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New Metropolitan Perspectives

Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages Perspectives

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Preface

This volume contains the proceedings for the fifth International "NEW METROPOLITAN PERSPECTIVES. Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages' Perspectives", scheduled from May 25–27, 2022, in Reggio Calabria, Italy.

The symposium was promoted by LaborEst (Evaluation and Economic Appraisal Lab) of the PAU Department, Mediterranea University of Reggio Calabria, Italy, in partnership with a qualified international network of academic institution and scientific societies.

The fifth edition of "NEW METROPOLITAN PERSPECTIVES", like the previous ones, aimed to deepen those factors which contribute to increase cities and territories attractiveness, both with theoretical studies and tangible applications.

This fifth edition coincides with what is most likely the end of the COVID pandemic that began in 2020. The global health emergency, despite having been a phenomenon limited in time, has acted as an accelerator of some changes in behavior and in the organization of activities associated with the ever-increasing spread of ICT.

The phenomena are too recent and still ongoing to fully understand the implications they will have on settlement systems, but the conclusion reached at the previous edition of New Metropolitan Perspectives seems to be confirmed: from many of the works presented at the Symposium, a reduction in the relevance of the localization factor emerges with ever greater clarity, at least in the ways known so far from the times of the Industrial Revolution, bringing to light more and more a paradigm shift in the center-periphery dualism.

In fact, the phenomenon that in the past led to the birth of the modern city, the need to concentrate people and activities in small areas, seems to be decreasing: the progressive spread of smart working and the digital modality for the provision of services (just think, e.g., of the digital services of the Public Administration or online commerce) significantly reduces the gaps in terms of accessibility to goods and services between metropolitan cities and marginalized areas, such as inland areas.

But this edition of the symposium also coincides with the start of a new phase for European policies, guided toward the green and digital transition, for the period 2021-27, by the European Green Deal, especially through the tool of the Next Generation EU.

The links between new technologies and sustainability tend to focus on the role played and that can play the city at EU level in fighting climate change.

Many of the contributions collected in this volume address the issue of the green transition through multidisciplinary points of view, dealing with very different issues such as, for example: infrastructures and mobility systems, green buildings and energy communities, ecosystem services and the consumption of soil, providing interesting information on the main trends in progress.

The changes in individual behavior and social organization, associated with the digital transition, are illustrated by the contributions that have addressed the issue of rules and of social innovation practices that are prefiguring new forms of governance for the regeneration of settlement systems. In this context, the issues of the new declinations of the concept of citizenship were also addressed, also with reference to the need to create favorable contexts for individual initiative and entrepreneurship, especially for young people, as a possible response to the challenge of employability for the new generations.

In this context, territorial information systems take on a leading role, together with apps capable of making territories increasingly smart.

The substantial investments planned by the EU to support the green and digital transition in the coming years require multidimensional evaluation systems, capable of supporting decision makers in selecting the interventions most capable of pursuing the objectives. The financial resources used for the implementation of the policies are borrowed from future generations, to whom we will have the obligation to be accountable for our work.

Unfortunately, at the time of writing we must also register serious concerns for the future of humanity, stemming from the risks of the spread of the conflict between Russia and Ukraine. In addition to the obvious concerns about the suffering that wars always cause to civilian populations, this situation makes future scenarios even more uncertain: It is clear that the circulation of goods, people and ideas will be increasingly conditioned by future geopolitical balances.

The ethics of research, in the disciplinary sectors that the Symposium crosses, invites us to feed, with scientific rigor, policies and practices that make the territory more resilient and able to react effectively to catastrophic events such as the pandemic or the war: We hope to know the outcomes of these courses in the next editions of the New Metropolitan Perspectives symposium.

For this edition, meanwhile, the more than 300 articles received allowed us to develop 6 macro-topics, about “Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages’ Perspectives” as follows:

1. Inner and marginalized areas local development to re-balance territorial inequalities

2. Knowledge and innovation ecosystem for urban regeneration and resilience
3. Metropolitan cities and territorial dynamics. Rules, governance, economy, society
4. Green buildings, post-carbon city and ecosystem services
5. Infrastructures and spatial information systems
6. Cultural heritage: conservation, enhancement and management.

And a Special Section, Rhegion United Nations 2020-2030, chaired by our colleague Stefano Aragona.

