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Bibliometric Knowledge-Based Performance Management in Construction Procurement

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Abstract

This study investigates the evolution of the Knowledge-Based Performance Management System (KBPMS) in the public construction sector, focusing on the integration of performance management, digitalization, and data-driven decision-making. It aims to identify research trends, thematic clusters, and conceptual foundations for designing knowledge-oriented systems that enhance transparency and efficiency in public procurement. A bibliometric analysis of 145 Scopus-indexed journal articles published between 2015 and 2025 was conducted using VOSviewer and Biblioshiny. The analysis mapped publication patterns and keyword co-occurrence networks to visualize the intellectual structure and emerging themes within KBPMS-related research. The results reveal a progressive convergence between performance management and digital technologies in construction governance. Four major clusters were identified, representing decision-making frameworks such as the Analytic Hierarchy Process (AHP), data-driven construction management, risk and safety performance systems, and cost–benefit–based evaluation. These clusters reflect a transition toward integrated and knowledge-based performance models supported by digital tools like Business Intelligence (BI) and Building Information Modelling (BIM). The findings provide insights for policymakers and project managers to design and implement digital performance management systems that support data-informed decision-making, transparency, and sustainable governance in public construction projects. This study is among the first to apply bibliometric techniques to examine KBPMS research within the public construction context. It contributes by linking performance management, digital transformation, and evaluation frameworks into a unified knowledge-based approach for improving accountability and efficiency in public sector project management.

Keywords: Knowledge-Based Performance Management System, Public Construction, Digitalization, Bibliometric Analysis

INTRODUCTION

Performance Management (PM) is a critical field of study, relevant to both practitioners and academics, that transcends national and sectoral boundaries (Neely et al., 1995). In today's constantly evolving market, organizations face an urgent need to re-examine and enhance their Performance Management Systems (PMS) to significantly boost productivity, service quality, and market share (Bititci et al., 2018; Bourne et al., 2018). Fundamentally, PMS objectives are dual: evaluative, assessing individual and collective performance levels, and developmental, fostering the potential for future growth. An effective PMS enables organizations to align human effort with strategic objectives, utilize resources efficiently, and provide managers with early warnings to take immediate corrective action against potential roadblocks (Adepoju, Austin-Gabriel, Hamza, & Collins, 2022; Ewin & Oye, 2025; Gadicha, Gadicha, Zuhair, Burange, & Khan, 2025).

Despite the consensus on the importance of effective PMS, many organizations, especially in the capital-intensive public sector construction industry, struggle with legacy systems that lack the agility required to respond to rapid technological and market changes (Carpi et al., 2017). A primary challenge in large-scale public sector contracting lies in pervasive inefficiencies during pre-contract (procurement) processes, leading to significant approval bottlenecks, project delays, and fragmented accountability. Traditional PMS approaches are often inadequate, as they fail to

capture and utilize real-time data from modern digital platforms such as e-Procurement systems, nor do they effectively foster knowledge-based learning. This challenge is particularly acute in the Indonesian construction sector, where ambitious national infrastructure targets demand accelerated project delivery and enhanced transparency in tender processes (Osagioduwa, n.d.; Salim & Negara, 2018).

In this context, performance management in the construction sector must evolve from a conventional evaluation mechanism into a knowledge-driven decision-support system that integrates digitalization, analytics, and organizational learning (ABADI, ABADI, & ABADI, 2025; Sivakumar & Kumar, 2019). The shift toward Knowledge-Based Performance Management Systems (KBPMS) represents a strategic response to the need for data-driven governance and competitive advantage in public construction. To address this gap, this research focuses on identifying and conceptualizing the key components of a Knowledge-Based Performance Management System (KBPMS) that can be integrated with digital platforms, transforming raw performance data into actionable insights. This endeavor requires navigating a complex and fragmented domain at the intersection of three research areas: Performance Management, Knowledge Management, and Digitalization in Construction Procurement. Since the literature spanning these three fields is vast and heterogeneous, a conventional literature review risks subjectivity and may overlook subtle but critical research patterns. Therefore, this study employs Bibliometric Analysis not only to map the intellectual landscape but also to establish an evidence-based foundation for developing a KBPMS framework suitable for the construction industry. Defined by Alan Pritchard in 1969 as the application of statistical and mathematical methods to analyze scientific publications, bibliometrics leverages foundational concepts like Lotka's law (Lotka, 1945) and Bradford's law to provide an objective assessment of research impact and trends (Thompson & Walker, 2015).

