Stakeholder Influence on Contractor Capacity Development Programs Towards a Resilient Competitive Advantage: Scientometric Review

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Abstract
The construction business is a crucial catalyst for national development, substantially enhancing a country's Gross Domestic Product (GDP) and serving a vital function in infrastructure advancement and economic progress. Notwithstanding many capacity development measures, the involvement of local contractors in high-value infrastructure projects remains limited, with foreign businesses continuing to dominate the industry. This study evaluates the scope of research on capacity development programs for construction contractors and analyzes the primary research themes in local construction contractor capacity development initiatives, emphasizing stakeholder requirements. A scientometric review was employed to examine research trends over the past decade on the advancement of contractor development programs. The investigation identified a restricted quantity of papers in this field (n=15), with China at the forefront of research output. The central study themes addressed encompassed the construction sector, stakeholders, project management, decision-making, and sustainability. This study highlights that stakeholder engagement is essential for the success of the construction sector, emphasizing the necessity for additional investigation into incorporating stakeholder requirements into capacity development program design. This study suggests that future research should examine the integration of stakeholders and the incorporation of their interests in the development processes of capacity development programs.

Keywords:
Stakeholder Influence, Construction, Contractor, Capacity Development, Resilience, Scientometric Review

1. INTRODUCTION
Stakeholder participation has a profound impact on the performance and ultimate success of construction projects, necessitating a comprehensive understanding of their roles and implications (Ebekozien *et al.*, 2023). Construction projects involve various stakeholders, and their interactions can significantly impact collaboration and the final project results (Yuan, 2021). The interactions among contractors, project owners, and other stakeholders are pivotal factors influencing success in construction and infrastructure projects, highlighting the necessity of effective communication, aligned objectives, and risk distribution strategies to ensure successful project execution and augment stakeholder value (Klakegg *et al.,* 2020). Construction project stakeholders are diverse, including individuals with personal ambitions, organizations with corporate objectives, and regulatory frameworks intended to support project advancement (Al-Adawiyah and Utomo, 2020). Building on the Scientometric studies, the study aims to unearth insights into research trends, collaboration patterns, and the impact of publications, complementing traditional qualitative reviews with quantitative evidence that will be established through this study (Galli, 2019). By applying statistical methodologies to evaluate research materials, the study endeavours to minimize subjectivity in the analysis (Shen *et. al*, 2022).

The impact of stakeholders on the capacity development programs of construction contractors is a complex issue that requires thorough examination, particularly regarding the establishment of sustainable competitive advantages in the construction industry. Stakeholder involvement goes beyond simple procedural compliance; it is a vital strategic facilitator that enhances project outcomes, fosters innovation, and promotes sustainable practices within the construction sector (Balasubramanian, 2020). Stakeholders include various entities such as customers, contractors, subcontractors, regulatory agencies, local communities, and end-users, each with unique interests, expectations, and degrees of influence on construction projects (Aslami and Uppal, 2021; Valle and Sarturi, 2022). Consequently, construction companies must proactively develop and oversee connections with both internal and external stakeholders that influence and are influenced by the organization (Athanasiadou and Theriou, 2021). Comprehending stakeholders and regulating their expectations is essential for improving corporate reputation and competitive edge (Fadun, 2014). Moreover, the proficient communication of project strategies to sponsors, stakeholders, and team members guarantees smooth project execution (Reaiche *et al.,* 2022). This proactive strategy not only reduces ambiguity but also improves the overall efficacy of project communication.

This study aims to explore research on the influence of stakeholders in the implementation of capacity development programs for contractor resilience, especially in developing economies, and this lies in its novelty. The study has the following objectives:

- Conduct a trend analysis of the extent of studies on construction contractor capacity development in the past decade
- Identify and analyse key discussion themes in the current studies and propose a future study direction in the development of capacity development programs.

