

Points of intersection between sustainability and project management

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Abstract. The goal of this paper is to explore the dimension of sustainability in project management through a systematic literature review; more specifically, the article aims at reviewing the approaches to ensure the performance of urban projects performance targeting sustainable objectives. An attempt to explore the way the two fields intersect by means of exchanging both strengths: project management know-how areas, on the one hand, and sustainability tools, a win-win for improving the efficiency of implementing sustainability in every project. The research objective is to define concepts, terminology and conceptual clarifications on the management of sustainable urban development projects, the bibliographic reference, which will present the historical evolution and the current state of knowledge in the field (theories, studies and relationships, good practices, definitions). The scope of this effort is to dive into the maze of a literature review in order to identify the link between project management and sustainability and the transition paved by unique and challenging experiences which shifts towards a green and inclusive future.

1 Introduction

The success of sustainability is greatly impacted by public projects. It is undeniable. Many government organizations are setting their key agenda to improve the sustainability of public projects and focus on evaluating their impacts on environmental, social, and economic aspects. This study aims to identify possible connections between sustainability and project management through a systematic review of the literature that should be considered by all project managers or decision makers when evaluating project processes.

The main research areas pursued, without being limiting, are: smart mobility - public transport, smart environment - environment - smart buildings, green energy, smart citizens - participatory budgeting, civic involvement; smart living - urban cultural heritage. How can the management of urban projects positively influence public health? The interaction between the city, urbanism, and the inhabitants is crucial. The role of project management (PM) in the field of urban planning becomes relevant for all sustainable urban projects.

The importance is global, which is why the United Nations (UN) defined sustainable development in Brundtland's report [1] as 'meeting the needs of the present without

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compromising the ability of future generations to meet their own needs'. It assumes that resources are finite and therefore must be used conservatively and carefully to ensure that they are sufficient for future generations without lowering quality of life. The Brundtland report laid the foundations for the Rio Summit in 1992, which eventually led to the creation of the UN Commission on Sustainable Development in the same year. Toward the end of the 1990s, the European Union (EU) focused on urban development. Regular meetings between ministers responsible for urban development have led to the strengthening of an "EU perspective", an approach to sustainable urban development at the EU level.

This approach has been refined over the years as it has been implemented in EU cohesion policy and other initiatives specifically targeted at the urban dimension. 2007 was a crucial year in this long process, the year in which the Leipzig Charter [2] for Sustainable European Cities provided two key principles for sustainable urban development:

1. Implementation of a holistic, integrated development policy;
2. Special emphasis on disadvantaged communities.

The EU member states promoted development policies for the regeneration and modernization of urban areas [3].

The year 2007 also marked the beginning of a new 2007-2013 programming period for Operational Programs [4], and sustainable urban development policies were fully integrated into EU funding schemes following the positive evaluation of URBAN initiatives; in other words, they have become part of the "central" cohesion policy.

The approach to sustainable urban development shifted to three main priorities: priority no 1 sustainable mobility, improving urban mobility conditions, and reducing greenhouse gas emissions to increase road safety in urban areas through environmentally friendly and digital transportation solutions, a priority that impacts both the city's citizens and the city's economic strengths in order to boost durable life; priority no 2 smart cities, improving the quality of life of its inhabitants through their active involvement in shaping the things around them, their home, using technology to improve the lives of its citizens, and priority no 3 urban sustainable regeneration, capitalization of unused public lands by transforming them into green, connected and accessible spaces.

A sustainable society must be socially responsible, focusing on environmental protection and dynamic balance in human and natural systems [5]."

In this perspective, the UN has proposed 17 Sustainable Development Goals (SDGs) [6] for Agenda 2030, in September 2015 and entered into force in 2016 with the Paris Agreement on climate change.

Well-being and health [7] are a key goal of sustainable development to achieve a good quality of life for all people, in view of the the rapid decline of last century that causes a demographic increase in urban areas and therefore the growing interest in adopting measures to protect public health from all adverse effects of urbanization [8].