Bibliometric analysis is highly effective in business and management reviews (Garengo & Sardi, 2021; Taticchi et al., 2015) as it allows for the quantitative identification of research pertinence, influential works, and the overall developmental trajectory of concepts (Culnan & Swanson, 1986). By systematically analyzing publication patterns, this approach enables us to: 1) Explore the conceptual linkages and evolution between Performance Management, Knowledge Management, and Digitalization in the construction domain; 2) Identify dominant methods, frameworks, and indicators that can inform the design of a practical KBPMS framework; and 3) Provide a structured, data-driven foundation for the formulation of future KBPMS models applicable to public construction procurement. Ultimately, this study goes beyond mapping trends: it aims to translate bibliometric insights into conceptual and practical implications for designing an adaptive, knowledge-based performance management framework that enhances competitiveness, transparency, and sustainability in public sector construction.

The primary objective of this research is to analyze and conceptualize the development of a Knowledge-Based Performance Management System (KBPMS) in the context of Indonesia's public construction sector by employing bibliometric analysis. Specifically, this study aims to identify the intellectual structure, emerging themes, and research trends that connect Performance Management, Knowledge Management, and Digitalization, three interrelated domains that together underpin the evolution of data-driven performance governance. By mapping the most influential authors, publications, and keywords, the study seeks to determine which theoretical frameworks and methodologies have shaped the discourse and how these can be synthesized into a robust conceptual model for KBPMS integration.

Academically, the study contributes to expanding the literature on performance management by introducing a data-driven, knowledge-based approach tailored to the digital era. It also enriches the theoretical understanding of how bibliometric methods can serve as a foundation for framework design in complex, interdisciplinary domains. Practically, this research provides policymakers, construction managers, and procurement authorities with a structured foundation for designing adaptive performance management systems that leverage knowledge sharing, analytics, and digital integration.

METHOD

This study employed a two-phase methodological approach. In the first phase, a bibliometric analysis was conducted to systematically review and map the evolution of Knowledge-Based Performance Management System (KBPMS) research within the public construction sector. This method enables the identification of key themes, influential works, and emerging clusters that form the scientific foundation of KBPMS. In the second phase, insights derived from the bibliometric findings were conceptually synthesized to propose the preliminary framework for KBPMS implementation. Bibliometric analysis was selected as it offers an objective and replicable technique for quantifying the structure and dynamics of research in a given field (Donthu et al., 2021).

In recent years, bibliometric analysis has gained increasing attention in social sciences and management research as a systematic and quantitative method for mapping scientific knowledge (Donthu et al., 2021; Turzo et al., 2022). To ensure transparency and reproducibility, this study follows a structured protocol for data collection. The bibliographic data were retrieved from Elsevier's Scopus database, which is considered one of the most comprehensive indexing services for peer-reviewed literature (Comerio & Strozzi, 2019; Norris & Oppenheim, 2007). The selection of Scopus was justified by its extensive coverage, reliable citation indexing, and inclusion of author-provided keywords that are essential for science mapping (Pesta et al., 2018).

Table 1. Data collection: research protocol

Component	Description
Data-set	Elsevier's Scopus
Time frame	2015–2025
Source fields	Title – Abstract – Keywords
Document type	Journal Articles (AR)
Source type	Journals (SRCTYPE = "j")
Publication stage	Final
Subject area included	• Business, Management (BUSI)• Social Sciences (SOCI)
Language	English
Search string	(TITLE-ABS-KEY (knowledge based system) AND TITLE-ABS-KEY (performance management) OR TITLE-ABS-KEY (KEY perfomance indicator) AND TITLE-ABS-KEY (construction) OR TITLE-ABS-KEY (procurement)) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))
Total dataset	145 articles

source: processed data

The search strategy was designed using Boolean operators and keyword strings relevant to the research focus on bibliometric studies. The search queries incorporated terms related to knowledge-based systems, performance management, construction, and procurement, as well as keywords concerning key performance indicators and e-procurement, reflecting the scope of research in performance management systems. The inclusion criteria were restricted to journal articles, published between 2015 and 2025, written in English, indexed under Business, Management, and Social Sciences, and in their final publication stage. After consolidating the results, a total of 145 publications were identified in the initial dataset. This approach ensured that the literature captured reflects both general and specific dimensions of performance management research, while maintaining methodological rigor and replicability (Tranfield et al., 2003).

