functional correlation between each factor and the total selling prices and the average percentage contribution of each independent variable are reported.

It should be highlighted that all expected functional links between the explanatory variables and the total selling prices have been confirmed by those generated by the model derived from the econometric analysis. The consistency of the obtained outputs has been widely dealt with in (Kurttila et al., 2000), in which the explanation of the functional correlations between the locational extrinsic variables selected by EPR and the total selling prices has been carried out with reference to the local real estate dynamics.

According to the aim of the research, the Figure 6 shows the extrinsic variables selected by the model and their positive or negative influence on total selling prices. In particular, the attractor poles—

represented in blue—whose proximity is positively appreciated on the reference market are assessed by the model as amenities in the Esquilino district, whereas the urban poles whose proximity negatively affects the choices of buyers and sellers indicate the disamenities for the reference urban context (represented in red). It should be recalled that the specificity assumed by the urban pole (amenity or disamenity or nothing) is deduced from the implementation of the econometric analysis (it represents a fundamental output) and constitutes a significant useful result for the overall study.

4.4 | Phase four—Development of the SWOT analysis

Starting from the initial analysis carried out on the urban area (phase one) and from the results deriving from the application of the econometric technique (phase three) relating to the identification of the extrinsic variables evaluated in terms of distance from the main urban landmarks, that are most influential in the processes of formation of real estate prices, the development of the SWOT analysis has been performed in the phase four.

In general terms, the SWOT analysis constitutes a basic tool capable of investigating and highlighting the set of current and potential factors that characterize the urban area, that is, the specifics that connote the state of the reference context and those that prefigure the probable and future conditions of the places by acting positively or negatively. With reference to the case study of this research, the SWOT matrix (shown in Figure 7) constitutes a synthesis of (i) the conclusions of studies (Middleton & Freestone, 2008; Mudu, 2003) and analysis (Carbone, 2020; Cardano, 2022) on the district already published, (ii) the indications provided by the main operators of the local market, (iii) the considerations based on previous knowledge of the district and on direct observations, (iv) the results deriving from the implementation of the econometric technique. The exam has been aimed at highlighting the characteristic elements of the urban area, which, therefore, constitute the crucial aspects on which to focus attention for the definition of effective urban regeneration policies.

In this sense, in fact, the aspects considered and evaluated as SWOT for the structuring of the matrix will be taken up in the subsequent phases of the methodology proposed for the selection of the “best” project solution among the different alternatives considered in the analysis.

In the Data S1, for each SWOT the main sources of the reference literature are specified in Table S1.

4.5 | Phase five—Exam of the different urban redevelopment project proposals

The project alternatives taken into consideration in the research for the selection of the “best” one refer to two areas located in the Esquilino district which, according to the results of the econometric analysis

TABLE 2 The summary of the obtained findings concerning (i) the typology of the functional correlations detected between the factors selected by the econometric technique as the most influential ones and the total selling prices and (ii) the average contribution of each variable on the real estate values expressed in percentage terms.

Variable	Functional correlation typology	Average percentage contribution
Excellent maintenance state of the residential property (Me)	From Mp to Me	DIRECT +38.2%
	From Mg to Me	DIRECT +18.4%
Good maintenance state of the residential property (Mg)	From Mp to Mg	DIRECT +24.2%
	From Me to Mg	INVERSE -22.5%
Bad maintenance state of the residential property (Mp)	From Me to Mp	INVERSE -61.7%
	From Mg to Mp	INVERSE -32.0%
Floor on which the property is located (F)	DIRECT	+6.5%
Total gross floor area of the property (S)	DIRECT	+15.2%
Distance from the Manzoni metro station (MAM)	DIRECT	+1.8%
Distance from the Science of Education Department—University of Rome 3 (entrance on Via Principe Amedeo) (Un1)	DIRECT	+10.9%
Distance from the Polyclinic Umberto I (Ps)	DIRECT	+5.0%
Distance from the Museum of the Liberation (Lm)	INVERSE	-3.6%
Distance from the Secret Service Office (SS)	INVERSE	-5.0%
Distance from the Teatro dell'Opera (To)	INVERSE	-4.5%
Distance from the Park of the Oppian Hill (Pco)	DIRECT	+3.2%
Distance from the New Esquilino market (Mes)	DIRECT	+3.7%
Distance from the Basilica of Santa Maria Maggiore (MM)	INVERSE	-1.2%
Distance from the Ministry of the Interior (Mi)	INVERSE	-0.3%
Distance from Porta Maggiore monument (Pm)	DIRECT	+2.7%
Distance from the Basilica of San Giovanni in Laterano (Gl)	DIRECT	+5.1%
Distance from the Finance Ministry (Fp)	DIRECT	+5.2%
Number of buildings whose facades are characterized by a good state of conservation (D)	PARABOLIC (in the first part inverse, then direct)	+0.3%
Number of buildings whose facades are characterized by a bad state of conservation (B)	INVERSE	-1.3%

carried out in the phase three and the SWOT analysis conducted in the phase four, represent the urban areas on which a higher attention by the public decision-makers involved in the definition of urban redevelopment strategies should be paid.

The four project solutions, among which to identify the one to be preferred, are different in terms of localization in the district and typology. In particular, the first two alternatives concern the redevelopment of Piazza dei Cinquecento, in front of the Termini railway station, already the subject of an open-procedure design competition in two stages called “Urban and functional redevelopment of the Termini node and Piazza dei Cinquecento,” sponsored by Grandi Stazioni Rail S.p.A in December 2020 (<https://www.concorsiawn.it/riqualificazione-piazza-cinquecento/home>).

The other two alternatives refer to the arrangement of Piazzale Labicano/Piazza Porta Maggiore, currently included in the Urban Plan

for Sustainable Mobility (PUMPS), adopted by Rome Capital (<https://romamobilita.it/it/progetti/pums>; <https://www.comune.roma.it/>).

Figure 8 shows the localization of the two intervention areas in the perimeter of the Esquilino district.

It should be pointed out that the projects have been selected for the study on the basis of their relevance within the current public policies. In particular, the two chosen critical areas of the Esquilino district constitute two focal urban tissue at the center of local political debates among the experts in the territorial planning field. The specificities of these areas (Piazza dei Cinquecento and Piazzale Labicano/Piazza Porta Maggiore), in terms of geographical position, function, and intended use, level of current degradation conditions and future potentialities, justify their significance for the development of valid urban strategies. The attention paid to the two considered areas by the local governors demonstrates the need and the urgency of the