In 2018, the European Commission launched six key transformations for better sustainability to reach the 2050 target:

1. Sustainable development encompasses all of society, not just the environment. Education and healthcare care are imperative to make good environmental decisions and earn high income.
2. Responsible consumption of resources, adopting a circular economy to do more using less resources.
3. Reduce the carbon footprint by adopting clean energy resources and renewable processes.
4. Food for all without compromising the biosphere and oceans, sustainable food systems by reducing meat consumption and increasing agricultural production.
5. Smart cities for the good of the community and the environment, smart infrastructure, and Internet connectivity.

6. Development of information technology to facilitate innovation and sustainability, digital revolution [9]. Although the SDGs have great potential, their collective success will depend on a number of institutional factors, such as the extent to which states formalize their commitments, strengthen related global governance arrangements, translate global ambitions into national contexts, integrate sectoral policies and maintain flexibility in governance mechanisms [10].

At the end of this short introduction, Figure 1 presents the top three priorities for sustainable urban development.

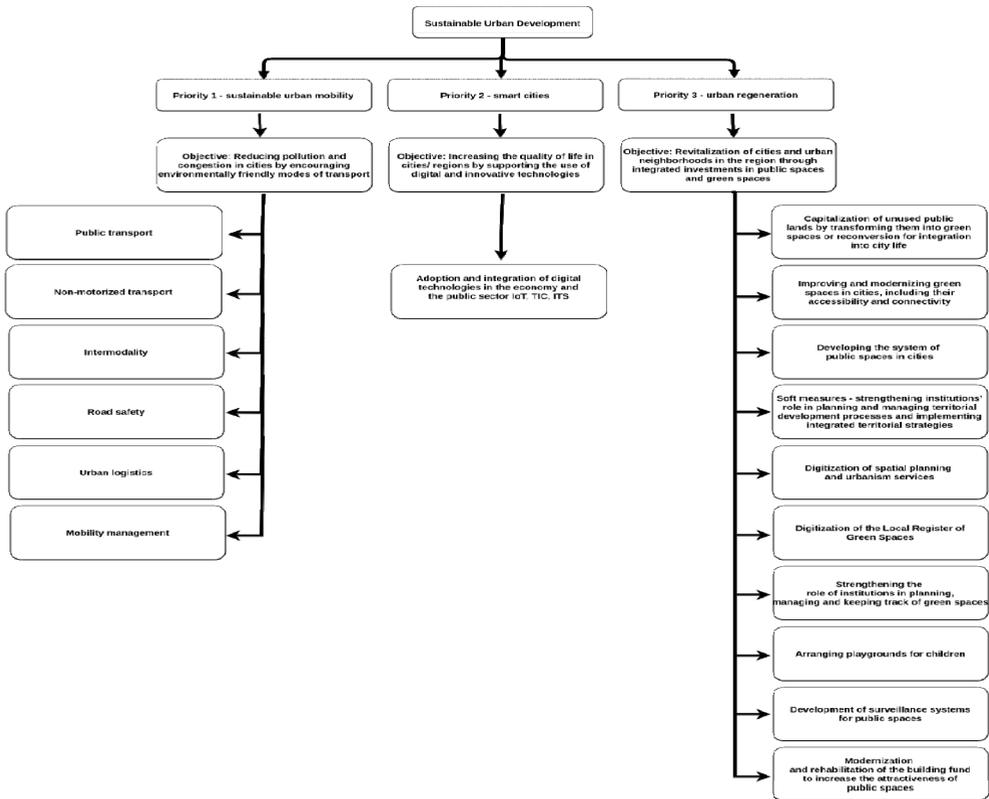


Fig. 1. Priorities for sustainable urban development.

2 Methodology

What dimensions of sustainability are the most relevant for urban PM projects? What is the impact of sustainability on PM processes (planning, execution, monitoring) within urban projects? How must project managers prepare to implement sustainability in the context of urban projects?

Directions are well defined, distributed, assumed, and implemented, but never definite. Modelling and supporting the decision-making process in the field of sustainable development is a must and something the global COVID-19 pandemic thought the world about. It has changed the perception of people of everything that was known before, a phenomenon that threatens sustainable urban development, which now requires reanalysis and adaptation.