We are pleased that the International Symposium NMP, thanks to its interdisciplinary character, stimulated growing interests and approvals from the scientific community, at the national and international levels.

We would like to take this opportunity to thank all who have contributed to the success of the fifth International Symposium "NEW METROPOLITAN PERSPECTIVES. Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages' Perspectives": authors, keynote speakers, session chairs, referees, the scientific committee and the scientific partners, participants, student volunteers and those ones that with different roles have contributed to the dissemination and the success of the Symposium; a special thank goes to the "Associazione ASTRI", particularly to Giuseppina Cassalia and Angela Viglianisi, together with Immacolata Lorè, for technical and organizational support activities: without them the Symposium couldn't have place; and, obviously, we would like to thank the academic representatives of the University of Reggio Calabria too: the Rector Prof. Marcello Zimbone, the responsible of internationalization Prof. Francesco Morabito, the chief of PAU Department Prof. Tommaso Manfredi.

Thank you very much for your support.

Last but not least, we would like to thank Springer for the support in the conference proceedings publication.

Francesco Calabrò
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Contents

Integrated Evaluation Methodology for Urban Sustainable Projects

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Abstract. The projects for cities' development must comply with multiple instances defined according to the sustainability dimensions, i.e. economic, social and environmental ones. Even in the light of the most demanding international governmental and other current provisions for climate-change adaptation, initiatives of public and/or private interest must be evaluated on the basis of their performance level in the perspective of economic growth, environmental protection and social well-being.

The present paper focuses on the following issues: *i*) the economic-sustainable evaluation of urban design-solutions; *ii*) how to carry out integrated evaluations that systematically include multiple aspects while respecting the interests involved.

The use of multi-criteria analysis methods if, on the one hand, contributes to the achievement of commingling among dissimilar semantic-assessment fields, on the other hand, it is characterized by the difficulty of taking into account the interests of all the stakeholders able to affect the intervention priority among investment alternatives in urban context.

The work aims at describing an integrated evaluation methodology based, on the one hand, on the syntactic-operational formalism of the Analytic Hierarchy Process (AHP), and, on the other one, on the implementation of an analytical technique of a descriptive-participatory type (SWOT analysis + focus group) for the definition of evaluation criteria and relative weights for the sustainable evaluation of projects.

Keywords: Urban sustainable development · Integrated evaluation framework · AHP · SWOT analysis · Focus group

1 Introduction

Facing the climate changes is the most difficult challenge nowadays [1]. Globally, climatic conditions are rapidly evolving, worsening the effects on cities in terms of quality of life, mean urban temperature, capability to respond to natural disaster, etc. [2]. The attention given to the issue of implementing the sustainability in every sector and as

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global issue is risen in the past fifteen years. Indeed, the United Nations (UN) develop a specific Agenda for Sustainable Development, in which the issues addressed are multiple and interrelated, in order "[…] to achieve a better and more sustainable future for all". Specific objectives are recognised in seventeen goals (Sustainable Development Goals – SDGs) with a focus on cities in Goal 11 "Make cities and human settlements inclusive, safe, durable and sustainable" [3]. Furthermore, in a perspective of monitoring the vulnerability of the cities in 2015, the Third UN World Conference adopted the "Sendai framework", with the support of the United Nations Office for Disaster Risk Reduction (UNISDR) [4]. In the Sendai report the shift from "disaster management" to "disaster risk management" is highlighted through the statement of prevention activities consistent with the seventeen SDGs. Furthermore, the building's design process is characterized by new approaches with an emphasis on the integration and the protection of natural components in the project, such as biophilic design - as a strategy for promoting positive connections between people and nature -, or the *archinature*, i.e. the complex and articulated interweaving in which nature and artifice should collaborate in the construction of buildings and landscape [5–7]. This typology of design aims to sustain the resilience of natural systems over the time, modifying many components of the environmental conditions of a building or landscape in the short term, in order to support, in the long term, an ecologically robust and sustainable natural community [8, 9]. Furthermore, in the European Union (EU) there is a particular attention for the integration of environmental criteria into all phases of the purchasing process, encouraging the diffusion of technologies and environmentally sound products. The European Commission has developed the Green Public Procurement (GPP) [10], encouraging member States to adopt action plans for the integration of environmental requirements into public procurement and, subsequently, issued specific Guidelines for the drafting of a National Action Plans on GPP. In Italy, for example, the Procurement Code [11] has introduced the obligation to follow the minimum environmental criteria (CAM) – defined consistently with the GPP - in the planning of new interventions on the territory. Through this approach, the projects must consider the life cycle of products, services and concessions and has to be measured by objective criteria capable of weighing the environmental, energetically, social and economic performance on a medium and long analysis term.