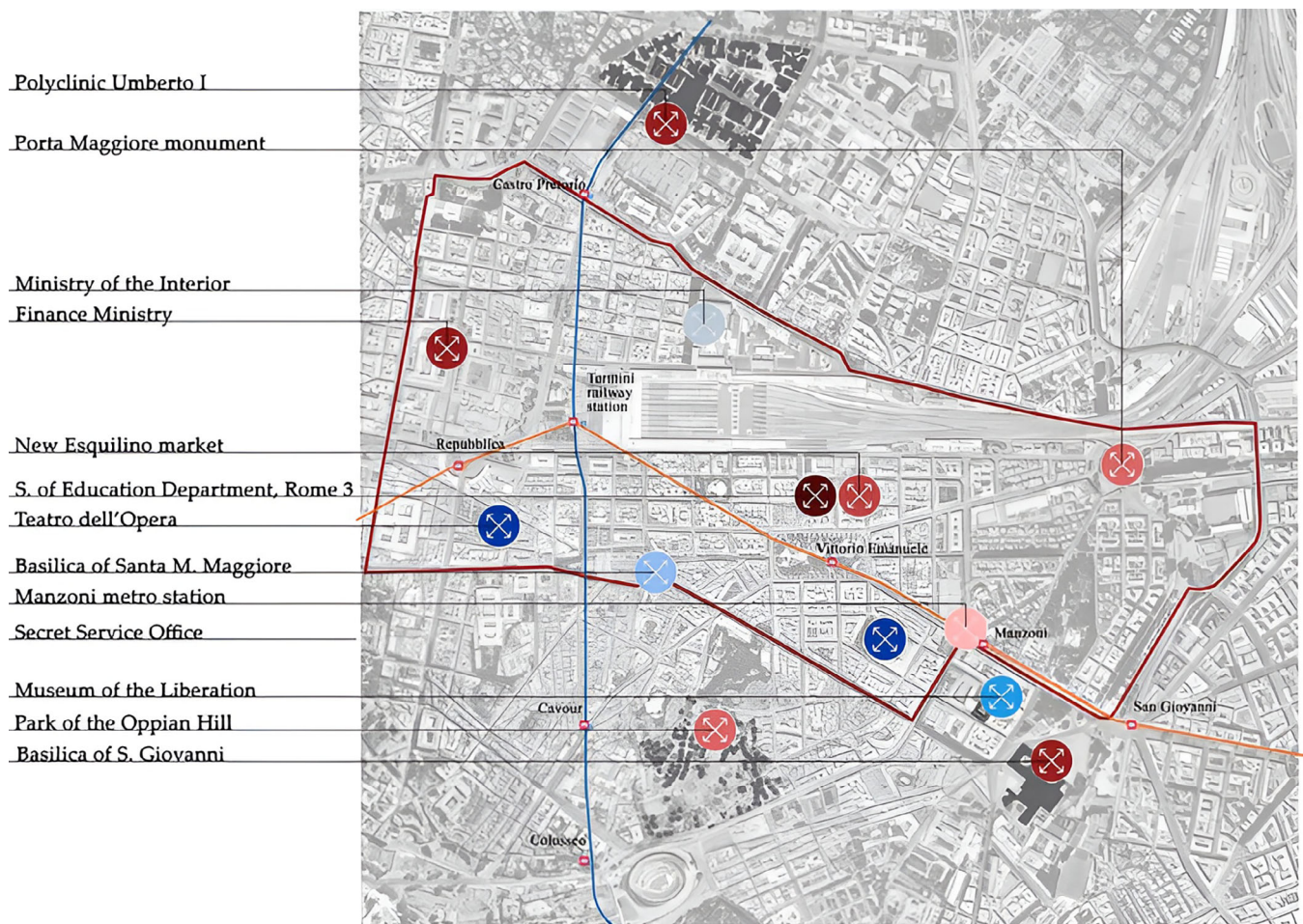


FIGURE 6 The amenities (in blue) and the disamenities (in red) in the Esquilino district according the econometric analysis.

projects to be implemented, also confirmed by several initiatives developed in the last years, such as numerous design competitions and larger-scale urban plans.

The main characteristics of each project solution are described below in terms of architectural and compositional quality of the spaces and esthetic quality of the envisaged functional elements, in relation to the uses and functions to be introduced and consistency with the general preestablished goals of the project.

4.5.1 | Project alternative No. 1—Redevelopment intervention of piazza dei cinquecento

The project focus is to empty the Piazza dei Cinquecento of vehicular crossings and to concentrate them within the perimeter of the square, in order to improve its use and to restore to the public space the character of an urban entrance to the city of Rome.

The proposal is focalized on the upgrading of the transport system and, in particular, provides for (i) the transfer of the parking areas for tourist busses and shuttles, taxis, kiss and ride, and private vehicle parking to via Marsala and via Giolitti and (ii) the use of the already built “New Parking Plate,” located above the platforms of Termini Station.

In the new configuration (Figure 9), the square will include (1) a green area (arboretum), integrated by pedestrian paths capable of mending the space between the archeological area of the Baths of Diocletian, Palazzo Massimo, and Piazza dei Cinquecento, (2) the parking area for the line busses connected to via Giolitti.

In particular, the arboretum will be configured as a combination space between a “domestic forest” and a “wild garden,” through the use of different typologies of vegetation. In general terms, the entire project aims to encourage the permanence of visitors and passersby. The viability issue is the crucial aspect of the project, through the minimization of driveways and the increase of areas intended for walkability. In order to promote the shared mobility and to reduce the polluting emissions into the environment, the inclusion of a 30 km/h zone on via Marsala, via Giolitti and all the adjacent roads to Piazza dei Cinquecento and the construction of the tramway line are planned.

4.5.2 | Project alternative No. 2—Redevelopment intervention of Piazza dei Cinquecento

The project alternative deals with the topic of the physical city of Rome accessibility, providing for the reactivation not only of the

FIGURE 7 SWOT matrix elaboration. SWOT, strengths, weaknesses, opportunities or threats.

Strengths	Weaknesses
<p>Historical-cultural value: the presence of several buildings of architectural and historical value and of monuments</p> <p>Efficiency of transport systems: the large number of public transportation stops (Temini train station, metro, bus and tram) able to promote the links with other municipal areas</p> <p>Adequate infrastructural level: the existence of different services and infrastructures (Piazza Vittorio market, schools, hotel, theaters, etc.) and public aggregation spaces (squares)</p> <p>Multi-ethnic recognition: the foreign component is a significant data compared to the local population (equal to 36.6%) to be enhanced and strengthened</p>	<p>Underutilization of the building stock: the significant presence of empty or disused residential buildings and low-quality accommodation facilities</p> <p>Lack of soft mobility systems: a lack of pedestrian paths and the absence of cycle routes is observed</p> <p>Degradation of urban spaces: the scarce efficiency of the public lighting and the lack of maintenance of the green and public spaces make the urban areas degraded</p> <p>Security level: in some district areas, the limited integration between the resident population and the foreign one generates a perceived low safe level</p> <p>Phenomenon of social degradation: a widespread presence of places where illicit actions are held, is attested</p>
Opportunities	Threats
<p>Regeneration of the existing building stock: the recovery of the existing disused properties and the requalification of the touristic buildings could determine an overall district renewal</p> <p>Smart Mobility: the creation of new pedestrian and cycle paths – with adequate public lighting systems - is necessary for the development of effective soft mobility itineraries</p> <p>Sociocultural quality: new and more suitable public aggregation spaces could favor a better sociocultural integration, starting from bottom-up proposals (for projects and initiatives) aimed at the improvement of the urban quality level</p>	<p>Increase in urban vehicular traffic: the conversion of some current driveways in pedestrian roads could cause an increase of vehicular traffic on some district main streets</p> <p>Increase of housing deprivation: the high number of tourists and commuter in the Termini train station areas and the “settlement competition” of the surrounding districts could determine a housing deprivation phenomenon accentuation</p> <p>Lack of interest from possible investors: the current degradation condition of the existing building stock could slow down or suppress the interest of potential investors</p>

20th-century architectural complex of the train station and the opposite square, but also the active involvement of the onboard system which feeds the incoming and outgoing flows exit from the station. This “connective” edge is, currently, “scarred” due to the inadequate management of vehicular flows and parking lots, and the lack of spaces suitable for traffic and pedestrians. The project aims to structurally integrate the road system, defining a fruition, and perceptive relationship capable of generating a unique public space where the arterial roads once again become the physical connectors between the city, the square and the station. In this sense, via Giolitti, via Marsala and via de Nicola will represent well organized systems for the coexistence of vehicular, cycle and pedestrian transit, moving the entrances and exits of means of transport exclusively on via Enrico de Nicola, for minimizing the interruptions of walking flows. The entire area continuity will be guaranteed not only by the presence of furnishing elements, but also by the introduction of a complex of tree-lined green areas, which facilitates the urban trajectories reading and establishes relevant links between the new square and the preexisting environmental, archeological, and monumental structures. An

extensive luminous coverage, which will guide movements to and from the area, will be a key element for redefining the connection between the urban front perimeter, the road system, and the Piazza dei Cinquecento. In Figure 10 a rendering view of the project alternative is shown.

4.5.3 | Project alternative No. 3—Regeneration intervention of porta Maggiore

The “Metrovia” project concerns the Porta Maggiore urban pole, which currently is constituted by a complicated network of lines and crossings, affecting the effectiveness of the entire tramway, and vehicular system. The project aims to simplify the trams circulation, with a new horseshoe layout (Figure 11). Despite the maintenance of the same traffic flow, the intervention pursues to enhance the archeological, and monumental heritage of the area, through the creation of a pedestrian garden, largely free from tram passages, capable of returning to Porta Maggiore, to the Sepulcher of Eurisace, the Aqueducts, and the