Interest in sustainable project management is growing for both the public and private sector. More and more scholars and practitioners are showing an increasing interest in the

implementation of sustainability in the processes of project management at the theoretical level, but is theory one with practice? [11-13].

We determined the areas of impact of sustainability on project management based on the identification of relevant sustainability characteristics that were obvious from research publications [14]. Sustainability appeared to have an impact on project management at various levels.

In the next figure (Fig. 2), a Venn diagram illustrates the intersection points between sustainability, project management, and urban projects, centered on the main interest, to find the answer to the following three research questions (RQ).

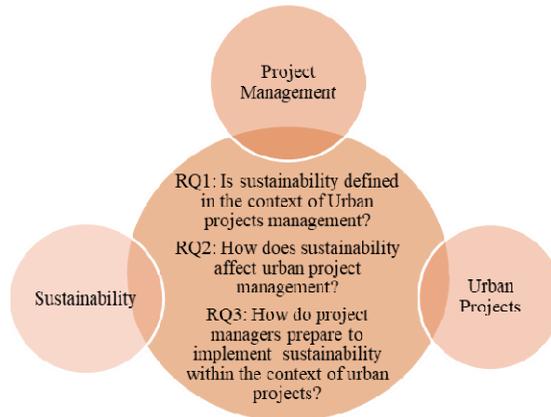


Fig. 2. Links between sustainability, project management, and urban projects.

Considering sustainability requirements (Fig. 3), first and foremost, is needed a change in the scope of project management from time, budget, and quality perspective to social, environmental, and economic effect. Secondly, it involves a shift in the project management paradigm, from one characterized by predictability and controllability to one characterized by flexibility, complexity, and opportunity. Finally, considering sustainability, it requires a mental shift on the part of the project manager: from providing expected results to assuming responsibility for long-term growth in organizations and society [12]. Sustainable development is the balance between economic growth, social welfare and the wise use of natural resources [15].



Fig. 3. Cyclicity of a sustainable PM.

3 Review of the literature

The method of systematic literature review (SLR) is considered especially among scholars as a useful technique that draws vital conclusions and identifies patterns and gaps based on published literature [15].

Following bibliometric research, namely analysis and collection of data through systematic review of the literature, a clear identification of the links between project management, sustainability and sustainability indicators, public projects and sustainable urban development was achieved, presenting the historical evolution and current state of knowledge in the field (theories and studies and the relations between them, good practices, research on the proposed research field, the results obtained).

The systematic search for articles published in the field was possible through online databases, considered to include most scientific documents, namely: Scopus, Web of Science (WoS), and Dimension. Patterns and gaps were identified based on the published literature, and important conclusions for the study were identified. Needless to say that the favorable context of the research is provided by the general concern for the sustainable urban development of the smart city from the perspective of innovation and adaptation to environmental changes; of relevant Smart services, efficient, safe, proactive, online and accessible, personalized, innovative, and focused on the needs of the community, perspectives which are to be followed and identified in the project management processes step by step.

The research plan follows the definition of concepts, terminology and conceptual clarifications on the management of smart and sustainable urban development projects, as presented in Figure 4.

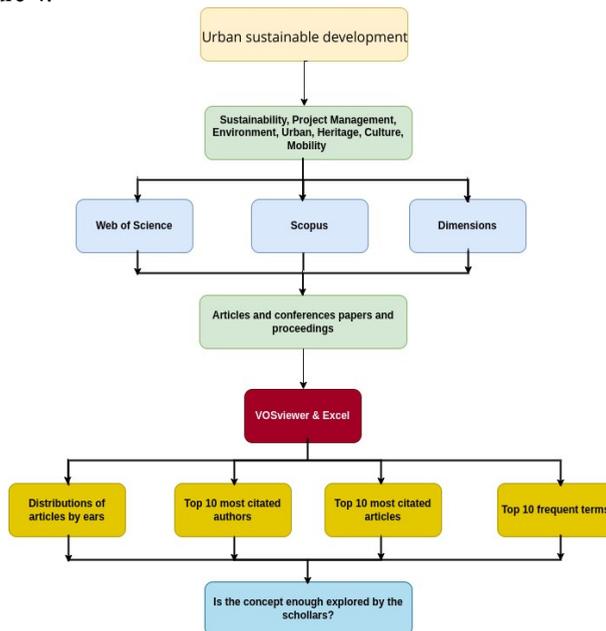


Fig. 4. Bibliometric research plan.