Following the retrieval of bibliographic records, a systematic data cleaning procedure was applied to refine the dataset. First, duplicate articles resulting from overlapping search queries were identified and removed. Next, the titles, abstracts, and author-provided keywords were carefully screened to ensure that only publications directly relevant to the themes of performance management systems and their applications in construction and procurement were retained.

Exclusion criteria were applied to eliminate items such as conference proceedings, book chapters, editorials, and non-English documents, in line with best practices in bibliometric research (Donthu et al., 2021; Turzo et al., 2022). Only original research articles were considered, as they provide the most consistent and high-quality sources for bibliometric mapping. This filtering process enhanced the internal validity of the study by ensuring the dataset comprised solely of relevant and comparable scholarly outputs.

In addition, the data cleaning process involved an interpretive screening stage, in which selected publications were categorized based on their conceptual contribution to three major domains: (1) Performance Management Systems (PMS), (2) Knowledge Management (KM), and (3) Digitalization in Construction Procurement. This additional step ensured that the refined dataset could not only be used for bibliometric visualization but also serve as a conceptual foundation for identifying the structural relationships among these domains, which underpin the design of the Knowledge-Based Performance Management System (KBPMS) framework.

The final dataset, therefore, consisted of articles that were methodologically consistent with the objectives of the study and aligned with the broader research question of mapping bibliometric trends while supporting the conceptual synthesis for KBPMS framework formulation. This transparent and reproducible cleaning process contributes to improving the reliability and accuracy of bibliometric investigations, as recommended by previous studies (Castriotta et al., 2019; Furrer & Sollberger, 2007).

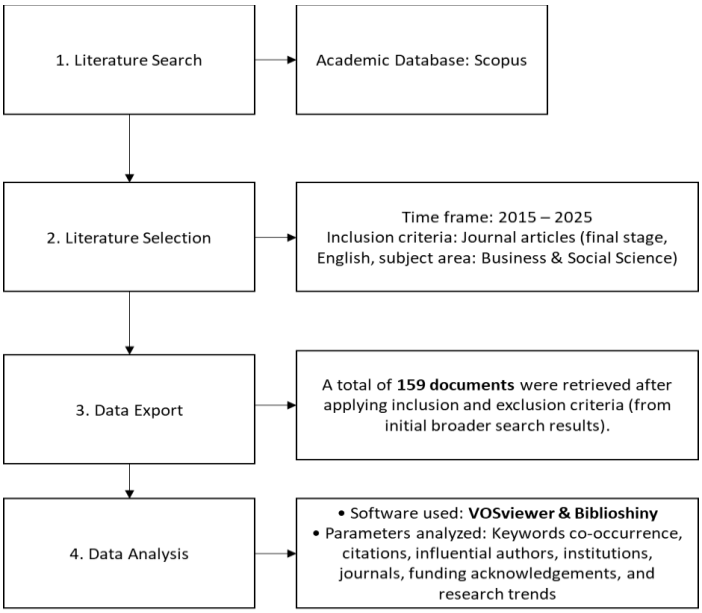

Figure 1. Process data cleaning
source: processed data

RESULT AND DISCUSSION

The analytical techniques adopted in this study follow the framework proposed by Donthu et al (2021), which divides bibliometric analysis into two main components: performance analysis and science mapping. Accordingly, the findings are presented in two parts. The first part involves performance analysis, which identifies the most prolific authors, influential journals, leading universities, and contributing countries, as well as the top 10 most cited publications in the dataset. This analysis also examines the methodological orientations and research focus of the selected studies, including the preferred analytical approaches, statistical tools, and data collection methods, thereby highlighting the global and sectoral coverage of performance management research in the construction and procurement context. The second part, science mapping, explores the intellectual structure and research fronts through a keyword co-occurrence network (Cobo et al., 2011). In this method, the repeated occurrence of the same keywords across multiple publications suggests conceptual relationships between studies (Callon et al., 1983; Castriotta et al., 2019). Using VOSviewer, this study applies Degree Centrality and Total Link Strength metrics to measure the connectivity and influence of keywords within clusters, thereby identifying thematic groupings and central research themes (Zou et al., 2018). Furthermore, beyond descriptive mapping, the analytical process in this study was designed to support conceptual interpretation. The purpose of this stage is not only to visualize bibliometric networks but also to extract key thematic relationships that can inform the development of a Knowledge-Based Performance Management System (KBPMS) framework in public construction procurement. The bibliometric results are therefore treated as analytical evidence for conceptual synthesis in the subsequent section (Findings), where dominant clusters and thematic patterns are interpreted as foundational components for framework formulation.