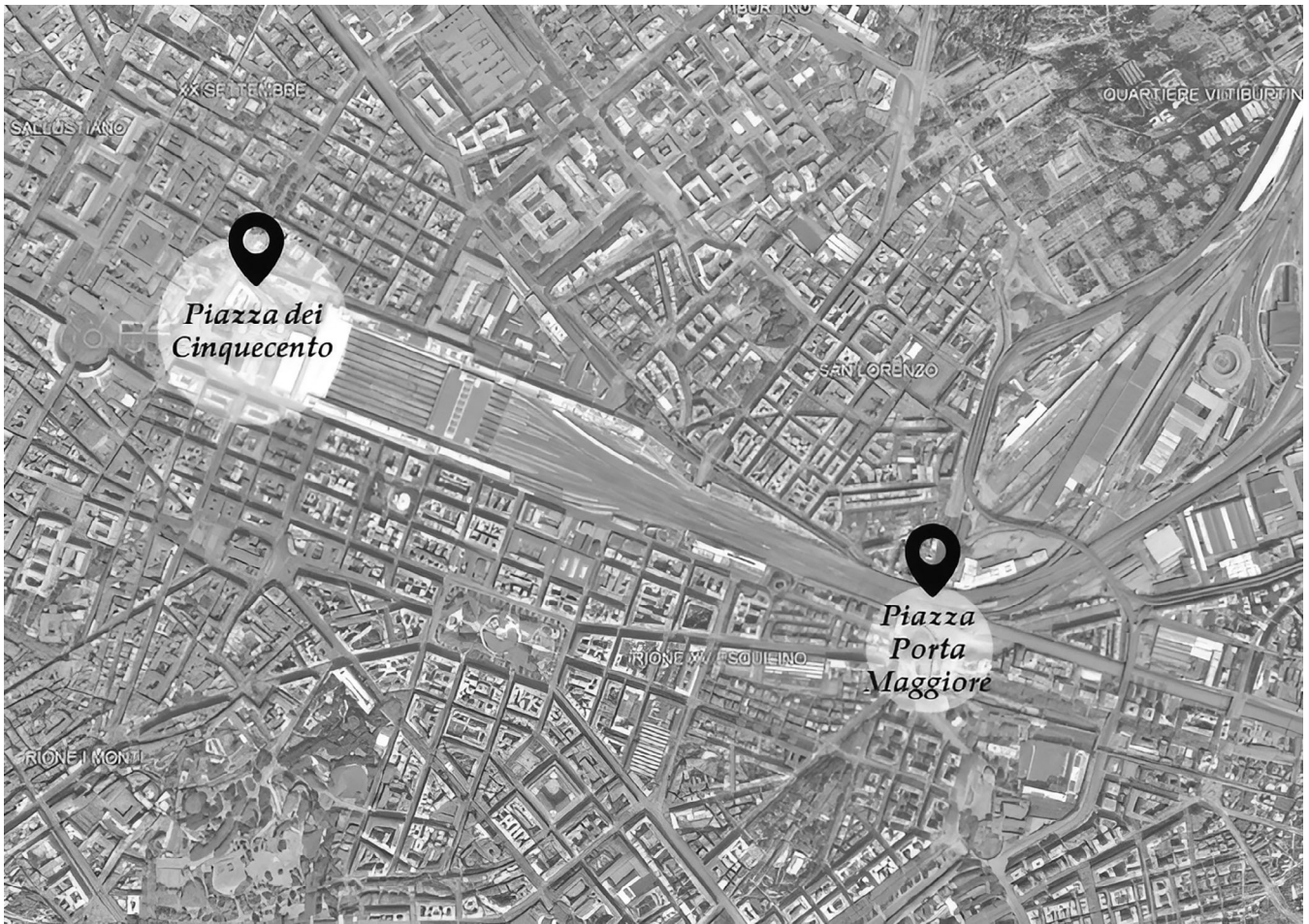


FIGURE 8 Localization of the two intervention areas within the Esquilino district.



FIGURE 9 Overall view of the project alternative No. 1.



FIGURE 10 Overall view of the project alternative No. 2.

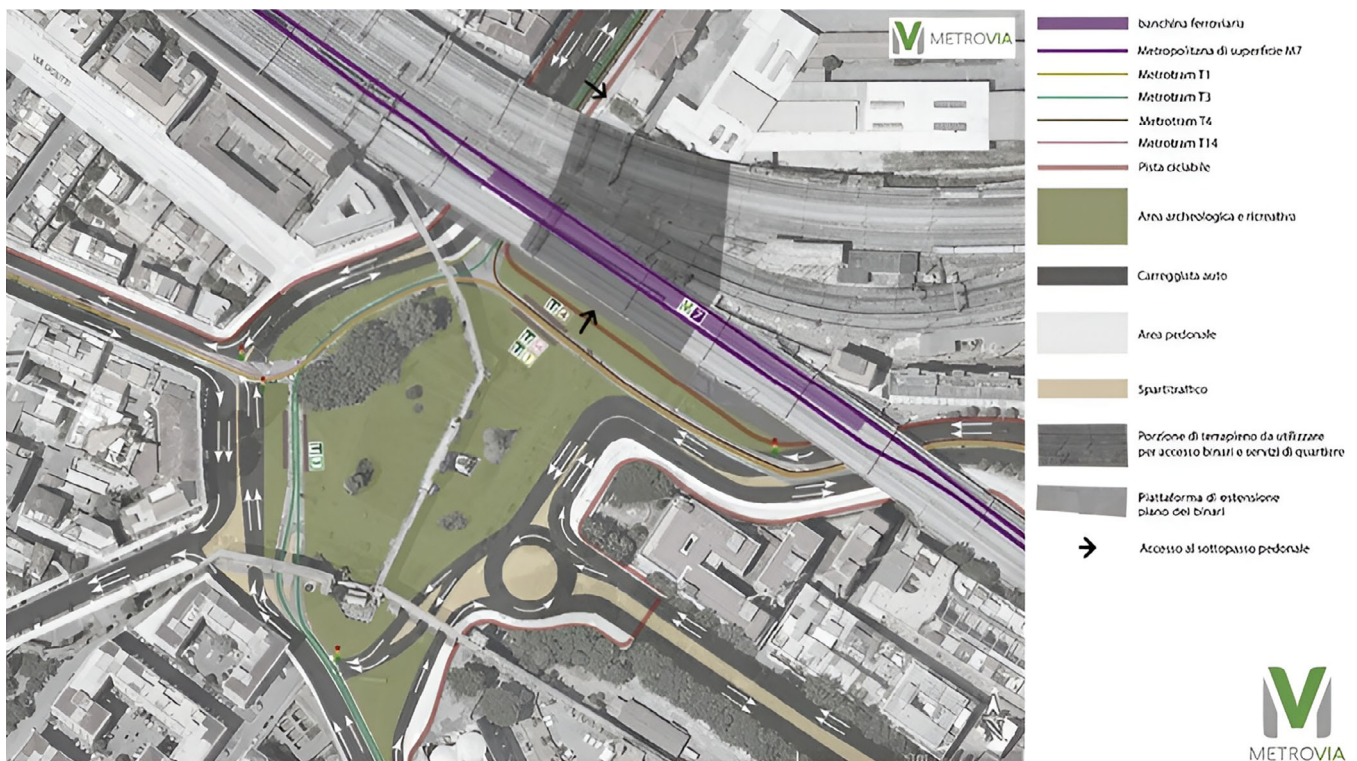


FIGURE 11 The masterplan of the project alternative No. 3.

Underground Basilica, a central role within the urban context of the city of Rome. In the same way, the “Metrovia” project is focalized on the renewal of via Giolitti, for which, in correspondence with the Termini railway station, the rerouting of the tracks and the consequent pedestrianization of the road section between Piazzale Labicano and the Termini underpass are planned. Specifically, the design solution provides for the realization of the new terminal, with the extension of the railway line by about 500 m beyond the current terminus, at the intersection of via Giolitti with Via Gioberti. The resurfacing of the

entire railway site will improve the use of passers-by along via Giolitti and will favor a direct connection with Porta Maggiore, increasing not only the level of road safety but also the integration with the various transport systems of Piazza dei Cinquecento such as: line bus terminus, tram, metro, train station, and taxi services. In particular, the creation of a linear cycle park on the old tracks will allow to free the road artery from the physical-visual barrier and to enhance the entire heritage, such as the temple of Minerva Medica, the church of Santa Bibiana, and the Ambra Jovinelli theater.

4.5.4 | Project alternative No. 4—Reconversion intervention of Porta Maggiore

Currently, the Porta Maggiore pole is included into the urban tissue of the city of Rome as a saturated space. The monumental archeology on the site represents a limit to be crossed. In this sense, the intervention—called platform—aims to relate the square of Santa Maria Maggiore to the area of Scalo San Lorenzo, through the use of three platforms and an underground passage located below the layout of the railway infrastructure. The new spatial linear-axial configuration will allow to connect the square with the archeological remains of the underground Neo-Pythagorean Basilica and the area of San Lorenzo. The intervention intends to promote the full valorization of the monumental archeological complex to strengthen its symbolic value and to clarify the relationship between the urban form and the anthropic and infrastructural flows. With reference to the mobility issue, such as the “Metrovia” project, that is, the project alternative No. 3— the platform project envisages the renewal of the via Giolitti arterial road and, in correspondence with the Termini railway station, the rerouting of the tracks and the consequent pedestrianization of the stretch between Piazzale Labicano and the Termini underpass. In Figure 12 a graphic representation of the main poles included in the project alternative No. 4 is reported.

In Table 3 a summary of the advantages and disadvantages of the four project alternatives is reported.

4.6 | Phase six—Structuring of two questionnaires

The purpose of this phase concerns the definition of two questionnaires: the first aimed at quantifying the weights and scores to be attributed to the various project evaluation criteria and sub-criteria

deduced from the SWOT analysis, and the second targeted at identifying the best project alternative among those analyzed on the basis of the preliminarily established criteria.