2. METHODS

Unlike narrative literature reviews, scientometric analysis employs statistical methods to reveal significant trends within the research area (Li *et al*., 2022). For this study, Scopus was chosen due to its reputation as the largest global abstract and citation database of peer-reviewed research literature across various scientific disciplines (Chadegani *et al*., 2013; Guz and Rushchitsky, 2009). Additionally, Scopus offers advanced features for tracking, analyzing, and visualizing research-indexed publications within the construction sector (Wuni *et al*., 2019; Onososen and Musonda, 2022).

2.1. Data Search, Retrieval, and Adoption

To preserve the integrity and replicability of the analysis, particular keywords, database selections, and criteria for inclusion or exclusion were utilized (Herrera-Franco *et al*., 2021). This study entailed querying Scopus using the terms "Stakeholder Influence", "Contractors", "Construction", "Capacity Development", "Resilience," and "Scientometric Review." Only English-language journal articles indexed by Scopus and categorized under engineering, project management, construction, and building technology were included, owing to their stringent peer review procedure (Butler and Visser, 2006; Zheng *et al.,* 2018; Zhao *et al*., 2017). The publication year was restricted to the range of 2014 to 2024 to encompass the most current academic literature in the field of research. A total of 260 items were obtained. Upon examining the abstracts, 60 articles were selected. After eliminating articles not related to the construction industry, fifteen (15) relevant articles were selected and exported into a Comma Separated Values (CSV) file and adopted for the scientometric analysis.

2.2. Science Mapping

The data was examined utilizing VOSviewer, a scientific mapping software application. VOS denotes "Visualization of Similarities" (Moral-Munoz Jose A *et al.,* 2020). VOSviewer was chosen for its adaptability and capacity to perform many studies and exhibit the supplied data (Moral-Munoz *et al.,* 2020). The production of maps, visualization, exploration, and tabular representation of trends facilitates the reference to the utilized data in a bibliometric analysis (Van Eck and Waltman, 2014).

3. RESULTS

3.1. Publication Trend Analysis

Analyzing the adopted articles to determine publication trends, an uneven pattern was observed from 2014 to 2024. There were no publications in 2014 and 2015, but the number rose to four in 2020, before dropping to 2 in 2022 to 2024. Only one article was published in 2016 and 2017, with no articles published in 2018 and 2019. However, publications increased in 2020, with four articles recorded in that year. Figure 1 illustrates the publication trend from 2014 to 2024.

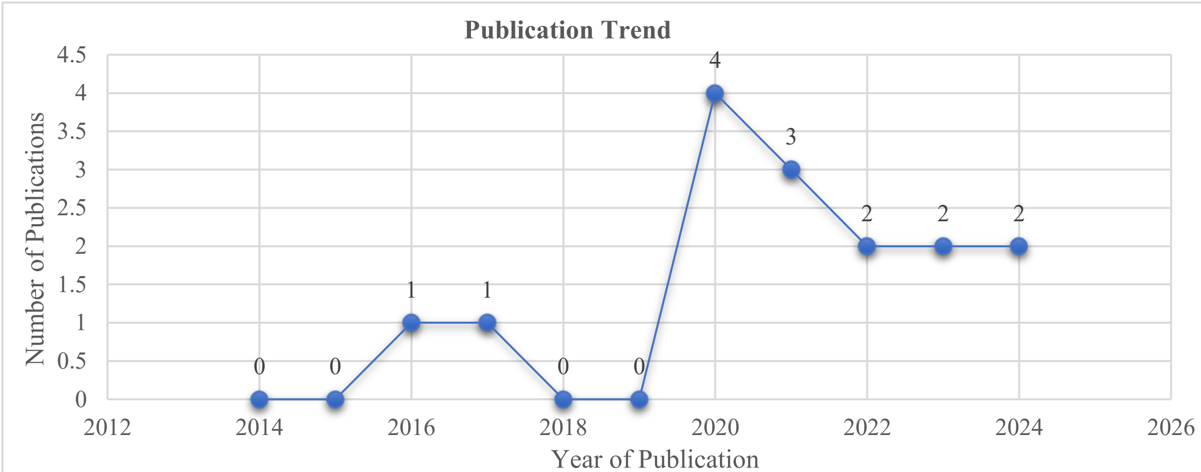

Figure 1: Publication Trend Analysis

3.2. Country of Origin

Among the top ten countries, China leads in publications with six articles, followed by Nigeria with four articles. Australia, Indonesia, and the United States of America contributed two articles each. South Africa, Saudi Arabia, South Korea, Taiwan, and the United Kingdom each contributed one article. Figure 2 depicts the publication countries.