The findings are presented based on the specific research questions. Each research question is addressed with the results that have emerged from the analysis. However, there are some common findings that are addressed as the study progresses. The bibliometric analysis produced

both performance and science mapping results, which together outline the intellectual structure of the Knowledge-Based Performance Management System (KBPMS) research domain in public construction procurement. The keyword co-occurrence mapping using VOSviewer identified four major thematic clusters that represent the dominant conceptual areas in this field: decision-making and evaluation systems, performance management in the construction industry, data-driven construction management, and safety and performance optimization.

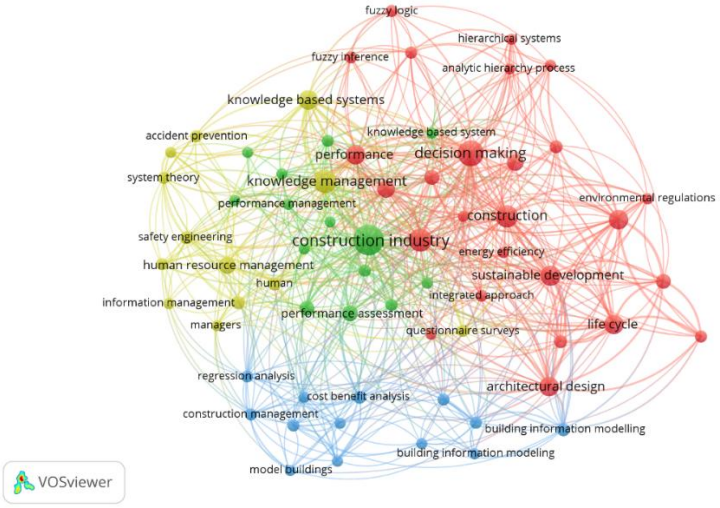

Figure 2. Most occurred keywords
source: processed data

As illustrated in Figure 2, the red cluster contains terms such as decision making, construction, and analytic hierarchy process, indicating a methodological focus on structured decision-making frameworks for performance assessment. The green cluster is characterized by keywords such as construction industry and performance management, which emphasize the sectoral orientation and the importance of systematic evaluation within the construction domain. The blue cluster includes construction management, building information modelling, and data analysis, highlighting the growing role of digital transformation and data analytics in monitoring and improving project performance. The yellow cluster, which includes safety engineering, system theory, reflects attention to human and systemic factors that influence overall performance optimization in construction projects.

Table 2. Most occurrence keywords (2015–2025)

keyword	occurrences	keyword	occurrences
construction industry	30	fuzzy inference	5
decision making	22	fuzzy logic	5
construction projects	18	fuzzy set theory	5
knowledge management	17	housing	5
construction	16	integrated approach	5
sustainable development	14	learning systems	5
environmental management	13	questionnaire surveys	5
performance	13	regression analysis	5
architectural design	12	structural design	5
knowledge based systems	12	system theory	5
life cycle	12	analytic hierarchy process	4

keyword	occurrences	keyword	occurrences
risk assessment	10	artificial intelligence	4
human resource management	9	building information modeling	4
risk management	9	construction engineering	4
performance assessment	8	customer satisfaction	4
environmental impact	7	decision theory	4
innovation	7	developing countries	4
project performance	7	education	4
building information modelling	6	energy efficiency	4
cost benefit analysis	6	engineering education	4
human	6	environmental regulations	4
machine learning	6	hierarchical systems	4
safety engineering	6	information management	4
stakeholder	6	knowledge based system	4
sustainability	6	managers	4
accident prevention	5	model buildings	4
benchmarking	5	performance management	4
construction management	5	performance measurement	4
construction safety	5	procurement	4
cost effectiveness	5	project delivery	4
decision support systems	5	project delivery systems	4
environmental performance	5	supply chain management	4
fuzzy inference	5	supply chains	4
fuzzy logic	5	system dynamics	4