In the present research, the first questionnaire (named *criteria questionnaire*) has been submitted to a heterogeneously composite sample of 270 subjects belonging to the local community who have been asked to express an opinion on the level of importance of each criterion compared to the others. The second questionnaire (called *alternatives questionnaire*) has been submitted to a pool of 80 experts (architects, landscape architects, engineers, sociologists, etc.) who have been asked a preference judgment on the alternatives with reference to the different considered aspects.

The developed questionnaires have been defined taking into consideration the main indications and guidelines that various Authors have provided in order to obtain an effective questionnaire (Brace, 2018; Dillman et al., 2014; Lewin & Somekh, 2011). In particular, through a simple and clear language aimed at facilitating the understanding of the items, the structure of the questions has been organized in a closed form, giving answers based on an evaluation scale. For each question, it has been required to formulate a judgment in numerical form representing the level of preference in comparing the two alternatives at a time (application of the pairwise comparison technique). The judgments in numerical form borrow the logic of the semantic scale of Saaty (1980).

In the *criteria questionnaire*, following a brief illustration of the aims of the questionnaire and of the collection of interviewee data for the classification of the sample, the considered aspects (criteria) to which a weight will be attributed through the pairwise comparison are explained. Specifically, the interviewee is first asked to answer the question such as “Which of the two aspects listed below is the most important?” and, subsequently, to formulate a numerical judgment on the importance of the criterion compared to the other, answering the

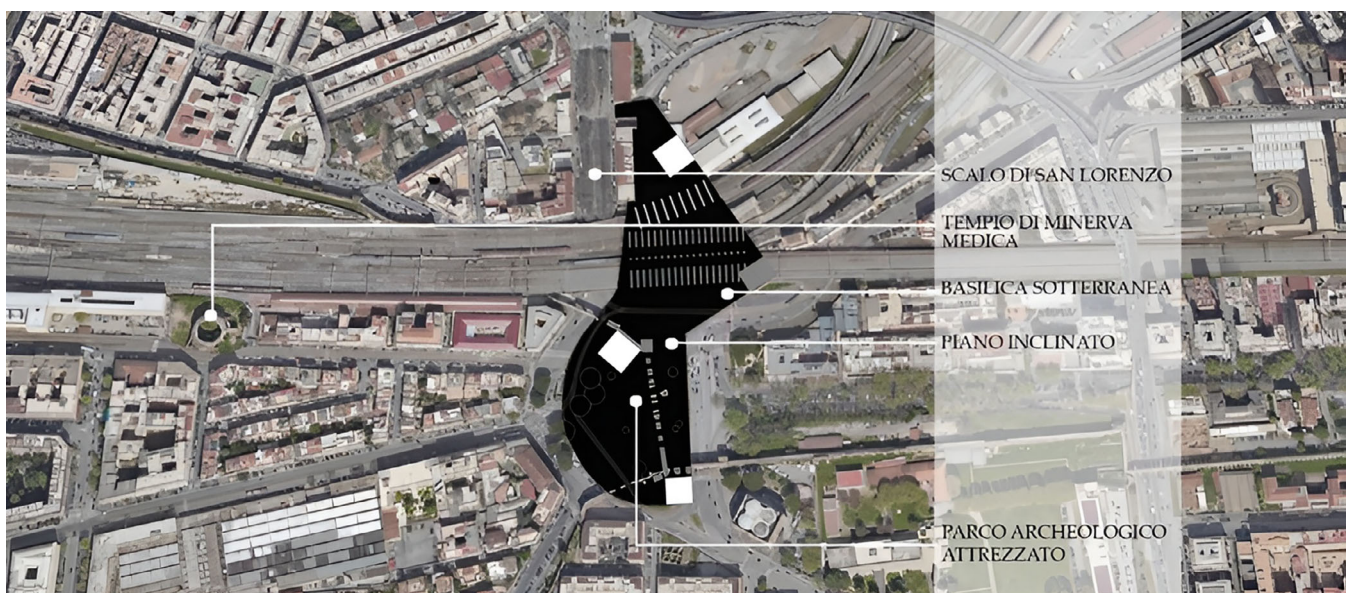


FIGURE 12 The masterplan of the project alternative No. 4.

TABLE 3 Summary of the advantages and disadvantages of the four analyzed project alternatives.

	Redevelopment intervention of Piazza dei Cinquecento		Regeneration intervention of Porta Maggiore	
	Alternative No. 1	Alternative No. 2	Alternative No. 3	Alternative No. 4
Advantages	<ul style="list-style-type: none"> Implementation of green solutions through the introduction of medium-tall sized arboretums, in order to encourage the visitors permanence Slow mobility: inclusion of a zone 30 to reduce pollutants in the environment and promote the shared mobility 	<ul style="list-style-type: none"> Usability of the space for generating a single public area aimed to minimize the interruptions to pedestrian flows Integration between the different existing and planned public transport systems 	<ul style="list-style-type: none"> Reorganization and optimization of urban roads Excellent accessibility to the various transport systems connecting with Piazza dei Cinquecento 	<ul style="list-style-type: none"> Enhancement of the existing architectural and monumental heritage Use of urban space through the reorganization of pedestrian traffic and parking spaces
Disadvantages	<ul style="list-style-type: none"> Limited usability of the areas due to a poor visual perception between the urban front, the roads, and square Marginalization of the historical and architectural buildings 	<ul style="list-style-type: none"> Exclusion of a diversified green pole in the urban area Poor slow mobility system 	<ul style="list-style-type: none"> Scarce inclusion of equipped urban green spaces Poor use of pedestrians and parking systems 	<ul style="list-style-type: none"> Minimization of vehicular traffic that could cause too high flows in other surrounding roads Scarce presence of equipped urban spaces

question such as “How much is the selected aspect more important than the other?” by using the Saaty semantic scale.

In the *alternatives questionnaire*, the comparison between the alternatives is carried out by considering the main evaluated criteria, that is, the aspects that characterize the area of intervention to which a weight has been attributed by submitting the *criteria questionnaire*. After having described the main features of each of the four design alternatives selected for the analysis and having identified the main characteristics of the interviewee's profile (role and level of knowledge of the Esquilino district), the formulation of a judgment preference between each pair of project alternatives with respect to each criterion has been asked, by answering questions such as “Which of the following project alternatives could contribute to [...]?” and “How much more important is the selected design alternative than the others?”

For the present research, the submission of the two questionnaires has been carried out through the preparation of the Google telematic forms, to which it has been possible to respond anonymously in the period January–February 2023. The two questionnaires are reported in the Data S1. It should be outlined that, for length reasons, an excerpt of the *alternatives questionnaire* (related to the SWOT strengths category) is shown; the other three surveys focused on the weaknesses, opportunities, and threats are identical in the questionnaire layout.

Furthermore, the main characteristics of (i) the sample of interviewees for the questionnaire submitted to subjects belonging to the local community in terms of personal data (i.e. age, citizenship, income level, area of residence, gender, localization of workplace, means of transport used to go to the workplace, etc.) and (ii) the pool of experts in terms of role assumed and the relevant disciplinary sector, are reported in the Data S1 (Figures S1 and S2). In addition, it should be highlighted that the number of the subjects included in the two samples (270 for the *criteria questionnaire* and 80 for the *alternatives questionnaire*) is representative, on the one hand, of the general opinion of

the local community and, on the other, of the expert judgment of specific categories of operators in the sector (architects, landscape architects, engineers, sociologists, etc.). The direct analysis carried out in a limited period of 2 months has allowed to capture the opinion of a consistent number of subjects respectively belonging to the two categories in order to be able to generalize the results obtained and consider the detected outcome valid.

4.7 | Phase seven—Application of the A'WOT hybrid method

In order to select the project alternative to be preferred among the four considered, in relation to the importance assigned to the evaluation criteria and sub-criteria, in phase seven the hybrid method A'WOT has been applied. In particular, by recalling the results of the SWOT analysis and by implementing the AHP multi-criteria technique, the weights of the criteria obtained from the submission of the *criteria questionnaire* have been multiplied by the scores assigned to the project proposals and derived from the *alternatives questionnaire*. In this sense, the selection of the “best” solution is carried out, by taking into account the opinions expressed by the subjects belonging to the local community and by the experts with reference to the selected criteria, in order to define the temporal priority list of the various interventions.