To better understand the links between sustainable urban development and investment project management by identifying sustainability indicators, the initial stage included a systematic search for articles of interest through the online databases Scopus, Dimension, Web of Science (WoS), and Google Scholar. Researchers consider the databases mentioned above to include the vast majority of scientific papers. The original sample analyzed

consisted of 4,227 articles. After excluding duplicate articles (the same articles from different databases), 1,237 documents (journal articles and conferences) were obtained. These were reduced to 613 after taking into account the titles and to 338 after taking into account the abstracts. Eventually, an additional reduction of 100 was reached on reading the full text. Thus, 100 articles were completely reviewed. We found that this analyzed scientific area is under development (sustainable project management, identification, and inclusion of sustainability indicators, sustainable urban development projects, construction projects); therefore, consulting the databases will continue especially for 2022.

Documents with a focus on sustainability accounted for more than 50% of the total sample. The development of the topic of sustainability in PM started relatively recently, in 2003. Furthermore, sustainability indicators in project management, especially investment projects (infrastructure, construction), are defined in a relatively small number of documents. These results show that the field of sustainability in PM and beyond, especially the use of indicators in construction projects that help the process, is still being explored [16]. Initial research was found in [17] and then the literature was followed, filtered, and evaluated in the article Integrating sustainability indicators into project management: The case of the construction industry [18, 19]. The research project was followed sequentially by tracking (documenting), filtering and evaluating the documents (Fig. 5). Document tracking (documentation) was used as a guide to find the right path to the junction of interest (sustainability and project management) and to retrieve some of the indicators in sustainable PM. This step was taken through a review of the work identified in online databases, journal articles, book chapters, and reports from international organizations.

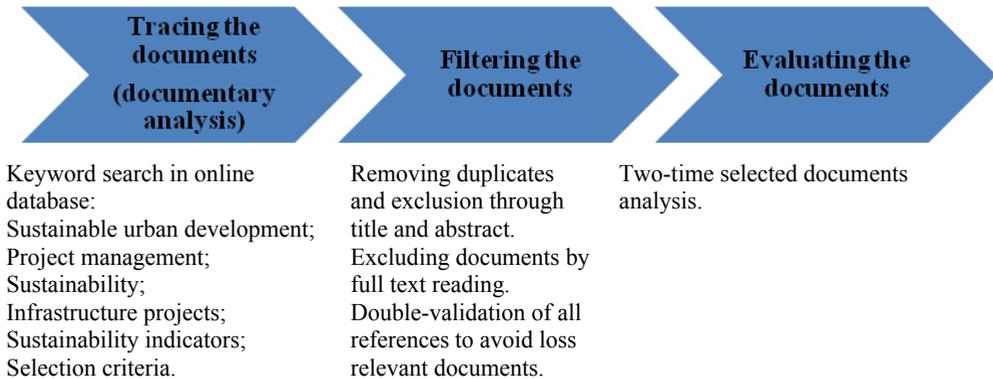


Fig. 5. Research Sequencing.

Additionally, the focus of the research was to highlight the snowball effect of sustainability in public projects, identifying sustainability indicators in project management and intersection points between both in investment projects. The use of keywords: sustainability, project management, environment, urban heritage, has been vital in identifying scientific articles. Therefore, we found that the notion of "Sustainability" cannot be assessed without the triple bottom line (TBL) scenario. The concept of sustainability is rooted in the concept of TBL [20] and captures the essence of sustainability [21].

The Google Scholar database has produced a huge amount of results (92,700 results for 2021) using the term sustainable project management. The 50 articles most cited were extracted for analysis. However, among the various virtual libraries explored, Google Scholar gave the most complete result in terms of the number of relevant articles. All references have been double-checked to avoid possible loss of documents. "To achieve an interdisciplinary synthesis of knowledge, a process is needed that involves diligent research on the subject, to identify opportunities to promote sustainable urban development in both

the public administration and the private sector from the perspective of sustainable development goals promoted by the international community [22]. (Directive of the European Parliament and of the Council amending Directive 2013/34 / EU).

