

02-002 – Multi-stakeholder governance for sustainable construction: an economic perspective – Gobernanza multi actor para la construcción sostenible: la perspectiva económica

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 English  Spanish

The construction sector constitutes a cornerstone of socioeconomic development in any nation, serving as an engine of growth and employment generation through infrastructure development. However, it has traditionally been associated with unsustainable practices, characterized by high consumption of non-renewable resources, significant waste generation, and a pronounced emphasis on short-term profitability. This paper advocates for a critical reassessment of the prevailing construction project management model, proposing a paradigm shift towards a holistic approach that integrates economic, social, and environmental dimensions of development. A thorough review of the existing literature underscores the imperative for a multi-stakeholder approach involving government, industry, and civil society, necessitating the integration of diverse disciplinary perspectives and the active engagement of relevant stakeholders. The establishment of robust regulatory frameworks that promote sustainable construction practices is crucial, as is the imperative to foster research and innovation in construction materials and technologies. Finally, a comparative analysis of diverse case studies demonstrates that this paradigm shift facilitates the emergence of innovative solutions, the establishment of more stringent standards, the advancement of research, and, ultimately, the sustainable development of the sector and the broader economy.

Keywords: *Construction industry; Sustainable economic development; Multi-stakeholder management*

El sector de la construcción constituye un pilar fundamental en el desarrollo socioeconómico de cualquier nación. No obstante, tradicionalmente se ha asociado con prácticas productivas que comprometen la sostenibilidad, caracterizadas por un elevado consumo de recursos no renovables, la generación de residuos y una marcada orientación hacia la rentabilidad de corto plazo. Este trabajo propone una reflexión crítica sobre su actual modelo de gestión abogando por un cambio de paradigma que integre, de manera holística, aspectos económicos, sociales y ambientales del desarrollo. A través de una revisión de la literatura especializada, se argumenta que la sostenibilidad en la construcción debe concebirse como un proceso dinámico que requiere una colaboración multi actor que involucre al gobierno, las empresas y la sociedad, al mismo tiempo que integre las perspectivas de diferentes disciplinas y agentes relevantes. Se plantea la necesidad de desarrollar marcos normativos que promuevan prácticas constructivas más sostenibles. Finalmente, a partir de diferentes casos de estudio, se muestra que dicho cambio de paradigma permite desarrollar soluciones innovadoras, establecer estándares más exigentes, fomentar la investigación y, en consecuencia, promover el desarrollo sostenible del sector y de la economía que resulta beneficiada.

Palabras claves: *Industria de la construcción; Desarrollo económico sostenible; Gestión multiactor*

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1. Introduction

The construction sector, a historical driver of economic and social progress, now faces a critical imperative: the transition towards sustainability. Traditional practices, characterized by excessive resource consumption and waste generation, have created an unsustainable environmental footprint. As Holtström, J., et al. (2024) highlight, this industry globally accounts for 30-40% of energy consumption and over 30% of annual carbon dioxide (CO₂) emissions, largely due to activities across the entire construction lifecycle. Nußholz, J.L.K., et al. (2019) further specify that construction materials are a primary contributor to these negative impacts.

The significant increase in resource consumption driven by industrialization and urbanization underscores the construction industry's crucial role. Cortés, D., et al. (2024) emphasize its direct impact on both the physical and biological environments, as well as its close ties to the social and economic well-being of nations, highlighting the industry's substantial influence. In this context, Pandit et al. (2017) point out that Sustainable Development Goals (SDGs) 9 and 11 directly address the development of sustainable infrastructure.

Recognizing this need for change, many companies are integrating sustainability mechanisms into their operations to identify opportunities for technological, informational, and material improvements aimed at boosting operational efficiency. Irfan, M., Alaloul et al., (2024) note that organizational culture shapes the various connections and interdependencies that lead to social sustainability indicators within an organization, emphasizing indicators such as goal setting, teamwork focus, community respect and care, and social sustainability awareness. Furthermore, Zulu, S.L., et al. (2023) argue that the successful adoption of sustainable practices hinges on effective stakeholder collaboration. They identify key drivers for sustainable construction: environmental health factors, industry-related regulatory factors, and company-linked economic factors. They also point to barriers to implementation, including a lack of awareness and knowledge, regulatory complexities, and economic costs.