In general terms, the A'WOT method, combining the SWOT analysis (already carried out) and the AHP, is able to support the decision-making process by determining a priority list of the design alternatives. The importance of the criteria and of the alternatives is resulted through the pairwise comparisons expressed in semantic judgments, converted into numerical values according to the Saaty scale. In this sense, the AHP has been used to evaluate the criteria associated with each SWOT category and to make these commensurable with respect to the attributed value judgment. The integration

of the AHP technique with the SWOT analysis allows the analytic-deductive selection of the priority alternative according to the approach of the pairwise comparison, for the analysis of the alternatives with respect to each SWOT aspect and their ranking from the best to the worst one on the basis of the decision problem prefixed goal. To this purpose, the answers of the two questionnaires submitted have been firstly analyzed according to the aim that characterized them (i.e. the *criteria questionnaire* for the assigning weights to the examined criteria, whereas the *alternatives questionnaire* for the assessment of the four project solutions with reference to the criteria). Subsequently, from the comparison in pairs, both among the different criteria and between each criterion and each alternative, the number of respondents has been analyzed, and the votes expressed and compared to the total number have been added. Therefore, the criteria evaluation matrix has been implemented, by importing the obtained data, calculating the reciprocal value, and normalizing the scores, in order to assign the weights to the analyzed criteria. Then, the alternatives matrix has been built, with the aim of establishing the score to be assigned to the four design solutions.

In particular, the weights of each SWOT criterion have been obtained from the normalized values that are the result of the algebraic ratio between the sum of the scores (from 0 to 9) assigned to the specific criterion analyzed and the number of answers given by the interviewees. Similarly, for the values included in the alternatives matrix, each of them derives from a ratio of two normalized values: the numerator corresponds to the ratio between the sum of the scores attributed by the experts' pool to each proposal and the number of the sample individuals, whereas the denominator is equal to the ratio between the sum of the numerical values given to the other alternative of the pairs comparison and the amount of the respondents. For example, for the “strengths” category and for the “Historical-cultural value” criterion, the weight reported in the matrix is equal to $1.3167 = 2.91/2.21$, where $2.91 = 786/270$ and $2.21 = 597/270$ with 786 and 597 are, respectively, the sum of the scores assigned to the criterion by the sample of the local communities and 270 is the total number of the interviewees.

For each matrix, the consistency ratio (CR) has been verified, considered acceptable the $CR < 0.10$, in order to validate the obtained values (Sharma & Pratap, 2013). Finally, to obtain the final ranking from which to define, which of the four design alternatives is the best with reference to the considered criteria, the summary matrix has been developed, where the scores of the alternatives and the weights of the criteria are reported. By multiplying the two values, the subtotals have been obtained, that is, the best alternative for each SWOT category have been identified. Finally, the sum of all the partial values have been carried out in order to determine which of the various project proposals is the best in absolute terms with reference to the adopted criteria.

4.7.1 | Analysis of the results

With reference to the criteria initially considered in the analysis derived from the SWOT analysis, 22 pairwise comparisons have been

submitted via questionnaire to the sample of subjects of the local community, divided according to the SWOT category to which they belong. Table 4 shows the selected criteria appropriately divided into SWOT and the weights assigned to each criterion, obtained from the implementation of the evaluation matrix and validated by the CR.

Similarly, through the *alternatives questionnaire* submitted to the experts' pool, for each criterion related to the four SWOT categories, the preferred solution has been selected. For example, for the “strengths” category and for the “Historical-cultural value” criterion, the project solution for which the highest score has been observed (equal to 0.307) is the project alternative No. 2—redevelopment intervention of Piazza dei Cinquecento. The result is consistent with the characteristics of the chosen design solution, since it involves the redevelopment of both the twentieth-century architectural complex of the station area and the arrangement of the opposite square, in order to (i) improve the perceptive and the fruition continuity of the entire urban area, (ii) establish spatial connections between the new square and the preexisting environmental, archeological, and monumental structures and, therefore, (iii) validate and increase the historical-cultural value of the places.

For the criterion “Efficiency of transport systems” included among the strengths of the SWOT analysis, the design alternative No.3 is the preferred one, given the renewal of the tramway, vehicular, and pedestrian lines capable of increasing the integration of the various transport systems and, therefore, of improving the efficiency of the overall infrastructure.

TABLE 4 The weights assigned to each selected criterion divided into strengths, weaknesses, threats, and opportunities, according the SWOT analysis.

Criteria	Assigned weights
Strengths	
Historical-cultural value	0.289
Efficiency of transport systems	0.295
Adequate infrastructural level	0.302
Multi-ethnic recognition	0.114
Weaknesses	
Underutilization of the building stock	0.059
Lack of soft mobility systems	0.048
Degradation of urban spaces	0.366
Security level	0.171
Phenomenon of social degradation	0.356
Opportunities	
Regeneration of the existing building stock	0.478
Smart mobility	0.133
Sociocultural quality	0.389
Threats	
Increase in urban vehicular traffic	0.211
Increase of housing deprivation	0.503
Lack of interest from possible investors	0.285

Abbreviation: SWOT, strengths, weaknesses, opportunities, and threats.

The project solution No.2 is assessed as the best with reference to the criterion “Adequate infrastructural level” (0.313) compared to the “Multi-ethnic Recognition” (0.313) one. This is in line with the main purposes of the project hypothesis related to (i) the strengthening of the public urban transport and of the soft mobility for the reduction of congestion caused by the private vehicular flow and (ii) the redevelopment of the areas adjacent to the train station currently degraded and not very accessible, in order to favor the coexistence of foreigners and natives, the processes of cultural exchange, and the integration between the local community and the different ethnic groups.

The same analysis has been carried out for the other three SWOT categories in relation to the *alternatives questionnaire*, aimed at identifying the preferred solution for each pairwise comparison between the hypotheses presented with reference to the examined criteria.

The evaluation matrices built for each SWOT categories and for each criterion considered in the analysis are shown in the Data S1 (Tables S2 and S3).

The final preference list of the four project alternatives considered in the analysis has been deduced from the summary matrix, in which the design solutions and the criteria of each category of the SWOT analysis have been reported.

In particular, the matrix is composed of the scores assigned to the alternatives appropriately obtained from the evaluation carried out by the pool of experts and of the normalized weights attributed to the criteria. From the sum of the partial values of each SWOT category, the design solution that best satisfies all the examined criteria is the alternative No.2, which, therefore, represents the “best” solution to be preferred among the four considered.

An excerpt from the summary matrix is shown in the Table 5.

Although the project alternative No.2 represents the solution that most satisfies the SWOT categories, and, thus, the “best” one to be preferred among the four considered, it should be pointed out that it is not able to meet all the evaluation criteria. In particular, the alternative No.2 is not capable of (i) improving the infrastructural level in the area, (ii) limiting housing deprivation, (iii) reducing urban vehicular traffic. For these criteria, in fact, the preference would fall on the project alternative No.3, that aims to improve the urban decor and the traffic flow of Porta Maggiore and surrounding areas, as well as countering the ineffectiveness of the current roads system, tram lines, and vehicular traffic which cause high pollution levels and poor urban quality. In

TABLE 5 The summary matrix for the final preference list of the four project alternatives.

Final preference list		
Alternative	Total	Priority list
Project alternative No. 1	0.681	4°
Project alternative No. 2	1.336	1°
Project alternative No. 3	1.032	2°
Project alternative No. 4	0.951	3°

Note: The bold and color shade identify the winner project alternative.

this sense, the intervention proposal (alternative No.3) provides for the renewal not only of the tram line, but also of the car and pedestrian ones, with the purpose of increasing the integration of the different public transport systems of the area, in order to encourage the use of public means rather than the massive and widespread use of the private ones.

A further consideration on the results regards the comparison between the project alternatives No.1 and No.2, referring to the same intervention area, that is, Piazza dei Cinquecento, and deriving from the open-procedure design competition in two stages called “Urban and functional redevelopment of the Termini node and Piazza dei Cinquecento”, sponsored by Grandi Stazioni Rail S.p.A in December 2020. Even if the alternative No.1 is the winning project of the competition, according to the methodological approach tested in this research, the alternative No.2 represents the best project solution. The comparison between the two mentioned alternatives highlights that the alternative No.1 is preferred for only 4 of the 15 considered criteria included in the SWOT matrix. However, the relevance of the criteria for which the alternative No.1 is preferred is lower compared to those for which the best solution is the No.2, since the weights assigned to each sub-criteria. In this sense, the outcome aims to stimulate a reflection on the selection of the criteria used in the design competition to evaluate the different project proposals.