Considering all the issues described above, it is possible to state that understanding the impact that climate change will have on cities is complex, because it involves many different factors hard to quantify [12]. In order to support and guide the planning and design of sustainable and resilient cities, it is necessary to develop methods, methodological approaches and tools able to assess urban sustainability criteria and appropriate performance indicators.

The research aims at developing an integrated evaluation methodology based on: *i*) the use of one of the main tools found in the literature for solving ranking problems – Analytic Hierarchy process (AHP) [13] – *ii*) the synergic implementation of a participatory process aimed at empirically quantifying the weights of the criteria involved in the evaluation flow of the examined projects.

The work is organized as follows: Sect. 2 contains a brief literature review in order to contextualize the research carried out; in Sect. 3 the evaluation methodology adopted

is illustrated; in Sect. 4 the methodology is applied to a case study, in order to highlight its potentialities; in Sect. 5 the conclusions are discussed.

2 Sustainable Criteria and Supporting Assessment Methods

The selection of a set of proper criteria, indicators and/or index for the assessment of the sustainability of urban transformation projects is quite complex. Analyzing the current literature, a lack of consensus is noticeable, not only on the whole conceptual framework of reference, but on the selection and optimal number of indicators. Also, there is a lack of uniformity in identifying the relative weights to be attributed to sustainability criteria and indicators [14]. Early in 2002 Warhurst [15] - referring to the mining, metals and energy sectors - highlighted the need to structure links among sustainable development and corporate social, economic and environmental performance. Nowadays, a recent study carried out by Morano et al. [16] point out the heterogeneity both in the adoption of criteria and indicators, in the methodology approach and in the tools that could be used. Furthermore, Tanguay et al. [17] highlight that, according to the reference territory, there are different classifications and categorizations of Sustainable Development Indicators (SDI); moreover, the ambiguous definition of sustainable development makes hard the selection of methods and difficult the accessibility of qualitative and quantitative data.

In order to respond to this state of the art, many studies and research have been developed on the subject. With reference to the construction sector, Ayman and Wafaa [18] carried out a review in order to establishing an International Sustainability Index. In United Kingdom, Boyko et al. [19] defined a toolkit that establishes the relative sensitivity of sustainability indicators to facilitate the use of scenarios in any urban context and at any scale of reference. In the Indian context, Anand et al. [20] developed a study to assess various sustainability criteria in smart cities using a fuzzy-AHP method. With specific reference to the selection of sustainable materials in the construction sector, Figuereido et al. [21] also adopted a framework that involved the integration of Life Cycle Sustainability Assessment (LCSA), fuzzy-AHP, and Building Information Modeling (BIM) to choose suitable materials, by creating a system of 52 indicators of urban sustainable development that could address economic growth and efficiency, ecological and infrastructural construction, environmental protection, social and welfare progress. Other research tried to systematize the use of many indicators throughout the development of integrated tools like the Dashboard of Sustainability (DS) [22, 23], that is a mathematical and graphical tool that is able to create concise evaluations to support the decision-making process; or the methodology proposed by Fernández-Sánchez and Rodríguez-López [24], aimed at identifying a specific set of sustainability indicators in construction project management.

3 Integrated evaluation methodology for sustainable projects

In the light of literature review evidence in Sect. 2, it seems appropriate to be able to apply "mixed" evaluation methodologies in order *i*) to address, manage and translate multiple design-assessment aspects of projects, taking into account the logical-functional relationships in sustainable perspective, *ii*) to create a system of multi-scalar analysis

that highlights the socio-economic and environmental characteristics of projects, as well as their sustainable effects for territorial growth. The proposed evaluation methodology allows for multi-dimensional assessments of alternative designs solutions based on a participatory and explicit information structure [25]. The novelty of the proposed methodological approach is identifiable in the mixture between the implementation of a participatory process according to a logic of direct functionality with respect to the multi-criteria evaluation method designed to solve the ranking problems between alternatives.