Addressing the industry's negative impacts, there has been a growing push for investment in sustainable innovation. However, Duong, Linh N. K., et al. (2021) acknowledge the challenge of persuading shareholders to invest in such initiatives due to perceived uncertainty regarding their positive correlation with stock market performance. Nevertheless, they contend that the increasing focus on SDGs and sustainable innovation offers companies a pathway to long-term competitive advantages. Their empirical findings demonstrate a positive correlation between announcements of sustainable innovation and stock market reaction, as well as a positive relationship between strategic alliances and capital turnover with this reaction, and a negative relationship between project start dates and stock market reaction.

Ray, A., Ghosh, S., & Mandal, M. C. (2021) conducted an empirical study identifying fundamental operational, social, and economic criteria for achieving sustainability in construction. Operationally, they emphasized pollution assessment, energy-efficient technologies, eco-friendly materials, life cycle design, and wastewater treatment. Socially, they highlighted corporate social services and safety design for risk mitigation. Economically, they pointed to capital budgets, standardization, labor and maintenance costs, renovation and waste disposal costs, and demolition energy consumption.

Empirical evidence indicates that effective social responsibility management provides a significant competitive advantage crucial for sustainability. However, Ajibike, W. A., et al. (2023) highlight the critical role of coercive pressure in driving tangible sustainability results within the industry. Despite the inherent benefits, companies often require external encouragement to invest in social and environmental responsibility initiatives to ensure legitimacy among stakeholders. This reliance on external pressure can be attributed to several

factors. Firstly, sustainability often involves long-term investments with non-immediate and difficult-to-quantify financial returns, making companies hesitant in a business environment prioritizing short-term profitability. Secondly, the absence of standardized and mandatory regulations can lead to cost-cutting competitive practices that undermine sustainability. Finally, increasing awareness among consumers, investors, and society regarding the environmental and social impact of companies can act as a powerful incentive for adopting more responsible practices.

This context underscores the paramount importance of prioritizing economic sustainability in the global expansion of the construction industry. Evaluating economic sustainability in tendering processes emerges as a vital dimension. Amoako Sarpong, F., et al. (2024) provide empirical evidence identifying key criteria for evaluating sustainability in this sector, encompassing management, technical, and commercial factors. Within these criteria, competitiveness, resource management and evaluation capacity, and profitability are significant variables. Consequently, their study suggests that a thorough evaluation of bidders' management practices is essential for ensuring economic sustainability from the outset of projects.

This discussion calls for a critical re-evaluation of the prevailing management paradigm in the construction industry, advocating a significant shift towards a model that integrates sustainability across its economic, social, and environmental dimensions. The feasibility of this transformation towards more responsible and efficient construction practices will be explored by examining the role of cross-sector collaboration between government entities, companies, and civil society, as well as the adoption of innovative regulatory frameworks and the consideration of inherent economic factors. Through a detailed bibliometric analysis (chapter 2), the conceptual evolution and implementation of sustainable practices in the sector will be mapped, leading to a conceptual proposal outlining the necessary actions for adopting a model based on identified best practices in sustainability. The potential benefits of this model will be highlighted, and strategies for effective collaboration among the various stakeholders influencing the sustainable development of the industry will be proposed. The model presented in chapter 3 will be grounded in a comprehensive review of specialized literature on sustainable thinking applied to construction. This analysis will enable the identification and characterization of key stakeholders in the sector and the evaluation of their influence in promoting sustainable practices. The primary objective is to establish the necessary conceptual and critical foundations for proposing the most effective alternatives for implementing sustainable practices within the industry.

2. Bibliometric Analysis of Sustainability Trends in Construction.

Driven by an evolving regulatory landscape, the integration of sustainable practices in the construction sector has significantly advanced through multidisciplinary convergence. This evolution contrasts traditional, inherently unsustainable practices with a growing demand for responsible approaches. This study traces the conceptual development of this transformation, documenting key aspects and themes that have shifted from operational management paradigms to fundamental scientific frameworks in materials science, environmental engineering, and construction physics, shaping research and knowledge. Table 1 summarizes these historical milestones and intellectual lineages, illustrating the progressive consolidation of sustainability in the construction sector.