5 | DISCUSSION

The developed methodological approach represents an operational tool, useful for different subjects (public and private) to be used in the decision-making processes capable of ensure greater transparency and awareness in the project selection phases. It can be included among the approaches aimed at defining effective and sustainable urban interventions. As part of the initiatives to be implemented capable of promoting the sustainable development of the territory, the methodology pursues to guide the decisors for screening the *urban areas* on which to intervene with priority and the *projects* to be started among different proposals. In this sense, the purposes of the operational tool are consistent with the currency and relevance assumed in recent decades by the SDGs (2030 Agenda and Green Deal (European Commission, 2023)) that cities should achieve with reference to the three fundamental pillars (economic, social, and environmental ones). The planning of interventions is the core of this issue, and the development of innovative easy-to-use approaches allows the implementation of reliable steps as a protocol to be followed in the choices for the definition of guidelines for sustainable urban design, in order to pursue a win-win path for all the subjects involved in the initiatives. It is globally clear that the implementation of the United Nations (UN's) SDGs in the urban centers is one of the most ambitious targets that the countries have undertaken: the need to bridge the gap between the substantive policy goals for long-term sustainability and the means that will be required to attain them is currently a opened question (Weymouth & Hartz-Karp, 2018). The scientific literature plays a significant role in this field: it should contribute to the existing

relevant knowledge, by providing theoretical, methodological and operative tools for evaluating project solutions, and achieving “inclusive, safe, resilient, and sustainable cities and human settlements” (Goal No.11 of UN SDGs) (Finnveden & Gunnarsson-Östling, 2017; Klopp & Petretta, 2017). The present study has tried to reach this purpose through an empirical research aimed to provide a practical tool to be used within urban planning processes for participatory governance actions that promote the sustainable development (De Guimarães et al., 2020). By recognizing the centrality assumed by the cities in the journey toward sustainable development (Villegas Flores et al., 2021; Yigitcanlar et al., 2020; Valencia et al., 2019), the work is part of the academic literature pursued to define methodological approach and assessment models able to encourage urban strategies based on the active participant in the sustainable development challenge (D'Adamo et al., 2022; Mitlin & Satterthwaite, 2014; Satterthwaite, 2021).

6 | CONCLUSIONS

In order to develop transparent and effective intervention programs, the Public Administrations should activate integrated selection procedures that, among different projects alternatives, support the choice mechanisms according to the preestablished requirements, constraints, and criteria. The evaluation methodological approach proposed in the present research is aimed at defining a flexible and user-friendly tool (structured in subsequent phases) to orient the phases of project alternative selection. The present research intends to provide a contribution in terms of operational tool for evaluating the urban interventions to be implemented on the basis of the findings of community's direct surveys. In fact, the proposed methodology is based on the participatory approach for identifying the evaluation criteria and, then, the best project solution by starting from these criteria.

Accordingly, with the purposes and results obtained in the studies of the reference scientific literature on the relevance assumed by the participatory phase in the definition of the urban strategies to be implemented, the methodological approach attributes a crucial function to the local communities. In this sense, the manifestation of their needs and desires is translated into the criteria questionnaire, through which the subjects can express their will to give greater/lesser weight to a specific criterion for evaluating project alternatives rather than another one.

An important advantage of the methodology concerns its applicability to all geographical contexts, as this requires the use of easily available data for the different cases (adaptable in relation to the specificities of the context). The elaborated technique is also simply repeatable: the structuring of the method in predefined steps allows to follow an orderly procedure in which each phase determines a result that can be/must be verified by having the available input data. For an effective implementation of the proposed method, therefore the need to check the reliability of the data is attested (in the economic phase the data regard the selling prices of properties, in the phase of administration of the questionnaires these concern

the answers to the questions, etc.). The development of the phases of the methodological approach presupposes, in fact, the use of valid and robust data taken from official sources and experts in the different thematic areas covered (e.g. for the direct survey through the questionnaires elaboration, sociologist and anthropologist, for the property prices detection, real estate appraisers, etc.).

With reference to the tender procedures related to architecture and engineer works, and, in particular, to the assessment stages of the different project proposals for the designation of the most preferable one, the methodological approach can support the determination of the criteria and the relative weights to be considered in the calls for the project competitions.

The experimentation of the methodology to the Esquilino district in Rome has allowed to test its validity and potentialities. Further insights of the research may concern the application of the evaluation tool to other urban areas that need regeneration initiatives and for which a relevant current public attention is attested. In this sense, the developed approach could guide the drafting of the call for the project proposals, by supporting the determination of the evaluation criteria to be used in the analysis of the future different solutions.

In addition, by having identified an urban area to be renovated and different intervention hypothesis, the assessment tool implementation allows to explicit the portions of the urban context to be analyzed for which a higher need of regeneration is attested. In this regard, each phase included in the proposed methodological approach is crucial to provide effective address lines for the decision-makers involved in the definition of territorial strategies. In fact, the main potentiality of the method concerns the attempt to develop a systematic evaluation approach for a valid and coherent urban transformation interventions planning that promotes the involvement of the communities in the choice processes and aims to transparent and non-discriminatory procedures. The questionnaire (i.e., a recognized tool for direct surveys) for the determination of the fixed criteria weights and the selection of design solution to be preferred by means the pairwise comparisons constitutes a delicate phase of the methodology. The accuracy of the questions included in the interview is strictly linked to the finding's goodness in terms of clearness, subjectivity, and consistency. The absence of objective, in absolute terms, and universally valid and shared outputs is inherent in the direct investigation tools: therefore, the reliability of the results is connected to the heterogeneity of the sample of the individuals selected for the analysis and to the proper structuring of the questions.

AUTHOR CONTRIBUTIONS

The paper is the result of the joint work of the Authors.

FUNDING INFORMATION

This research received no external funding.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial and non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

The data will be available following a requirement to the corresponding author.