The final phase of the systematic literature review involved extracting meaningful information from each of the 100 final documents. To mitigate any potential biases, objectivity was achieved through a two-way analysis and discussion between the researchers [23].

To arrive at an interdisciplinary synthesis of knowledge, a process involving thorough research on the subject was required, as shown above, followed by debates and discussions among small group project managers to identify opportunities to promote sustainable urban development in both public administration and small business projects in light of the international community's sustainable development goals of the international community. In this sense, project management should broaden its vision of the impact and value of the project in terms of integration and impact of sustainability [24].

4 Useful Definitions

Research on the definitions of sustainable development is relevant to understand its impact on PM.

The concept of "sustainable cities" is now widely used both nationally and locally, and the variety of definitions covering the full complexity of this concept is great. A clear understanding of sustainability is given by the use of common language, expressions, terms, concepts that encourage dialogue between stakeholders, and thus form the basis for cooperation. Therefore, we can talk about the development of a glossary that contains useful words and expressions, in order to continue the evolution of research through those who use them and thus outline new and diverse definitions for sustainable urban development [25].

Analyzing the history of projects and project management, we argue that the discipline has continuously evolved as a transitional innovation that can meet the challenges posed by sustainable development. However, more research is needed. The transition to sustainable development must be made by project managers through a well-defined project management [35, 36], focused on balancing social, economic and environmental interest by means of *integrating* sustainable dimensions [37-39] into PM processes, activities, identify, define, unify and coordinate the various challenges of sustainable project management; short-term orientation through an efficient *schedule* to manage the timely completion of the project, local and global orientation dimension of sustainability that incorporates the organizational *Quality* policy regarding planning, managing and controlling the projects and product *Quality* requirements to meet the stakeholders expectations; Accountability and transparency in *procurement* of the processes required to purchase or acquire products, services or results needed from outside the project team; Sustainability impact in the project *scope* included in all project work required, and only the work required, to complete the project in a successfully and sustainable manner; Consuming income and not capital, *Cost* management through the processes involved in planning, estimating, budgeting, financing, funding, managing and controlling cost to complete the project within the approved budget; Engaging *stakeholders* participation to follow, acquire, manage *Resources* needed for a successful completion of the project sustainability dimension; *Risk* reduction for the processes, conducting risk management planning, identification analysis response, planning response, implementation, and monitoring risk on a project; Sustainability values and ethics dimension reflected in the processes required to define, manage, control the project *Communication* needs as defined by the stakeholders.

Table 1. Definitions of Sustainable Urban Development.

Sources	Definition
<i>Encyclopedic dictionary.</i> Marcel D. Popa, Aleksandr Stănculescu, Gabriel Florin-Matei, Anicuța Tudor, Carmen Zgăvârdici, Rodica Chiriacescu, Encyclopedic Publishing House, 1993-2009 (Marcel D. Popa, 1993-2009)	Sustainability (<engl. Sustainable) s. F. The quality of an anthropic activity carried out without exhausting the available resources and without destroying the environment, therefore, without compromising the possibilities of satisfying the needs of the next generations [26].
<i>The Romanian language explanatory dictionary</i> (2nd edition revised and added) Univers Enciclopedic Gold, 2016 (Romanian Academy, 2016)	Sustainability, s.f. 1. (Econ.) Characteristic of an activity that can be carried out over a long time period. 2. (Ecol.) The use and development of natural resources without leading to their depletion or degradation of the environment [27]. - Cf. sustainability.
(Comisia Europeană, 2020; European Commission, 2020). What is sustainable development? https://ec.europa.eu/trade/policy/policymaking/sustainable-development/ (Comisia Europeană, 2020)	Sustainable development means meeting the needs of the present while ensuring that future generations can meet their own needs [28].
Keating, M. (1993). <i>The Agenda of the Earth Summit for Change.</i> Center for our shared future. (Keating, 1993)	Sustainable development is the balance between economic growth, social welfare, and the wise use of natural resources [29].
Elkington, J. (1998). Elkington, J. (1999). <i>Cannibals with Forks: The Triple Bottom Line of 21st Century Business</i> New Society Publishers John Wiley & Son (Elkington, 1998)	Sustainable development has three pillars: economic, environmental, and social, known as the triple bottom line. To achieve sustainable development, policies in these three areas must work together and support each other [30].
Stanitsas, M., Kirytopoulos, K., & Leopoulos, V. (2021). Integrating Sustainability Indicators into Project Management: The case of the construction industry. <i>Journal of Cleaner Production</i> , 279, 123774 (Stanitsas, 2021)	Sustainable PM is the management of all phases of a project through planning, monitoring and control throughout the life cycle of project processes and deliverables, to fully comply with stakeholder requirements, opting for transparency and ethics for organization and society, and ensuring that the dimensions economic, social, and environmental factors are taken into account [31].
Heinen, J.T. (1994). Emerging, Divergent, and Convergent Paradigms for Sustainable Development. <i>The International Journal of Sustainable Development & World Ecology</i> , 1(1), 22-33. (Heinen, 1994)	"Sustainability must be made operational in each specific context, at scales relevant to its achievement, and appropriate methods must be devised for its long-term measurement [32]."
World Commission for Environment and Development Brundtland Commission (Brundtland Commission, 1987)	"Development that seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs." [33]