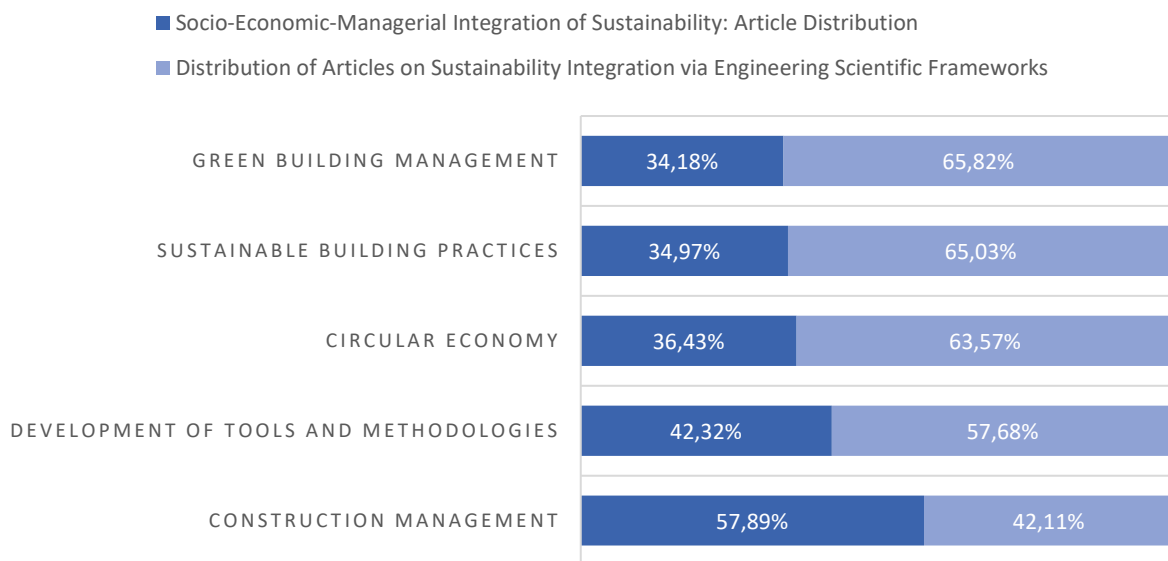
Table 1: The Interplay of Managerial and Scientific Perspectives in Integrating Sustainability into Construction.

#	Fields of study	Frameworks	Historical timeframe of appearance	Total of Articles	Socio-Economic-Managerial Integration of Sustainability: Article Distribution	Distribution of Articles on Sustainability Integration via Engineering Scientific Frameworks	Top 3 countries
1	Construction Management	Traditional Practices, Environmental Awareness, Standards and Certifications	1900-2025	145,996	57.89%	42.11%	China, USA, United Kingdom
2	Development of Tools and Methodologies	Life Cycle Assessment, Environmental Impact Assessment, Sustainability	1989-2025	2,332	42.32%	57.68%	USA, United Kingdom, Australia
3	Circular Economy	Waste Management and Recycling, Sustainable Materials Procurement, Energy Efficiency	1988-2025	2,259	36.43%	63.57%	China, United Kingdom, Spain
4	Sustainable Building Practices	Sustainable Materials, Construction Techniques, Sustainable Architecture	1992-2025	1,959	34.97%	65.03%	United Kingdom, USA, China
5	Green Building Management	Technology and Digitalization, Resilience and Climate Change Adaptation	1995-2025	1,021	34.18%	65.82%	China, USA, Australia

Source: Author.

A bibliometric analysis of 153,567 Scopus-indexed articles (1900-2025) explored the integration of sustainable practices in the construction sector. Keyword co-occurrence analysis identified relevant fields of study, ranging from project management to fundamental scientific frameworks, revealing thematic relationships. The analysis focused on peer-reviewed articles in engineering, environmental sciences, social sciences, business, energy, economics, and finance. Table (Table 1) organizes these research fields chronologically based on their emergence, influenced by relevant trends and paradigms, thus illustrating the trajectory of sustainability in construction. Building on this, Figure 1 presents the distribution of contributions to the sustainable construction paradigm, highlighting the interplay between social, economic, and managerial perspectives, and the sector's fundamental scientific frameworks.