ORCID

Francesco Tajani  <https://orcid.org/0000-0002-2011-1950>

Pierluigi Morano  <https://orcid.org/0000-0001-8049-1206>

Felicia Di Liddo  <https://orcid.org/0000-0003-0038-3200>

REFERENCES

- Abdalla, S. S., Elariane, S. A., & El Defrawi, S. H. (2016). Decision-making tool for participatory urban planning and development: Residents' preferences of their built environment. *Journal of Urban Planning and Development*, 142(1), 04015011.
- Abdelmohsen, S. (2014). A BIM-based Framework for Assessing Architectural Competition Entries. Emine Mine Thompson Department of Architecture and Built Environment Faculty of Engineering and Environment Northumbria University. 473.
- Alizadeh, H., Doostvandi, M., & Zandsalimi, M. (2024). Redefining sustainable urban development: A critical analysis in the wake of COVID-19. *Sustainable Development*, 1–19. <https://doi.org/10.1002/sd.3018>
- Altarelli, L., Cao, U., Chiarini, C., Del Vecchio, M., & Petrini, S. (1983). L'isolato come tema: progetti per il quartiere Esquilino.
- Arnstein, S. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216–224.
- Åström, J. (2020). Participatory urban planning: What would make planners trust the citizens? *Urban Planning*, 5(2), 84–93.
- Awad, J., & Jung, C. (2022). Extracting the planning elements for sustainable urban regeneration in Dubai with AHP (analytic hierarchy process). *Sustainable Cities and Society*, 76, 103496.
- Awasthi, A., Omrani, H., & Gerber, P. (2018). Investigating ideal-solution based multicriteria decision making techniques for sustainability evaluation of urban mobility projects. *Transportation Research Part A: Policy and Practice*, 116, 247–259.
- Battisti, A., Barnocchi, A., & Iorio, S. (2019). Urban regeneration process: The case of a residential complex in a suburb of Rome, Italy. *Sustainability*, 11(21), 6122.
- Berčić, T., Bohanec, M., & Ažman Momirski, L. (2024). Integrating multi-criteria decision models in smart urban planning: A case study of architectural and Urban Design competitions. *Smart Cities*, 7(2), 786–805.
- Berntzen, L., & Johannessen, M. R. (2016). The role of citizen participation in municipal smart city projects: Lessons learned from Norway. In *Smarter as the new urban agenda: A comprehensive view of the 21st century city* (vol 11, pp. 299–314). Springer.
- Bevilacqua, C., Calabrò, J., & Maione, C. (2013). The role of community in urban regeneration: Mixed use areas approach in USA. In M. Schrenk, V. V. Popovich, P. Zeile, & P. Elisei (Eds.), *Proceedings Real Corp, 20th–23rd May* (pp. 1361–1365). Rome, Italy.
- Blakeley, G., & Evans, B. (2009). Who participates, how and why in urban regeneration projects? The case of the new 'city' of East Manchester. *Social Policy & Administration*, 43(1), 15–32.
- Brace, I. (2018). *Questionnaire design: How to plan, structure and write survey material for effective market research*. Kogan Page Publishers.
- Callahan, K. (2007). Citizen participation: Models and methods. *International Journal of Public Administration*, 30(11), 1179–1196.
- Carbone, V. (2020). L'Esquilino ai tempi del Covid-19: e forme dell'esclusione e della solidarietà. Note di campo. In V. Carbone & M. Di Sandro (Eds.), (Vol. 13). Roma Tre-Press.
- Cardano, N. (2022). L'Esquilino nei primi tre decenni del Novecento. *Ricerche di Storia dell'arte*, 47(3), 6–18.
- Chenary, K., Pirian Kalat, O., & Sharifi, A. (2024). Forecasting sustainable development goals scores by 2030 using machine learning models. *Sustainable Development*, 1–19. <https://doi.org/10.1002/sd.3037>
- Cheshmehzangi, A., Dawodu, A., Song, W., Shi, Y., & Wang, Y. (2020). An introduction to neighborhood sustainability assessment tool (NSAT) study for China from comprehensive analysis of eight Asian tools. *Sustainability*, 12(6), 2462.
- Chin, H. C., & Foong, K. W. (2006). Influence of school accessibility on housing values. *Journal of Urban Planning and Development*, 132(3), 120–129.
- Choi, Y., Kim, H., Woosnam, K. M., Marcouiller, D. W., & Kim, H. J. (2016). Urban resettlement in residential redevelopment projects: Considering desire to resettle and willingness to pay. *Journal of Housing and the Built Environment*, 31, 213–238.
- Chupin, J. P. (2011). Judgement by design: Towards a model for studying and improving the competition process in architecture and urban design. *Scandinavian Journal of Management*, 27(1), 173–184.
- da Silva, R. R., Santos, G. D., & Setti, D. (2022). A multi-criteria approach for urban mobility project selection in medium-sized cities. *Sustainable Cities and Society*, 86, 104096.
- D'Adamo, I., Gastaldi, M., Ioppolo, G., & Morone, P. (2022). An analysis of sustainable development goals in Italian cities: Performance measurements and policy implications. *Land Use Policy*, 120, 106278.
- De Guimarães, J. C. F., Severo, E. A., Júnior, L. A. F., Da Costa, W. P. L. B., & Salmoria, F. T. (2020). Governance and quality of life in smart cities: Towards sustainable development goals. *Journal of Cleaner Production*, 253, 119926.
- Della Spina, L., Carbonara, S., Stefano, D., & Viglianisi, A. (2023). Circular evaluation for ranking adaptive reuse strategies for abandoned industrial heritage in vulnerable contexts. *Buildings*, 13(2), 458.
- Della Spina, L., Giorno, C., & Galati Casmiro, R. (2019). Bottom-up processes for culture-led urban regeneration scenarios. In *Computational science and its applications-ICCSA 2019: 19th international conference* (pp. 93–107). Springer International Publishing.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. John Wiley & Sons.
- European Commission. (2023). A European Green Deal. Accessed March 25, 2023. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
- European Parliament. (2023). Green Deal: key to a climate-neutral and sustainable EU. Accessed March 30, 2023. <https://www.europarl.europa.eu>
- Falanga, R. (2020). Formulating the success of citizen participation in urban regeneration: Insights and perplexities from Lisbon. *Urban Research & Practice*, 13(5), 477–499.
- Farro, A. L. (2019). *Il mondo in un quartiere. Migrazioni internazionali Esquilino Roma-Centro. Culture, interessi e politica. Contemporanea. Sfide sociologiche e ricerca sociale* (pp. 1–394). CEDAM Publisher.
- Finnveden, G., & Gunnarsson-Östling, U. (2017). Sustainable development goals for cities. In J. Bylund (Ed.), *Connecting the dots by obstacles? Friction and traction ahead for the SRIA urban transitions pathways*. Urban Transitions Pathways Symposium.
- Flores, N. V., Salvador, L. C. C., dos Santos, A. C. P., & Madero, Y. S. (2021). A proposal to compare urban infrastructure using multi-criteria analysis. *Land Use Policy*, 101, 105173.
- Hong, Y. (2018). Resident participation in urban renewal: focused on Sewoon renewal promotion project and Kwun Tong town centre project. *Frontiers of Architectural Research*, 7(2), 197–210.
- Horelli, L., Jarenko, K., Kuoppa, J., Saad-Sulonen, J., & Wallin, S. (2013). *New approaches to urban planning-insights from participatory communities*. Aalto University.
- Hossain, M. U., Ng, S. T., Antwi-Afari, P., & Amor, B. (2020). Circular economy and the construction industry: Existing trends, challenges and prospective framework for sustainable construction. *Renewable and Sustainable Energy Reviews*, 130, 109948. <https://www.concorsiawn.it/riqualificazione-piazza-cinquecento/home>. n.d.

- Hui, E. C. M., Chen, T., Lang, W., & Ou, Y. (2021). Urban community regeneration and community vitality revitalization through participatory planning in China. *Cities*, 110, 103072.
- Ianniello, M., Iacuzzi, S., Fedele, P., & Brusati, L. (2019). Obstacles and solutions on the ladder of citizen participation: A systematic review. *Public Management Review*, 21(1), 21–46.
- Insolera, I. (1993). *Roma moderna, Un secolo di storia urbanistica 1870–1970*. Nuova edizione.
- Juan, Y. K., Roper, K. O., Castro-Lacouture, D., & Ha Kim, J. (2010). Optimal decision making on urban renewal projects. *Management Decision*, 48(2), 207–224.
- Kangas, J., Pesonen, M., Kurttila, M., & Kajanus, M. (2001). A'WOT: Integrating the AHP with SWOT analysis. In *Proceedings of the sixth international symposium on the analytic hierarchy process* (pp. 2–4). ISAH.
- Kazemian, R., & Rönn, M. (2009). Finnish architectural competitions: Structure, criteria and judgement process. *Building Research & Information*, 37(2), 176–186.
- Ke, Y., Liu, J., Meng, J., Fang, S., & Zhuang, S. (2022). Comprehensive evaluation for plan selection of urban integrated energy systems: A novel multi-criteria decision-making framework. *Sustainable Cities and Society*, 81, 103837.
- Khan, Z., Dambruch, J., Peters-Anders, J., Sackl, A., Strasser, A., Fröhlich, P., Templer, S., & Soomro, K. (2017). Developing knowledge-based citizen participation platform to support Smart City decision making: The Smarticipate case study. *Information*, 8(2), 47.
- Kim, J. Y., Kim, J. H., & Seo, K. W. (2023). The perception of urban regeneration by stakeholders: A case study of the Student Village design project in Korea. *Buildings*, 13(2), 516.
- Kisi, N. (2019). A strategic approach to sustainable tourism development using the A'WOT hybrid method: A case study of Zonguldak Turkey. *Sustainability*, 11, 964.
- Klopp, J. M., & Petretta, D. L. (2017). The urban sustainable development goal: Indicators, complexity and the politics of measuring cities. *Cities*, 63, 92–97.
- Kreiner, K. (2012). Organizational decision mechanisms in an architectural competition. In *The garbage can model of organizational choice: Looking forward at forty* (pp. 399–429). Emerald Group Publishing Limited.
- Kurttila, M., Pesonen, M., Kangas, J., & Kajanus, M. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis—A hybrid method and its application to a forest-certification case. *Forest Policy and Economics*, 1(1), 41–52.
- Lee, F. Y., Ma, A. T., & Cheung, L. T. (2021). Resident perception and willingness to pay for the restoration and revitalization of urban rivers. *Water*, 13(19), 2649.
- Lewin, C., & Somekh, B. (2011). *Theory and Methods in Social Research* (pp. 1–368). Sage Publications Ltd.
- Li, X., Zhang, F., Hui, E. C. M., & Lang, W. (2020). Collaborative workshop and community participation: A new approach to urban regeneration in China. *Cities*, 102, 102743.
- Liu, B., Xiao, J., Li, L., & Wu, G. (2022). Do citizen participation programs help citizens feel satisfied with urban redevelopment policy in China? *Journal of Chinese Governance*, 7(3), 341–371.
- Maginn, P. J. (2007). Towards more effective community participation in urban regeneration: The potential of collaborative planning and applied ethnography. *Qualitative Research*, 7(1), 25–43.
- Menteth, W., O'Carroll, O., Curtis, R., & Sawyers, B. (2016). *Design contest guidance: For selecting architects and design teams*. Project Compass CIC.
- Micelli, E., & Scaffidi, F. (2022). Sustainability in urban regeneration: Real or propaganda? In *Urban regeneration through valuation Systems for Innovation* (pp. 75–89). Springer International Publishing.
- Michels, A., & De Graaf, L. (2010). Examining citizen participation: Local participatory policy making and democracy. *Local Government Studies*, 36(4), 477–491.
- Middleton, C., & Freestone, P. (2008). The impact of culture-led regeneration on regional identity in north east England. *Regional and Urban Regeneration in European Peripheries*, 51, 51–58.
- Mitlin, D., & Satterthwaite, D. (2014). Sustainable development and cities. In *Sustainability the environment and urbanisation* (pp. 23–61). Routledge.
- Montuori, M. A. (2007). The visible and the invisible: Crossing ethnic and spatial boundaries in two immigrant's neighborhoods in Rome. Retrieved December 12, 2013.
- Morano, P., Tajani, F., Di Liddo, F., & La Spina, I. (2023). The evaluation in the urban projects planning: A logical-deductive model for the definition of “warning areas” in the Esquilino District in the City of Rome (Italy). *Smart Cities*, 6(1), 469–490.
- Morano, P., Tajani, F., Guarini, M. R., & Sica, F. (2021). A systematic review of the existing literature for the evaluation of sustainable urban projects. *Sustainability*, 13(9), 4782.
- Mudu, P. (2003). Gli Esquilini: Contributi al dibattito sulle trasformazioni nel Rione Esquilino di Roma dagli anni settanta al Duemila [The Esquilini: Notes on the transformations of the Esquilino Area in Rome from 1970s to 2000]. In R. Morelli, E. Sonnino, & C. M. Travaglini (Eds.), (a cura di) *I territori di Roma* (pp. 641–680). Storie, popolazioni, geografie.
- Naku, D. W. C., & Afrane, S. (2013). Local community development and the participatory planning approach: A review of theory and practice. *Current Research Journal of Social Sciences*, 5(5), 185–191.
- Nasar, J. L. (1999). *Design by competition: Making design competition work*. Cambridge University Press.
- Nikoloudis, C., Aravossis, K., Strantzali, E., & Chrysanthopoulos, N. (2020). A novel multicriteria methodology for evaluating urban development proposals. *Journal of Cleaner Production*, 263, 120796.
- Observatory of the Real Estate Market (OMI) of the Italian Revenue Agency. 2023 Accessed May 21, 2023. <https://www.agenziaentrate.gov.it/portale/web/guest/schede/fabbricatiterreni/omi/banche-dati/quotazioni-immobiliari>.
- Panagopoulos, T., Guimarães, M. H., & Barreira, A. P. (2015). Influences on citizens' policy preferences for shrinking cities: A case study of four Portuguese cities. *Regional Studies, Regional Science*, 2(1), 141–170.
- Parés, M., Bonet-Martí, J., & Martí-Costa, M. (2012). Does participation really matter in urban regeneration policies? Exploring governance networks in Catalonia (Spain). *Urban Affairs Review*, 48(2), 238–271.
- Pethia, S. R. (2011). *Reconstructing communities: The impact of regeneration on community dynamics and processes* [Doctoral dissertation, University of Birmingham].
- Piano Urbano della Mobilità Sostenibile (PUMS). (2023). <https://romamobilita.it/it/progetti/pums>
- Pollock, V. L., & Sharp, J. (2012). Real participation or the tyranny of participatory practice? Public art and community involvement in the regeneration of the Raploch Scotland. *Urban Studies*, 49(14), 3063–3079.
- Pourzakarya, M., & Bahramjerdi, S. F. N. (2021). Community-led regeneration practice in Ghalam Gudeh district, Bandar Anzali, Iran: A participatory action research (PAR) project. *Land Use Policy*, 105, 105416.
- Rădulescu, C. M., Ștefan, O., Rădulescu, G. M., Rădulescu, A. T., & Rădulescu, M. V. (2016). Management of stakeholders in urban regeneration projects. Case Study: Baia-Mare, Transylvania. *Sustainability*, 8(3), 238.
- Roma - Piano Urbano della Mobilità Sostenibile. (n.d.). Documento PUMS—Vol.1—Quadro conoscitivo ed obiettivi. https://www.comune.roma.it/web-resources/cms/documents/PUMS_roma_vol1.pdf
- Rönn, M. (2010). Expertise and judgment in architectural competitions: A theory for assessing architecture quality. In *International conference: Constructions matters, Copenhagen Business School*, 5-7 May 2010 (pp. 1–21). Copenhagen Business School.
- Rönn, M. (2011). Architectural quality in competitions. A dialogue based assessment of design proposals. *FORMakademisk*, 4(1), 100–115.