<p>Camagni, R. (1998). Sustainable urban development: definition and reasons for a research programme. <i>International Journal of Environment and Pollution</i>, 10(1), 627. (Camagni, 1998)</p>	<p>Sustainable urban development can be defined as a process of synergistic integration and coevolution between the major subsystems that make up a city (economic, social, physical and environmental), which guarantees the local population a long-term level of well being without compromising opportunities for the development of the surrounding areas and, thereby, helping to reduce the harmful effects of development on the biosphere [34]."</p>
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A public institution /corporation can receive several benefits by incorporating the idea of sustainability, including value creation, performance enhancements, increased efficiency, flexibility, and much more [40]. For this reason, organizations often choose sustainable business as their strategic path. Only by integrating a focus on the importance of economic, environmental and social issues in decision-making will sustainable development's overarching goal, long-term economic and environmental stability, become a reality. According to Schoper, [41] the establishment of the concept of sustainable development at the project management level, as well as the operational level, is of the utmost importance for the successful implementation of a strategy until 2025. This is because a project is a mechanism for the implementation of an organization's strategy, and Aarseth et al. [42] predicted that this would be one of the key areas of project management development. A review of the literature revealed that many authors who have written about the incorporation of sustainability into project management procedures have a keen interest in the subject [43-47], emphasizing the need to include sustainability by both organizations and project managers.

5 Conclusions

An efficient public administration manages the city's resources by showing a general concern for the sustainable urban development of the smart city from the perspective of innovation and adaptation to environmental changes; of relevant, efficient, secure, community-focused smart services.

It does this through sustainable investment projects with a positive impact on the environment, designed and executed by a management that prioritizes and includes sustainability measures in all project processes, constantly taking into account the imminent barriers: low budgets, lack of awareness, understanding, information, commitment; inconsistent policies, regulations, incentives, and commitments from management, lack of sufficient time to address sustainability issues or lack of a long-term perspective, and the general perception that addressing sustainability generates high costs, as well as resistance to change and information.

Public institutions/organizations must realize that using a certain project management approach offers a solid foundation for bringing sustainability and superior outcomes in this respect. To manage their projects in a sustainable way, project managers must also be aware of the direction in which they must evolve and adjust their key competencies, roles, and responsibilities [48-50].

Overcoming these barriers will bring benefits for the whole community to use: moderate use of natural resources, compliance with existing climate legislation, reduction of harmful emissions and waste generation, improved working conditions and working standards, health and safety, long-term savings taking into account the cost of the whole life cycle, the

fulfillment of international obligations (Kyoto Protocol, 1998), clear and transparent procurement procedures or the stimulation of the green technology market. Only by promoting the concept of smart city, smart symbiosis between mature and innovative technologies, integrated platforms, modern infrastructure, and energy efficiency in accordance with the needs of the community, will the shifts toward a green and inclusive future occur.

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