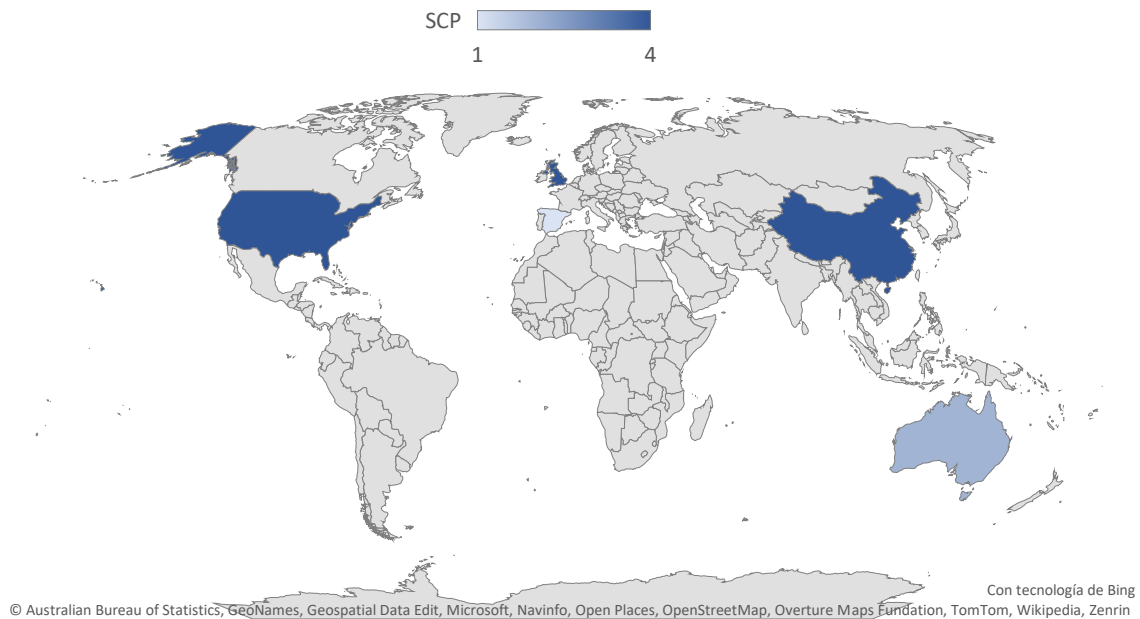
Figure 1: Consolidation of Sustainable Construction Practices.



Source: Author.

The consolidation of the sustainable construction paradigm has been markedly advanced by a group of leading countries that have championed innovative practices and implemented stringent standards. Documented bibliometric analysis highlights the United States, England, China, Australia, and Spain as prominent pioneers in this domain. These nations have made significant contributions across crucial areas such as enhancing energy efficiency, fostering the development and utilization of sustainable and innovative materials, implementing responsible resource management strategies, and actively promoting material reuse. Figure 2 visually represents the geographical distribution of these key countries and their respective levels of contribution, evaluated on a scale of 1 to 4 according to the findings of this study.

Figure 2: Global Arena of Sustainable Construction Paradigm (SCP).



Source: Author.

The transition towards a sustainable paradigm in the construction sector is significantly underpinned by its organizational management, working in tandem with its scientific foundations. The analysis indicates that project management, with its focus on the planning, organization, and control of resources (S. Keoki Sears, et al., 2015), is instrumental in embedding sustainability considerations from the initial project phases, addressing environmental, social, and economic implications. Complementarily, the administrative function within construction, by optimizing resource utilization, promotes the responsible stewardship of natural resources and the implementation of circular economy models, informed by research in the hard sciences.

Effective decision-making, facilitated by environmental impact assessment tools and methodologies, is paramount. From an economic viewpoint, the adoption of sustainable practices in the construction industry, evaluated through performance criteria (Oyefusi, O. N., et al., 2025), hinges on the dynamic interaction between the government, infrastructure users, and construction companies. This interplay, encompassing environmental, economic, organizational, and social dimensions, is fundamental to driving sustainability within the sector.