source: processed data

These thematic clusters form the conceptual foundation for understanding how performance management research in construction has evolved. Collectively, they reveal an interdisciplinary movement that combines methodological decision frameworks, performance evaluation, digital integration, and safety considerations concepts that underpin the development of a Knowledge-Based Performance Management System (KBPMS). The following sections elaborate on how these clusters relate to each specific research question.

RQ1. What kind of framework is most appropriate to be implemented in the public construction sector to improve competitiveness and transparency through Knowledge-Based Performance Management Systems (KBPMS)?

The bibliometric mapping shows a growing global interest in integrating performance management principles with digital and data-driven approaches in the construction sector. Between 2015 and 2025, the number of publications demonstrates a consistent upward trajectory, indicating a broadening research focus on intelligent and knowledge-supported performance systems. The temporal trend of publication growth is illustrated in Figure 3, which displays a noticeable increase in research activity beginning in 2020.

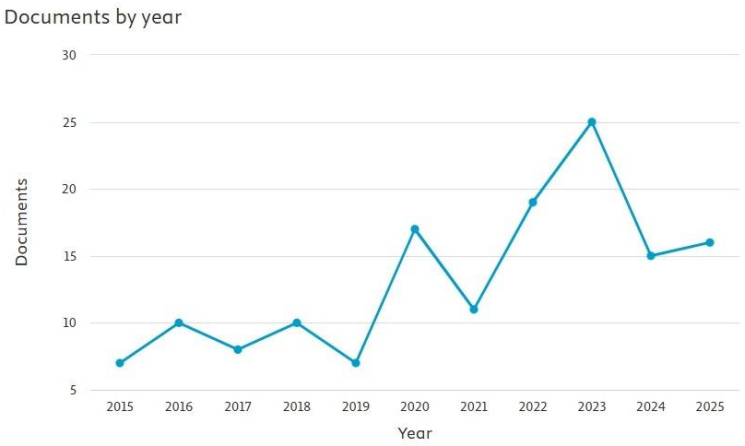

Figure 3. Documents by year
source: processed data

The distribution of publications by country, presented in Table 3, shows that China and the United States are the two leading contributors with 443 and 363 publications respectively, followed by the United Kingdom (177), Brazil (126), and Hong Kong (114).

Table 3. Distribution of papers by period for most productive countries

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
BRAZIL	0	5	5	8	8	14	14	14	18	18	22	126
CHINA	0	2	5	9	9	20	25	51	93	106	123	443
HONG KONG	1	2	2	7	7	7	12	15	15	23	23	114
UNITED KINGDOM	4	7	8	8	9	15	22	22	26	28	28	177
USA	4	9	12	18	24	30	32	45	51	66	72	363
Total	**9**	**25**	**32**	**50**	**57**	**86**	**105**	**147**	**203**	**241**	**268**	**1223**

source: processed data

The data indicate that research in this domain has achieved global recognition, involving both advanced and emerging economies. While the relative contributions differ, the upward trajectory across multiple regions reflects a collective effort to improve performance systems in the construction sector through evidence-based and structured approaches. Rather than indicating topic specialization by country, the pattern demonstrates an overall strengthening of institutional and academic interest in developing frameworks that enhance efficiency, accountability, and transparency.

When viewed together with the keyword co-occurrence results (Figure 1), the bibliometric evidence suggests that the development of an appropriate framework for KBPMS should integrate four conceptual foundations identified in the thematic clusters: decision-making mechanisms, performance management processes, digital construction management, and safety–risk optimization. These dimensions collectively indicate that an effective KBPMS framework for public construction procurement must be both analytical and adaptive. It should incorporate structured decision-making tools, data-supported monitoring mechanisms, and performance indicators that align with industry-specific requirements while maintaining transparency and stakeholder accountability. Overall, the global growth and thematic composition of KBPMS-related studies emphasize that performance management in the public construction sector is evolving toward a more integrated, data-informed, and knowledge-based paradigm. This

convergence supports the conceptual need for a framework that balances methodological rigor with contextual flexibility—ensuring competitiveness, transparency, and sustainable governance in construction procurement.