By considering a panel (I) of design solutions (i = 1, …, *n*) to be evaluated from a sustainable perspective, the proposed methodology is constituted by the following sequential steps:

Step 1_SWOT analysis for sustainable criteria recognition: definition of the evaluation criteria (j = 1, …, *m*) to be used to quantitatively and/or qualitatively measure the effects of the i-*th* intervention to be carried out in the urban area of reference from the point of view of sustainable development. The systematic process of the main performance criteria to be used in the evaluation phase of the i-*th* project alternative is carried out according to the logic of SWOT analysis. This highlights strengths, weaknesses, opportunities and risks that characterize the set of projects (I). The comparison among the different SWOT analysis carried out for each i-*th* alternative project is used to identify appropriate evaluation criteria in order to choose of a specific project consistent to the programmatic goals of sustainability at international level. The criteria (j-*th*) are directly derived by examining the SWOT analysis developed for each project, and identifying the keywords that are most frequently recurrent in the i-*th* alternative;

Step 2_Focus group for weighting-criteria: weighting in correspondence with the j-*th* evaluation criteria by Step 1 for the i-*th* project solution.

The weighting of the criteria is developed through the engagement of focus group practice, namely a group interview involving a small number of similar people or participants who have common experiences in urban sustainable studies;

Step 3_AHP analysis: measurement of the relative weights (w_{ij}) among design solutions *i* with respect to the j-*th* evaluation criterion by Step 1.

This with the Analytic Hierarchy Process that provides: *i*)the construction of the pairwise comparisons matrix between alternative projects; *ii*) the determination of relative local weights. The local weights of each project are multiplied by those of the corresponding via focus group activity. The products thus obtained are summed in global weights (or priorities value) of the analysis elements. To verify whether the weights obtained in the Step 2 are comparable to the judgments of the AHP, the Consistency Ration (CR) for each comparison matrix, as ratio between Consistence Index and Random Index [26] must be defined;

Step 4_Evaluation problem solving: the outcomes obtained by previous Steps could support the solving of multiple operative decision-making systems, e.g. the creation of the ranking lists, total and relative to each evaluation criterion, between project alternatives, or the selection of best project to finance for the urban sustainable development.

The proposed evaluation algorithm is tested on case study aimed to structure a ranking among alternatives related to urban regeneration projects located in different countries of the world. The application of the methodological framework is aimed at testing the flexibility of the proposed analysis scheme, even in the situation of having to evaluate examples of projects implemented in settlement contexts of different economic, social and environmental feature. In Sect. 4 the description of the case study under examination is presented.

4 A Ranking Case Between World-Wide Urban Renewal Projects

The case study takes into account a set of 13 projects, of diverse affiliation country, aimed to the urban renewal and recovery of property of historical and architectural significance. The projects are spread worldwide: five in Europe (two in Italy, one in France, one in Belgium, one in Slovakia), two in North Africa (Egypt and Morocco), two in middle east/Mediterranean (Lebanon, Turkey), four in western Asia (Iran). The identification of 13 case-studies was performed according to relative construction year, investment costs and capacity to pursue sustainability goals in the urban context where they are located.

The objective is to individuate which of this projects are able to determine the best financial, social, cultural and environmental benefits in sustainable perspective on their territory. Below descriptions of the steps of the proposed evaluation methodology with regard to the ranking case-study are reported.

Step 1: SWOT analysis for sustainable criteria recognition
The specificities of the several cities in the world where the i-*th* project is located, and the availability of information on the interventions examined, led to the description of each project according to the logic of SWOT analysis. The comparison among i-*th* SWOT analysis allows to identify key evaluation aspects – *sustainable evaluation criteria* – on the basis of which is possible to frame the ranking case-study. By the process of comparing alternative solutions, the evaluation of the projects set could be made according to the following sustainable evaluation criteria: C1) economic impact; C2) historical value; C3) environmental aspect; C4) location and relationship with the urban core of the city; C5) creation of open space; C6) private/public collaboration; C7) social sustainability; C8) cultural boost; C9) technological features; C10) correspondence to national and international strategies of sustainable development.