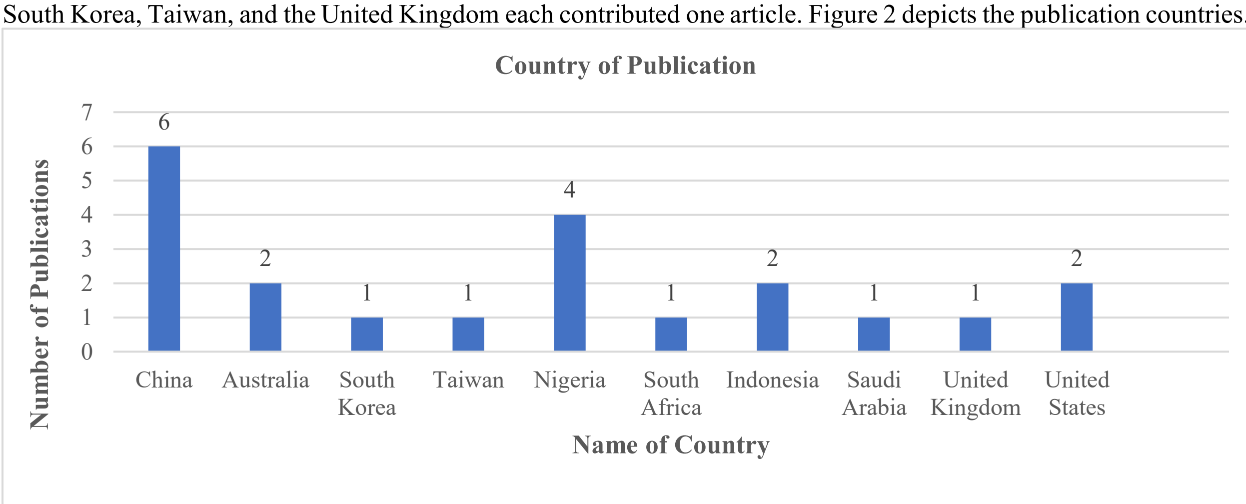

Figure 2: Country of Origin

3.3. Co-Citation Clustering

A total of 1,542 writers were referenced in the data sets, with a minimum citation requirement of 2; 74 authors met this criterion, as illustrated in Figure 3. The most frequently mentioned author was Zhang I with 9 citations. Zhou Z has 7 citations, Li G has 8 citations, and Anderson S was the least cited with 2 citations, as illustrated in Figure 7. The VOSviewer density visualization illustrates the prominent networks. The author's co-citation network illustrates the significant papers within a dataset (Olawumi *et al*., 2017). The density visualization is constrained, indicating a need for broader collaboration in this domain.