RQ2. What performance indicators are most suitable to be practically implemented for measuring efficiency, knowledge utilization, and project success in construction procurement?

The keyword performance occupies a central position within the bibliometric network, as illustrated in Figure 4, showing its extensive connections to multiple thematic areas that together form the foundation of performance evaluation in construction procurement

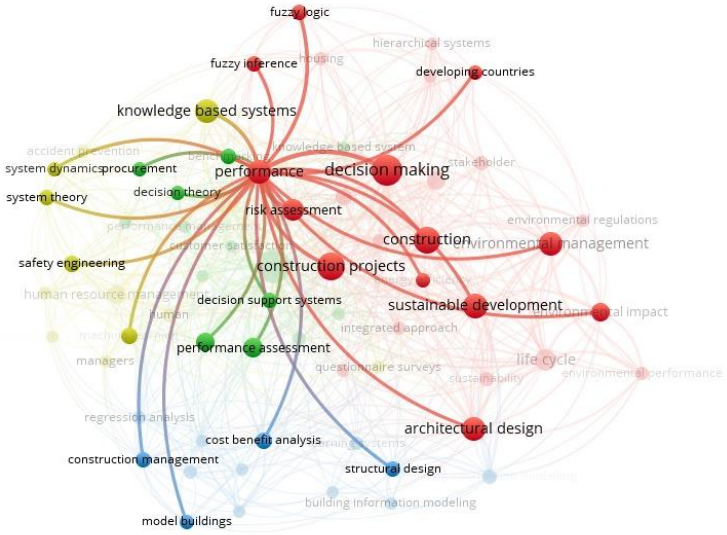

Figure 4. Keyword Co-occurrence Network Centered on "Performance" in Construction Procurement Research (2015–2025)
source: processed data

As depicted in Figure 4, performance is closely linked with decision making, construction projects, and construction, reflecting the strategic and operational aspects of project execution in the construction sector. These connections suggest that performance is commonly assessed in terms of how effectively decisions are made and implemented throughout the project lifecycle. The relationship between performance and decision making indicates that the efficiency of management processes and the ability to make evidence-based choices are key determinants of project success. The association between performance and sustainable development as well as environmental management highlights an increasing focus on sustainability-related outcomes. This linkage implies that performance indicators in contemporary research extend beyond traditional measures of cost and time to include environmental responsibility and long-term project impact. The link between performance and performance assessment, decision support systems, and procurement shows that systematic evaluation mechanisms and governance structures play a vital role in performance measurement. These connections reflect efforts to institutionalize structured monitoring and procurement-based accountability in public construction.

Furthermore, performance is directly connected with construction management, cost benefit analysis, structural design, and building information modelling. These relationships indicate that performance measurement is increasingly grounded in quantitative and technological approaches.

Indicators derived from cost–benefit analysis, digital modelling, and data analytics allow for more objective and evidence-driven evaluation of project efficiency and effectiveness. The association of performance with knowledge based systems and system theory demonstrates the conceptual movement toward integrating knowledge management and systemic thinking in performance evaluation. This integration facilitates continuous learning, feedback loops, and data sharing across project stakeholders, strengthening organizational adaptability and innovation. Finally, the relationship between performance and safety engineering underscores the importance of human and safety dimensions in defining project success. Performance is therefore not limited to productivity metrics but also encompasses the ability to manage risks, protect workers, and ensure overall project resilience. Taken together, these interconnected relationships illustrate that performance in construction procurement is understood as a multidimensional construct that bridges strategic, operational, environmental, technological, and human factors. The bibliometric evidence suggests that effective performance indicators for a Knowledge-Based Performance Management System (KBPMS) should encompass decision quality, project execution efficiency, sustainability outcomes, data-driven evaluation, knowledge integration, and safety assurance. Embedding these indicators into a KBPMS framework would allow for transparent, evidence-based, and adaptive performance monitoring in public construction governance.

RQ3. How can benchmarking and digital tools be integrated to enhance knowledge-driven performance evaluation?