3. Multi-Stakeholder Governance in Sustainable Construction: An Analysis

The integration of sustainability principles into the strategic and operational management practices of the construction sector has been a subject of extensive scholarly discourse (Zaman, U., et al., 2020). This sustained attention is attributable to a confluence of inherent complexities, including the sector's intricate supply chain dynamics (Abdolazimi, O., et al., 2024), the evolving landscape of regulatory frameworks, its characteristic fragmentation, and existing deficits in awareness and educational initiatives. These multifaceted challenges have often resulted in disparate and localized sustainability efforts, frequently emphasizing strategic stakeholder theory within the domains of strategic planning, cultural controls, and project management methodologies.

To facilitate a more comprehensive and impactful adoption of sustainability within the industry, the subsequent section advances a series of research proposals with a specific economic orientation, informed by the enabling mechanisms identified within this article. The proposed conceptual framework posits that successful implementation, rigorously evaluated against defined performance criteria, necessitates that decision-making processes within the sector are underpinned by robust tools and methodologies capable of conducting thorough analyses of social and environmental impacts. This requires a holistic understanding of the complex interrelationships among key project stakeholders, namely the end-users of infrastructure, construction enterprises, and governmental agencies.

The challenges faced by the construction sector are of critical significance. Sustainability within this industry, conceptualized as the minimization of negative externalities on both the biophysical environment and societal well-being. This involves the systematic categorization of concepts emanating from transformative paradigms, such as the circular economy. Contemporary research (Lovrenčić Butković, L., et al. 2023) has empirically demonstrated that effective waste management protocols, the mitigation of environmental impacts, informed material and product design considerations, and optimized building design strategies are salient determinants of both sustainability outcomes and economic viability. With respect to infrastructure end-users, the integrated assessment methodologies typically incorporated within sustainability evaluations aim to quantify the impact of construction projects on their experienced satisfaction within their immediate spatial context (Valdes-Vasquez & Klotz, 2013). Fundamentally, these evaluations serve to predict the performance trajectory of infrastructure projects concerning their temporal duration, budgetary constraints, and community acceptance, encompassing initiatives that proactively ensure the inclusion of underrepresented demographic groups. As the primary stakeholders driving the demand for sustainable construction projects, infrastructure end-users initially possess the inherent capacity to generate substantive positive economic contributions. Consequently, the following research proposal is presented below:

Rp₁: Optimal economic returns from sustainable infrastructure projects are predicated on the breadth and quality of user engagement, which is enabled by the implementation of adequate participation mechanisms and the establishment of a supportive socioeconomic and regulatory framework.

Within the construction sector, the imperative for sustainability is also reflected in the corporate social responsibility (CSR) practices that organizations are increasingly expected to implement. This adoption is crucial given the transient and enduring impacts of construction projects on diverse stakeholder groups. Empirical evidence from Zhang et al. (2024) indicates that construction firms tend to prioritize corporate governance and employee interests, followed by construction quality and environmental stewardship, employing a tripartite approach to stakeholder management encompassing coercive, cooperative, and coordinated strategies. Subsequently, the inherent complementarity of stakeholder relationships, stemming from their shared demands on corporate resources, underpins their association and presents opportunities for optimization to enhance organizational competitiveness (Moodley, K., et al., 2008). Nevertheless, the relative strengths or weaknesses inherent in these inter-party relationships requires the consideration of a more comprehensive framework, potentially incorporating early-stage revisions within the construction process (Brandt et al., 2010). Such information facilitates a deeper understanding of the intricate social interrelationships embedded within the design, construction, and operational phases of projects. Therefore, the subsequent research proposal is hereby presented:

Rp₂: The positive engagement of construction firms in sustainable initiatives, assessed through the authenticity, impact, strategy, collaboration, innovation, culture, and transparency of their practices, demonstrates a direct correlation with the efficacy of