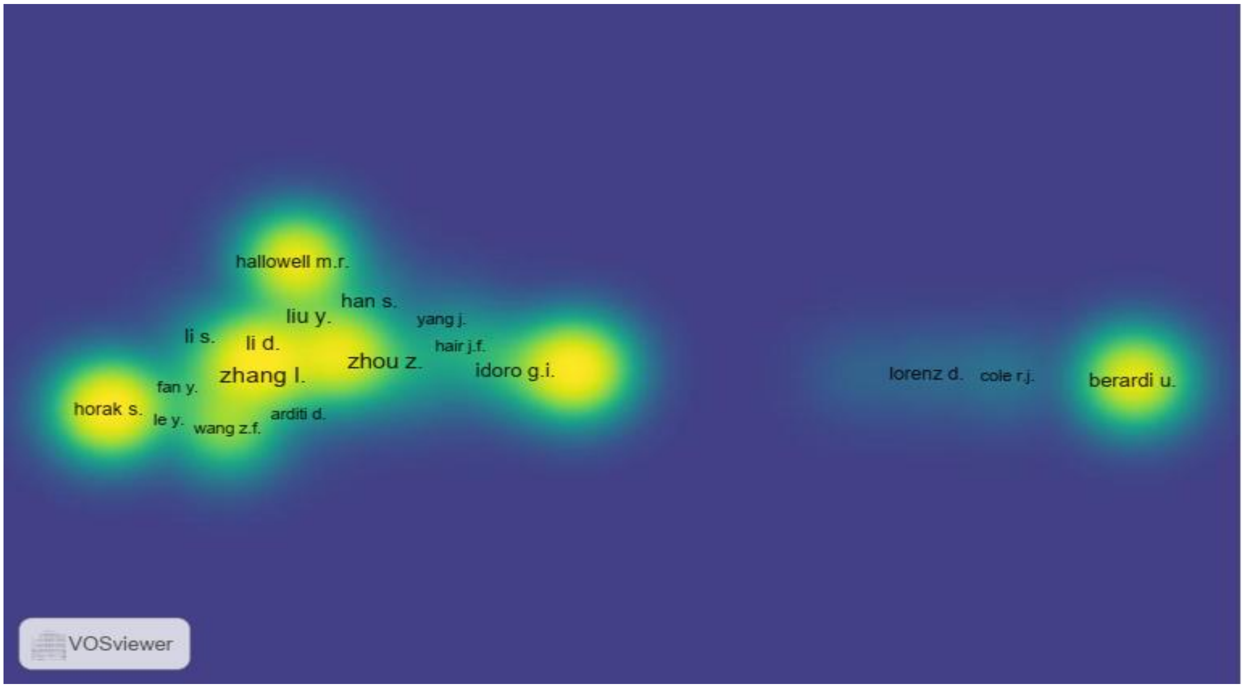

Figure 3: Co-Citation of Authors

3.4. Key Words Analysis

Research articles include keywords. Van Eck and Waltman (2014) assert that keywords signify the interconnection among various domains of knowledge and the structuring of study subjects. The five depicted clusters clearly indicate that the construction business is a prominent theme of conversation. The construction sector significantly contributes to economic growth. Another significant theme addressed is stakeholders. Their significant impact on the execution of developmental projects makes it unsurprising that this theme has emerged as one of the five principal topics of discussion during the past decade. It can be inferred that considering stakeholder interests contributes to the efficacy of capacity development programs. The third theme addressed is project management. The construction sector is inherently distinctive, with each project and program yielding unique results. The emergence of new technologies has increased the demand for agile project management systems. Consequently, it can be inferred that the discourse surrounding the implementation of suitable project management systems is garnering interest in the construction industry. Adaptability emerged as another important issue of discussion. The research indicates that the construction sector is transforming methodologies and technology. These alterations exert diverse effects on the resilience of the construction industry. Consequently, the sector must acquire the necessary skills and expertise to adapt to these developments for its continued viability. Figure 4 displays the visualization of the keywords.