The bibliometric mapping identifies construction projects as the central node linking performance management with digitalization, sustainability, and safety dimensions, as illustrated in Figure 5. The strong connections between construction projects, decision making, construction, sustainable development, environmental management, architectural design, and analytic hierarchy process (AHP) indicate that benchmarking in construction has evolved toward structured and multi-criteria decision frameworks. This reflects a growing emphasis on evaluating performance not only through cost and time efficiency but also through sustainability, design optimization, and environmental accountability. The presence of AHP further suggests that researchers employ systematic comparison models to assess alternatives and establish consistent benchmarking standards across projects.

The relationship between construction projects and building information modelling (BIM) underscores the digital transformation of performance evaluation practices. BIM functions as an integrated environment that enables the real-time visualization and analysis of project data, supporting dynamic benchmarking and early identification of performance deviations. The connections with decision support systems and project performance further demonstrate that digital benchmarking increasingly incorporates analytical and knowledge-based mechanisms. Through these tools, data from previous projects can be captured and reused, facilitating organizational learning and continuous improvement in decision-making processes.

The associations of construction projects with information management, accident prevention, and safety engineering reveal that digital benchmarking frameworks are extending beyond operational efficiency to include human and safety dimensions. These relationships highlight that effective benchmarking now encompasses data governance, safety control, and preventive risk management as integral components of project evaluation. Overall, the bibliometric evidence indicates that benchmarking and digital tools in construction procurement are converging into a knowledge-driven system. Within a Knowledge-Based Performance Management System (KBPMS), this integration enables real-time benchmarking through BIM and AHP, enhances

decision quality through analytical systems, and promotes transparency and learning through effective information management.

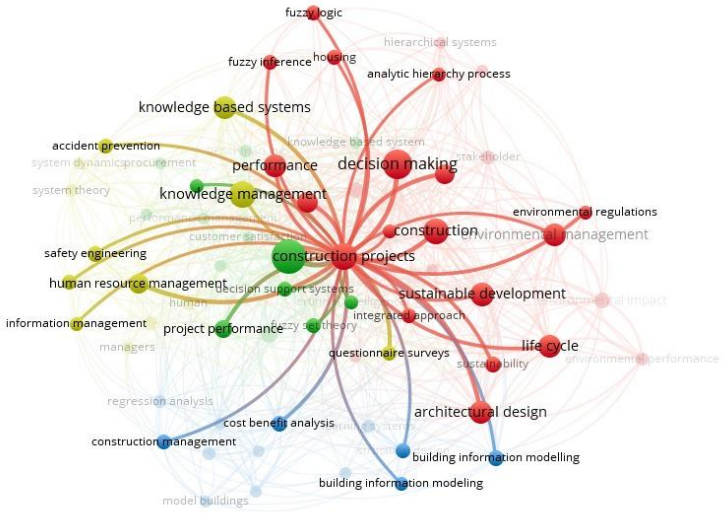

Figure 5. Keyword Co-occurrence Network Centered on "Construction Projects" (2015–2025)
source: processed data

RQ4. How can learning and knowledge mechanisms within KBPMS enhance decision-making, accountability, and sustainability in public construction governance?

The bibliometric mapping positions knowledge management at the center of the intellectual network, linking managerial, technical, human, and innovation-related domains as shown in Figure 5. Its close connections with construction industry, performance management, performance assessment, and decision support systems indicate that knowledge processes operate through systematic monitoring and evaluative mechanisms. Knowledge management therefore functions as the conduit by which project- and organization-level data are interpreted, synthesized, and translated into performance insights that inform planning and governance.

The association of knowledge management with human resource management, machine learning, system theory, safety engineering, and accident prevention highlights the human–technical interplay in organizational learning. These links suggest that learning within KBPMS is both people-centered and data-driven: human capital and safety practices generate tacit and explicit knowledge, while analytical techniques and predictive models enable the codification and reuse of lessons learned. Consequently, knowledge management supports anticipatory and preventive capacities, improving resilience and reducing performance failures.

The relationships between knowledge management and decision making, construction, sustainable development, innovation, construction management, regression analysis, and construction engineering imply that knowledge mechanisms are deeply embedded in technical decision processes and sustainability objectives. For KBPMS design, this means integrating knowledge repositories, analytics, and decision-support tools so that evidence, innovation, and technical evaluation jointly inform benchmarking, procurement choices, and policy. Embedding such knowledge-centred processes enhances transparency, enables continuous organizational learning, and strengthens the capacity of public construction systems to achieve safer, more sustainable, and more accountable project outcomes.