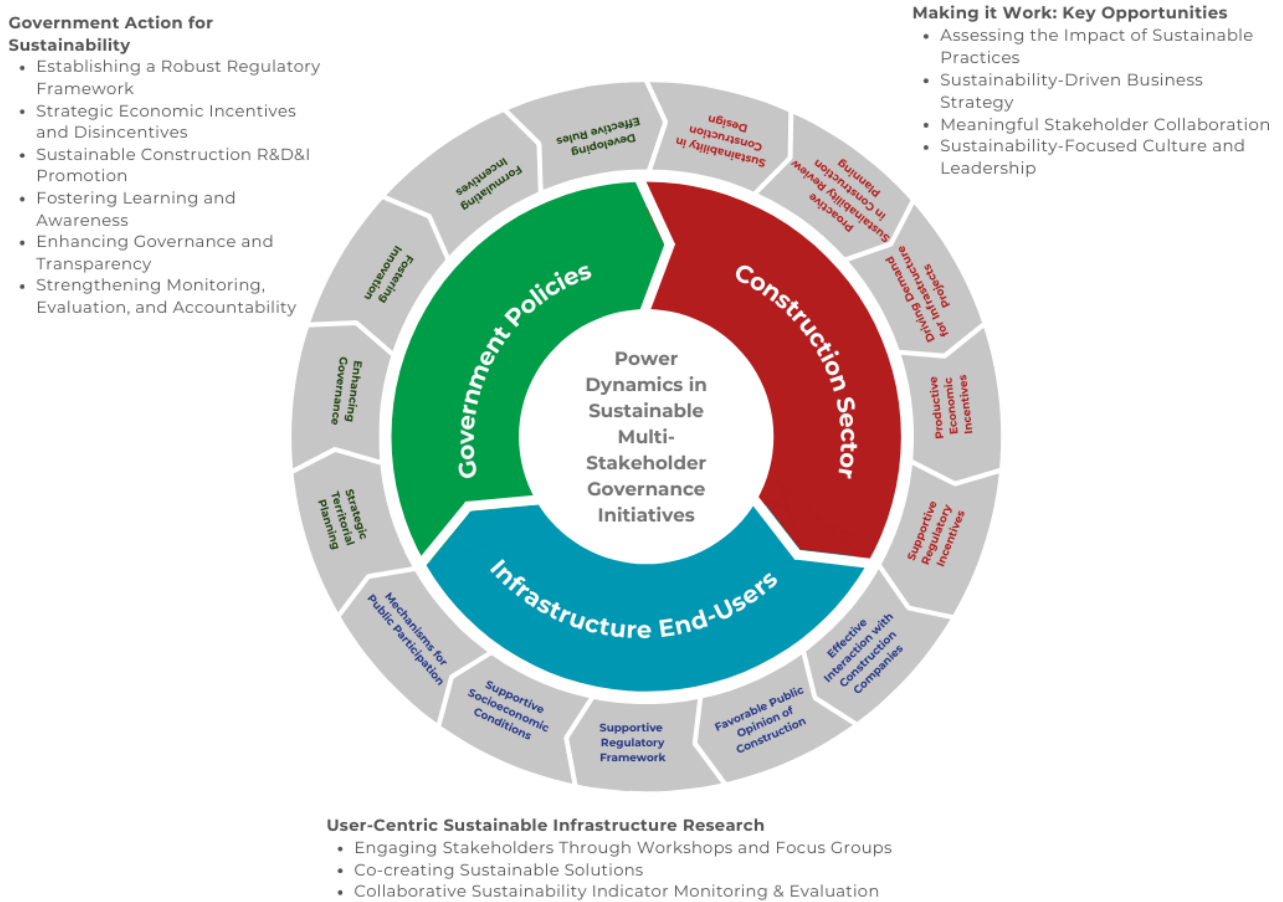
exogenous factors such as robust regulatory frameworks, effective economic incentives, and substantial market demand for sustainable projects.

It is understandable that governmental perspectives on sustainability in the construction sector may prioritize economic considerations, sometimes superseding immediate concerns for social equity and environmental stewardship (Facundo Rubinstein, I., 2023). This tendency is likely associated with the state's emphasis on consolidating institutional frameworks conducive to reorienting policy agendas towards the Sustainable Development Goals (SDGs). The economic paradigm emerging from this perspective often focuses on the vertical redistribution of resources within the sector, potentially leading to an underestimation of the salience of social and environmental dimensions. This limitation is particularly pertinent in developing nations, where extant literature documents significant impediments to the effective adoption of sustainable policies, including substantial implementation costs, a paucity of expertise in formulating and enforcing contextually appropriate regulations, and constrained awareness among stakeholders within the construction sector (Yap et al., 2024). Consequently, the efficacious application of a sustainable model in construction necessitates an efficient synergy between governmental commitments and organizational actions. This implies a requirement for analyzing government policies through a relational lens, one that acknowledges the complex interdependencies among stakeholders and accords due consideration to environmental and human rights perspectives (Taofeeq, D. M., et al., 2022). Therefore, the subsequent research proposal is hereby presented:

Rp₃: Achieving the full realization of public policies designed to consolidate a sustainable construction sector mandates a rigorous investigation of governmental interventions encompassing the creation of normative frameworks, the deployment of incentivizing mechanisms, the fostering of technological innovation, the provision of vocational training, exemplary leadership in public works endeavors, the fortification of governance capacities, the development of territorial planning strategies, and the institution of effective control mechanisms for the industry.