- Saaty, T. L. (1980). The analytic hierarchy process: Planning, priority setting, resource allocation.
- Saiu, V., Blečić, I., & Meloni, I. (2022). Making sustainability development goals (SDGs) operational at suburban level: Potentials and limitations of neighbourhood sustainability assessment tools. *Environmental Impact Assessment Review*, *96*, 106845.
- Sanchez Medero, G., & Pastor Albaladejo, G. (2019). The quality of participatory processes in the urban redevelopment policy of Madrid city council. *Ene*, *10*, 56.
- Satterthwaite, D. (2021). Sustainable cities or cities that contribute to sustainable development? In *The Earthscan reader in sustainable cities* (pp. 80–106). Routledge.
- Serpi, A. (2009). Il rione europeo. Un caso di Gentrification. Il Rione Incompiuto. In F. Scarpelli (Ed.), *Antropologia Urbana dell'Esquilino* (pp. 229–270). CISU Publisher.
- Sharifi, A. (2019). A critical review of selected smart city assessment tools and indicator sets. *Journal of Cleaner Production*, *233*, 1269–1283.
- Sharifi, A., Simangan, D., Kaneko, S., & Virji, H. (2021). The sustainability–peace nexus: Why is it important? *Sustainability Science*, *16*(4), 1073–1077.
- Sharma, S., & Pratap, R. (2013). A case study of risks optimization using Ahp method. *International Journal of Scientific and Research Publications*, *3*(10), 1–6.
- Shrestha, R. K., Alavalapati, J. R., & Kalmbacher, R. S. (2004). Exploring the potential for silvopasture adoption in south-central Florida: An application of SWOT–AHP method. *Agricultural Systems*, *81*(3), 185–199.
- Soomro, K., Khan, Z., & Ludlow, D. (2017). Participatory governance in smart cities: The urbanAPI case study. *International Journal of Services Technology and Management*, *23*(5–6), 419–444.
- Tajani, F., Morano, P., Di Liddo, F., & Doko, E. (2022). A model for the assessment of the economic benefits associated with energy retrofit interventions: An application to existing buildings in the Italian territory. *Applied Sciences*, *12*(7), 3385.
- Tian, T., & Zhu, L. (2015). Experiences of citizen participation in old city regeneration in Yangzhou, China. *Population Mobility, Urban Planning and Management in China*, 329–347. https://doi.org/10.1007/978-3-319-15257-8_19
- Torre, C. M., Morano, P., & Tajani, F. (2017). Saving soil for sustainable land use. *Sustainability*, *9*(3), 350.
- Valencia, S. C., Simon, D., Croese, S., Nordqvist, J., Oloko, M., Sharma, T., ... Versace, I. (2019). Adapting the sustainable development goals and the new urban agenda to the city level: Initial reflections from a comparative research project. *International Journal of Urban Sustainable Development*, *11*(1), 4–23.
- Verma, P., & Raghubanshi, A. S. (2018). Urban sustainability indicators: Challenges and opportunities. *Ecological Indicators*, *93*, 282–291.
- Wang, W. M., Lee, A. H., Peng, L. P., & Wu, Z. L. (2013). An integrated decision making model for district revitalization and regeneration project selection. *Decision Support Systems*, *54*(2), 1092–1103.
- Wang, Y., & Xiang, P. (2019). Investigate the conduction path of stakeholder conflict of urban regeneration sustainability in China: The application of social-based solutions. *Sustainability*, *11*(19), 5271.
- Weymouth, R., & Hartz-Karp, J. (2018). Principles for integrating the implementation of the sustainable development goals in cities. *Urban Science*, *2*(3), 77.
- White, J. T. (2014). Design by competition and the potential for public participation: Assessing an urban design competition on Toronto's waterfront. *Journal of Urban Design*, *19*(4), 541–564.
- Wu, N., & Zhao, S. (2015). Impact of transportation convenience, housing affordability, location, and schooling in residence choice decisions. *Journal of Urban Planning and Development*, *141*(4), 05014028.
- Wu, Z., Jin, M., & Cao, H. (2024). Residents' environmental behavior in eco-community development and its influencing factors: Evidence from Dongying City, Shandong Province in China. *Sustainable Development*, *1*, 16.
- Yang, J., Yang, L., & Ma, H. (2022). Community participation strategy for sustainable urban regeneration in Xiamen, China. *Land*, *11*(5), 600.
- Yigitcanlar, T., Han, H., & Kamruzzaman, M. L. (Eds.). (2020). Approaches, advances and applications in sustainable development of smart cities.
- Zhang, C., & Liao, L. (2022). The active participation in a community transformation project in China: Constructing new forums for expert-citizen interaction. *Journal of Chinese Governance*, *7*(3), 372–399.
- Zhang, Y., Kang, S., & Koo, J. H. (2021). Perception difference and conflicts of stakeholders in the urban regeneration project: A case study of Nanluoguxiang. *Sustainability*, *13*(5), 2904.
- Zhou, T., Zhou, Y., & Liu, G. (2017). Key variables for decision-making on urban renewal in China: A case study of Chongqing. *Sustainability*, *9*(3), 370.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Tajani, F., Morano, P., Di Liddo, F., & La Spina, I. (2024). An evaluation methodological approach to support the definition of effective urban projects: A case study in the city of Rome (Italy). *Sustainable Development*, 1–23. <https://doi.org/10.1002/sd.3153>