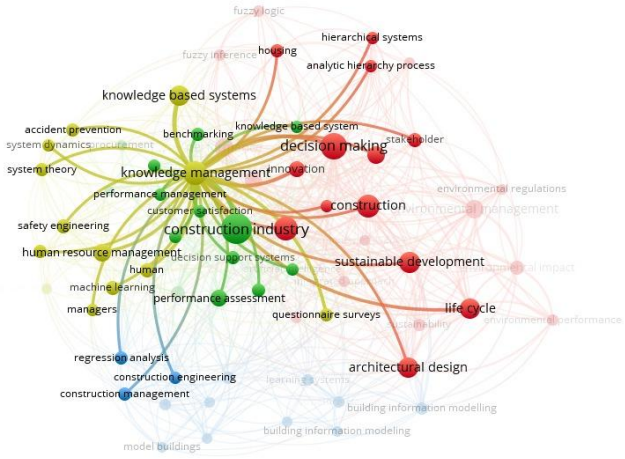

Figure 6. Keyword Co-occurrence Network Centered on "Knowledge Management" (2015–2025)
source: processed data

Beyond the bibliometric mapping, a contextual literature synthesis was conducted to position the current research within the broader academic landscape of performance management, knowledge management, and digital transformation in construction. This synthesis identifies how previous studies conceptualized these themes and how the present study advances them through the Knowledge-Based Performance Management System (KBPMS) perspective. Table 4 summarizes representative prior studies and the current research, highlighting methodological distinctions, conceptual integration, and newly proposed findings relevant to enhancing competitiveness in the public construction sector.

The comparison above demonstrates that previous studies have provided valuable insights into performance, risk, and knowledge management in the construction sector. However, most of these works examined the topics separately, emphasizing either technological, managerial, or risk-oriented perspectives without establishing an integrative, data-driven framework. Through bibliometric mapping combined with contextual synthesis, this study proposes new findings that have not been identified in previous research. The main finding is the recognition of knowledge management as the central construct that connects digital tools, safety systems, and performance evaluation in public construction procurement. The bibliometric results reveal a convergence between digitalization, performance assessment, and organizational learning, which forms the foundation of the Knowledge-Based Performance Management System (KBPMS). This integration provides practical implications by offering a framework that can be applied to enhance companies' competitiveness and institutional transparency in the construction industry. By linking knowledge-driven decision-making, risk-based learning, and digital integration through platforms such as BIM and Business Intelligence, the KBPMS transforms traditional performance measurement into a strategic and adaptive mechanism that promotes organizational capability, governance quality, and sustainable competitiveness in the public sector.

CONCLUSION

This bibliometric study reveals a growing academic and practical emphasis on performance management in the public construction sector, with a strong shift toward digital transformation, sustainability, and knowledge-based governance. Between 2015 and 2025, research trends converged on integrating performance management, construction management, data analytics, risk

management, cost–benefit analysis, and Building Information Modelling (BIM)—marking a transition from traditional evaluation toward Knowledge-Based Performance Management Systems (KBPMS). This evolution aligns with Aguinis and Burgi-Tian (2021), who note that modern performance management emphasizes learning and transparency over static assessment. Similarly, Stroet (2020) confirms that multi-criteria decision tools such as Analytic Hierarchy Process (AHP) and data-driven analysis enhance the precision and adaptability of performance systems. The findings demonstrate that KBPMS can serve as an effective mechanism to improve governance quality, accountability, and organizational performance in public construction. For practitioners, this study underscores the urgency of adopting integrated and digitalized performance management frameworks. Managers should align cost–benefit assessment, risk management, and real-time monitoring using tools like BIM, Business Intelligence (BI), and e-Procurement platforms. Investing in data literacy, analytical capability, and digital infrastructure will enable continuous learning and enhance project sustainability. Future research should combine bibliometric and case-based approaches, exploring BIM integration, real-time analytics, and AHP applications to operationalize KBPMS. Comparative cross-country and longitudinal studies are also recommended to assess contextual differences and foster collaboration between academia, government, and industry in building sustainable, data-driven performance systems.

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