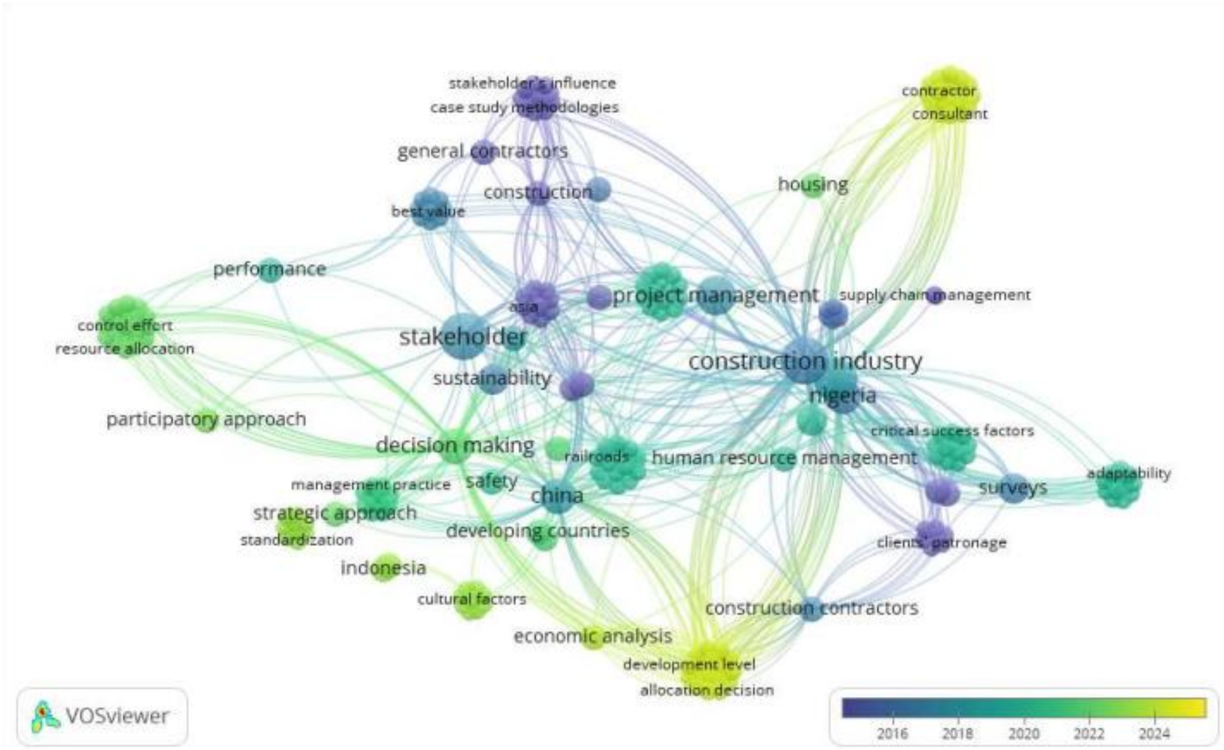

Figure 4: **Keyword Visualization**

4. DISCUSSION

Literature reviews are essential elements of academic research, providing foundational syntheses of knowledge on certain subjects (Bolderston, 2008; Lim, *et al.,* 2022). These evaluations assess previous research, offering a thorough summary of the current knowledge within a discipline (Okoli and Schabram, 2010; Siddaway, *et al.,* 2018).

4.1. Research Trend

Research trends suggest a notable concentration of scholarly inquiry within specific regions or nations. The inclusion of 15 publications in this review highlights the need for further research in this area, especially in developing countries. The trend began with no publications in 2014, peaked at four in 2020, and subsequently declined to two in both 2023 and 2024. Despite a rise in the total number of publications (n=4) in 2020, the inconsistent distribution and volume of published papers over the preceding decade indicate that additional efforts are warranted.

4.2. Source of Publication

Research on capacity development has garnered significant global interest due to its potential to enhance performance and resilience, particularly within the infrastructure sector of developing countries. This analysis reveals that developed nations dominate research outputs in this area, with a noteworthy concentration from industrialized countries, especially China. This trend underscores the need for further investigation in the field. While developing economies are making contributions to research efforts, there remains a persistent concern regarding stakeholder dissatisfaction with the capabilities of qualified local contractors, indicating an area that requires more focused attention. Despite the clear levels of dissatisfaction among stakeholders regarding trained local contractors, developing nations continue to receive capacity-building support from various partners (Jain and Dhir, 2021). This situation emphasizes the urgent need for additional research on stakeholder needs and their participation in the development of capacity-building initiatives in these contexts.