Consequently, it is posited that the integration of sustainability principles within the strategic and operational management of the construction sector is contingent upon the confluence of multifaceted and intricate determinants. Salient among these are the inherent complexities of the supply chain, the prevailing regulatory framework, and the level of awareness and professional development among infrastructure stakeholders. To elucidate the interrelation between the constructs under investigation in the research proposals and explicate their synergistic influence on the consolidation of sustainable practices, Figure 3 delineates the interactive relationships among these variables and their potential to enhance the efficacy of sustainability integration.

Figure 3: Exploring Power Dynamics in Sustainable Multi-Stakeholder Governance Initiatives.



Source: Author.

The objective of this conceptual model is to graphically represent a proposal for multilevel governance aimed at fostering sustainability within the construction sector. It is posited that efficacious collaboration among the three fundamental actors delineated herein is essential for the attainment of this objective. Concomitantly, the model argues that the realization of sustainability is contingent upon both the substantive participation of relevant stakeholders and the balanced, dynamic interaction among them.

Regarding infrastructure users, whose societal demands imbue the undertaken work with significance, it is postulated that their role transcends mere utilization. Active engagement in the design, implementation, and evaluation phases of projects is advocated. Factors such as a propitious public opinion, robust citizen participation, supportive socioeconomic conditions, and collaborative evaluation mechanisms are deemed critical to ensuring that constructed solutions effectively address community needs and cultivate enduring sustainability.

Concerning construction enterprises, it is proposed that their primary function lies in the operationalization of sustainable practices. Consequently, it is suggested that they integrate business strategies with sustainability as a central tenet, undertake systematic impact assessments, establish proactive collaborations with other stakeholders, and cultivate an organizational ethos committed to sustainable development. Through this transformation, the

sector will evolve from a passive recipient of regulations to an active agent of change, capable of leading advancements within its own operational sphere.

Finally, it is proposed that the government assume a pivotal role as a regulatory authority and strategic facilitator. Its primary responsibilities are conceptualized as encompassing the establishment of a robust regulatory framework, the design of strategic economic incentives and disincentives, the promotion of research, development, and innovation in sustainable construction, and the fostering of knowledge dissemination, transparency, and accountability mechanisms. The model posits that these governmental actions aim not only to delineate clear normative guidelines but, more fundamentally, to cultivate a conducive environment that guides, supports, and demands an effective transition towards sustainability from other actors.

Therefore, the model posits that sustainable construction can only be achieved through governance predicated on cooperative relationships among actors with differentiated roles but a shared objective: sustainability. It is thus contended that the effective implementation of this model necessitates the judicious management of power dynamics through the promotion of co-creation, transparency, and shared responsibility. In this conceptualization, sustainability should not be solely construed as a technical or environmental objective but rather as a political and social process demanding volition, dialogue, and commitment from all involved parties. In essence, sustainability is herein understood as an integral component of human rights and as a logical extension of environmental sustainability principles.

4. General Discussion

This article highlights a detailed exploration of the key challenges facing the construction sector, which is striving for greater sustainability. Accordingly, a critical examination was conducted of the main negative externalities associated with traditional practices, the significant influence of regulatory frameworks and the evolution of social expectations, the initial responses observed by key economic actors in the sector, and the inherent obstacles that continue to hinder the widespread integration of sustainable approaches. Therefore, this study incorporates a bibliometric analysis, offering both a historical overview and a thematic mapping of scholarly work in this evolving field.