Step 2: Focus group for weighting-criteria
To establish weights-criteria for the i-*th* project examined, a focus group activity is carried out. A small-group discussion of 4 members that have knowledge on the project set and sustainability objectives, guided by a trained leader, is created. Through online means (video-chat, web-forum) the participatory evaluation among group-components is performed. Each component is called to express own judgment on importance degree for j-*th* criteria in correspondence to i-*th* project alternative. The evaluation process of importance degree attribution is made on the basis of the evaluation scale [0, 3, 5, 7] which stands as follows: not at all meaningful (0); low meaningful (3); quite meaningful (5); high meaningful (7). In Table 1 the outcomes of focus group activity for weighting-criteria are reported.

Table 1. Criteria-weights values

Project alternatives	Sustainable evaluation criteria									
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
P1. Navile Market	3	5	7	7	7	5	3	3	0	5
P2. Regeneration of Maspero Triangle	5	5	5	7	5	5	3	0	3	3
P3. Progetto Manifattura	5	5	7	5	7	5	5	7	5	5
P4. Iran Mall	7	0	3	5	3	3	5	5	7	3
P5. Waterfront City	7	0	3	5	7	7	5	0	5	7
P6. Twin City	7	0	5	7	7	3	7	3	7	7
P7. Rabat City Train Station	7	7	0	7	5	7	3	0	5	3
P8. Galataport	7	0	0	7	5	5	7	5	7	3
P9. Chitgar Lake	3	3	3	7	5	3	5	5	0	0
P10. Naghsh E Jahan	5	7	0	5	3	3	5	3	3	0
P11. Charbagh Street	5	5	7	7	0	3	3	0	3	3
P12. Tivoli Greencity	3	0	7	3	3	3	7	0	0	5
P13. Philharmonie	0	0	3	5	0	3	3	7	7	3

Step 3: AHP analysis

The measurement of the relative weights among design solutions *i* with respect to the j-*th* evaluation criterion by Step 1 is made via AHP analysis. Ten comparison matrices among alternative projects for each evaluation criterion are performed. As evaluation scale of reference the follows is adopted: 3 (low meaningful versus other alternative); 5(quite meaningful versus other alternative); 7 (high meaningful versus other alternative). In spite of the well-established *Saaty* scale (1, 3, 5, 7, 9), this smaller range value scale has been adopted in order to preserve operational uniformity with the previous Step and corresponding evaluation process.

Table 2 reports an example of comparison matrix among project alternatives for the C1 (economic impact criterion).

To verify the judgments consistency of Step 3 and those underlying the AHP, the Consistence Ratio (CR) is calculated for j-*th* comparison matrix as in Table 3.

As noted via literature studies on AHP, a CR index value < 0.1 is considered permissible; when the CR value exceeds a threshold equal to 10%, the deviation from the perfect consistency condition is considered unacceptable [26]. For the case-study, the follows range values for CR index are considered (Table 4). The minimum and maximum CR values ($CR_{min} = 0.130$; $CR_{max} = 0.360$), as well as the intermediate benchmark ($\overline{CR} = 0.245$) were obtained by assuming the j-*th* comparison matrix consists entirely of the minimum, middle and maximum values (3, 5, 7) of the rating AHP scale. In accordance with the range values as in Table 4 the CR outcomes by AHP analysis of reference case-study are quite acceptable.

Table 2. Comparison matrix between project alternatives regarding economic impact criterion

C1.Economic impact	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13
P1	1,00	7	7	7	7	7	5	5	5	7	7	5	3
P2	0,14	1,00	5	7	7	7	7	7	3	5	5	3	3
P3	0,14	0,20	1,00	7	7	7	7	7	3	5	5	3	3
P4	0,14	0,14	0,14	1,00	5	5	5	5	3	3	3	3	3
P5	0,14	0,14	0,14	0,20	1,00	5	5	5	3	3	3	3	3
P6	0,14	0,14	0,14	0,20	0,20	1,00	5	5	3	3	3	3	3
P7	0,20	0,14	0,14	0,20	0,20	0,20	1,00	5	3	3	3	3	3
P8	0,20	0,14	0,14	0,20	0,20	0,20	0,20	1,00	3	3	3	3	3
P9	0,20	0,33	0,33	0,33	0,33	0,33	0,33	0,33	1,00	7	7	5	3
P10	0,14	0,20	0,20	0,33	0,33	0,33	0,33	0,33	0,14	1,00	5	3	3
P11	0,14	0,20	0,20	0,33	0,33	0,33	0,33	0,33	0,14	0,20	1,00	3	3
P12	0,20	0,33	0,33	0,33	0,33	0,33	0,33	0,33	0,20	0,33	0,33	1,00	3
P13	0,33	0,33	0,33	0,33	0,33	0,33	0,33	0,33	0,33	0,33	0,33	0,33	1,00