4.3. Co-Citation of Authors

Co-citation analysis is a fundamental component of bibliometric and scientometric methods, offering a solid framework for investigating the intricate intellectual landscape of a specific scientific field. This approach operates on the premise that the frequency with which two documents are co-cited by subsequent publications reflects the degree of their thematic similarity or intellectual interconnection (Roca, 2021). Based on Figure 4 above, the most significant papers have a link strength of 623. While the least influential paper had only 18 link strengths.

4.4. Co-Occurrence of Keyword

Keywords are employed to examine the content of each theme cluster as delineated by Donthu et al. (2021) and their manifestation in a research publication by Wuni et al. (2019). The primary five issues addressed in the selected papers are "construction industry," "stakeholders," "project management," "decision-making," and "sustainability." The primary issues highlighted in the selected publications, specifically the construction sector and stakeholders, underscore their importance in the study field. Capacity development consistently engages multiple stakeholders at the finance, planning, and implementation stages of infrastructure development. Stakeholders are those involved in the capacity-building processes, and their interests are crucial to the success of these initiatives. This study highlights the prominence of capacity development and stakeholders as the two most discussed themes, emphasizing the importance of further exploration in this sector.

5. CONCLUSION

This study utilized bibliometric and science mapping methodologies to objectively evaluate the literature on capacity development initiatives for local construction contractors while considering stakeholder needs. The results indicate a clear need for further exploration in this area, as evidenced by the limited number of articles (n=15) published over the past decade. Developed economies dominate the publication landscape, whereas developing countries continue to lag, despite receiving financial and technical assistance from funding institutions aimed at training local construction contractors.

The reviewed literature reveals a positive trend in the discussion of key issues over the last decade, with the construction industry and its stakeholders identified as central themes. This highlights the importance of ongoing research in this field. Additional themes such as project management, sustainability, and decision-making underscore the urgent need to continue enhancing the capabilities of local construction contractors to adapt to an evolving industry. Building on human capital development theories, this study contributes to the design of a comprehensive capacity development program that addresses the ongoing dissatisfaction of key stakeholders in the construction sector. This program is expected to improve the understanding of capacity development initiatives, enhance stakeholder satisfaction, and bolster the resilience of local contractors.

Ultimately, addressing stakeholder requirements will support the achievement of capacity development objectives. Implementing alternative strategies for these programs has significant implications for the sustainability of trained local construction contractors and advancing infrastructure development. The analysis of selected papers indicates that the lack of consistent research trends reflects an insufficient focus on and commitment to understanding and enhancing the capabilities of local contractors in developing countries. The absence of publications on stakeholder approaches to capacity development in 2014, coupled with irregular publication patterns, indicates that a robust foundational strategy for these efforts has yet to be developed. A stronger theoretical framework incorporating stakeholder theory could provide a more systematic approach to stakeholder engagement in capacity development.

Furthermore, the majority of the publications originate from affluent nations rather than developing countries, highlighting a gap in localized, context-specific research necessary for addressing the unique challenges faced by local contractors in these regions. The significant contributions from China and the United Kingdom suggest that existing research may not fully represent the realities and stakeholder needs of developing economies. While "construction industry" and "stakeholders" are prominent themes, the reduced focus on "stakeholder influence" and "adaptability" indicates that the role of stakeholders in the collaborative capacity-building process has not been thoroughly examined. Effective capacity development requires the active participation of stakeholders, which include local contractors, funding agencies, and regulatory bodies. Despite ongoing capacity development initiatives, there remains a notable level of stakeholder dissatisfaction with the outcomes, which suggests a potential shortfall in comprehending and integrating stakeholder expectations into capacity development initiatives aimed at fostering a resilient construction sector.

6. LIMITATIONS

This study acknowledges certain limitations. The data utilized in this paper was exclusively sourced from Scopus, indicating that there may be additional literature accessible through other academic search engines that could provide different insights into the analysis. Furthermore, limiting the selection to studies published only in English may result in incomplete conclusions, as there could be relevant articles published in other predominant languages from developed countries.

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