The extant body of research consistently highlights the crucial importance of national socio-economic contexts and the considerable influence of infrastructure users as pivotal stakeholders. Within this framework, it was argued that opportunities for collaborative research focused on sustainable, user-centered infrastructure arise around several critical dimensions, as illustrated in the proposed conceptual model. These dimensions include a thorough understanding of user needs and priorities, particularly their perceptions regarding the impact of sustainable initiatives on their daily lives and their immediate surroundings. To facilitate a more profound comprehension of these issues, the implementation of methodologies such as post-occupancy evaluations that capture real experiences, collaborative case studies conducted directly with user communities to understand their perspectives, and the establishment of continuous feedback mechanisms has been proposed. These approaches have the potential to identify specific areas for enhancement, informed by the firsthand experiences of the individuals who utilize the infrastructure.

Although present research does not address this specific area, it is suggested that future academic research would greatly benefit from a comprehensive examination of the psychosocial factors, individual motivations, and perceived barriers that influence users' sustainability decisions. Consequently, subsequent research endeavors may consider incorporating rigorous behavioral studies and implementing carefully designed pilot programs to understand these dynamics in practice.

Furthermore, it is recommended that the co-creation and participatory design of sustainable solutions be considered as a significant avenue for future academic exploration. This would entail the active involvement of users from the outset of research and design processes, facilitated by methods such as interactive workshops, dedicated online engagement platforms, and open public consultations. The objective of this approach is to generate more innovative and contextually appropriate solutions, with greater community buy-in through the integration of local knowledge and perspectives. Additionally, the ongoing monitoring and evaluation of sustainability indicators, including community-relevant quality of life metrics and participatory data collection techniques, warrants serious scientific attention. By integrating users in the evaluation of projects and establishing continuous feedback loops, a more authentic assessment of corporate social responsibility initiatives can be achieved that goes beyond purely technical metrics.

From a governmental perspective, the conceptual argument posits that a fundamental responsibility lies in investigating and comprehensively understanding the diverse needs and priorities of infrastructure users. This profound understanding should serve as a foundational element in the formulation of effective public policies that are aimed at fostering sustainable infrastructure. In accordance with the proposed visual model, it is posited that the collaborative participation of users and construction companies in the joint identification of challenges and the evaluation of possible solutions can significantly enrich government decision-making processes. This, in turn, can result in the implementation of policies that are more sensitive to the real needs and concerns of citizens.

5. Conclusions

This study explores the multifaceted challenges inherent in the construction sector's ongoing shift towards sustainable practices, acknowledging its significant energy requirements and considerable utilization of natural resources. In view of the above, several converging elements that foster this transformation deserve attention, including a growing awareness of environmental issues, the development of regulatory standards, and the recognition of potential competitive benefits that sustainability can offer organizations operating within the industry. However, the research also identifies notable challenges, such as the difficulties in accurately predicting the financial returns from investments in sustainability initiatives and a tendency to depend on external drivers for the adoption of responsible operational procedures.

The bibliometric analysis provides a valuable historical and thematic overview, charting the conceptual development of sustainability within the construction sector and highlighting the contributions from various academic fields across geo-spatial segments. It illustrates how principles of organizational management, along with the advancements in building sciences, have been instrumental in the adoption of more sustainable approaches. Furthermore, the research highlights the pivotal interconnectedness of the diverse stakeholders involved in the sector—government agencies, construction companies, and infrastructure users—as a crucial factor in advancing towards a sustainable construction paradigm.

Within this framework, the research emphasizes on the importance of collaborative efforts and the active involvement of infrastructure users in the research and development of sustainable solutions. The study asserts that a comprehensive understanding of their needs, priorities, and perspectives on the ramifications of sustainable initiatives is paramount to ensure the pertinence and efficacy of the implemented solutions within specific socio-economic contexts.

Considering the conceptual nature of this inquiry, it is recommended that subsequent empirical studies could be conducted. Such studies might employ methods such as post-implementation assessments, in-depth case analysis, and ongoing feedback systems. These methods could either support or challenge the necessity of integrating the direct experiences of users into the

continuous process of improving sustainability in construction. Concurrently, it is recommended that future research incorporate psychological and behavioral factors to assess their impact on the adoption of sustainable practices. This would delineate potential avenues for academic research aimed at a more profound comprehension of their dynamics and motivations within diverse cultural and social contexts.

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Use of Generative Artificial Intelligence

No generative artificial intelligence was used in preparing this communication.

Communication aligned with the Sustainable Development Goals