Table 3. Consistence Ratio (CR) values

	Sustainable evaluation criteria	CR
C1	Economic impact	0.349
C2	Historical value	0.322
C3	Environmental aspect	0.277
C4	Location	0.339
C5	Open spaces	0.290
C6	Public/Private collaboration	0.326
C7	Social sustainability	0.367
C8	Cultural boost	0.308
C9	Technological features	0.364
C10	Sustainable development	0.326

Table 4. CR range values

CR range value	Meanings
$0.130 \leq CR \leq 0.245$	High acceptable
$0.246 \leq CR \leq 0.360$	Quite acceptable
$CR \geq 0.361$	Not acceptable

Step 4: Ranking problem outcomes.
By previous steps total priority list and relative ones for j-*th* criterion are obtained, respectively in the Tables 5 and 6 following.

Table 5. Total priority list

	P1	P5	P8	P3	P2	P4	P6	P9	P10	P7	P11	P13	P12
i-th Global weight	0.184	0.139	0.130	0.101	0.096	0.084	0.072	0.059	0.046	0.040	0.034	0.028	0.022

Table 6. Relative priority lists

Relative priority lists									
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
P4	P1	P1	P1	P1	P1	P4	P3	P4	P1
P2	P2	P3	P2	P3	P5	P6	P4	P6	P5
P1	P7	P2	P4	P2	P2	P1	P1	P8	P6
P5	P3	P6	P7	P5	P7	P3	P9	P3	P3
P7	P10	P12	P9	P6	P3	P2	P8	P2	P2
P6	P11	P11	P3	P7	P4	P8	P13	P5	P4
P3	P9	P4	P6	P9	P8	P5	P6	P7	P12
P8	P4	P5	P5	P4	P6	P12	P10	P13	P7
P10	P5	P9	P8	P8	P9	P9	P2	P10	P8
P11	P6	P13	P11	P10	P10	P10	P5	P11	P11
P9	P8	P7	P10	P12	P11	P7	P12	P1	P13
P12	P12	P8	P13	P11	P12	P11	P7	P9	P10
P13	P13	P10	P12	P13	P13	P13	P11	P12	P9

5 Conclusions

Assessing the sustainability of projects requires the implementation of methodologies to express the projects performance according to the three dimensions of sustainability, namely economic, social and environmental ones. This should also be carried out by taking into account the decision-making context, in particular the interests related to the stakeholders involved in the life cycle of the projects to be assessed [27, 28]. The integrated evaluation methodology for urban sustainable projects [29, 30] described in this contribution attempts to comply, on the one hand, with the need to carry out assessments that respect the points of view of multiple stakeholders, and, on the other one, to

formulate judgments according to a logical-operational process that is as rational and sequential as possible. The development of SWOT analysis, as first step, and then the implementation of focus group provides qualitative-quantitative input information data for the applicability of evaluative procedures (e.g., AHP), in order to support ranking cases among alternatives for the sustainable city development. The testing and checking phase of the applicability of the proposed evaluation framework on the set of 13 urban renewal projects in world-wide context allow to make some reflections. Namely, the proposed framework on which to set up the integrated evaluation of projects in sustainable key can change according to: *i*) the type of evaluation problem to be solved, *ii*) the category and number of stakeholders (public and/or private) involved in the project initiatives. The combination of these factors (type of evaluation problem, territorial analysis and stakeholders involved) defines the degree of detail and accuracy of the evaluation framework, as well as the level of accuracy of the evaluation system proposed, supporting the resolution of multiple evaluation cases of interest. Limitations of the research lie in the measurement of the weights of each criterion through a participatory process, and thus in the randomness of computing this data in the AHP evaluation process. Outlines of future researches will regard the integration of proposed methodological framework whit different multi-criteria decision tools, and its applicability to diverse type of investments in circumscribed contexts of analysis.

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