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A BIBLIOMETRIC ANALYSIS ON GREEN BUILDINGS ISSUES IN ASIA: 20 YEARS REVIEW

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Abstract

This article presents a comprehensive 20-year bibliometric analysis focused on the trends and patterns of research addressing green building issues in Asia. The problem statement arises from the increasing importance of green buildings in mitigating environmental impacts, coupled with the rapid urbanization witnessed in Asia. This study aims (1) to identify the publication trends in green buildings issues in Asia for the past 20 years; (2) to investigate the evolving trends of research priorities between the last two decades; (3) to study the field's intellectual and geographical evolution from the structures of collaboration and co-occurrence networks. This research used the Scopus database served as the primary source for collecting relevant publications spanning the period from 2004 to 2024. A systematic search using specific keywords related to green building issues in Asia was conducted. The bibliometric software VOSviewer was employed to visualize co-occurrence networks mapping, analyze publication trends, and others analysis. The analysis shows a steady increase in publications, reflecting growing interest in green building research across Asia. Leading contributors form a competitive and diverse research community, with Environmental Science, Social Sciences, and Engineering as the main subject areas, highlighting the field's multidisciplinary nature. Over the past two decades, research has evolved from broad discussions on sustainability to more focused, evidence-based, and interdisciplinary studies emphasizing technology, certification, and human-centered design. The co-authorship network further reveals that countries with stronger institutions and policies dominate research output, while regional gaps remain, underscoring the need for greater collaboration, knowledge sharing, and policy support to promote a more balanced and sustainable research ecosystem in Asia.

Keywords: Green Buildings, Green Issues, Bibliometric Analysis

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INTRODUCTION

In the dynamic landscape of sustainable development, green buildings have emerged as a linchpin, catalyzing a paradigm shift towards environmentally conscious urbanization. Over the past two decades, the Asian continent has been at the forefront of this transformative journey, navigating the intricate intersection of innovation, policy, and societal change. As the study embarks on a bibliometric analysis spanning the last 20 years, this article delves into the wealth of scholarly literature to unravel the intricate tapestry of green building issues in Asia. The exponential growth of research on green buildings in Asia underscores the urgency and global significance of sustainable urban development. Scholars, policymakers, and industry experts have engaged in a rich tapestry of discourse, addressing the multifaceted challenges and opportunities that define the region's commitment to eco-friendly construction practices.

This study seeks to provide a comprehensive and nuanced understanding of the evolving scholarly discourse on green building issues in Asia. It identifies key intellectual contributors and maps collaborative networks to reveal intersections of knowledge production and clusters of expertise that have influenced the field's development. The findings offer both a retrospective view of the past two decades and guidance for future research and policy directions in sustainable development. In addressing the growing academic focus on this topic, the study is guided by three main research questions:

- (1) What are the publication trends in green building research in Asia over the past 20 years?
- (2) How have thematic focuses and research priorities evolved, as reflected through keyword co-occurrence patterns? and
- (3) How do collaboration and co-occurrence networks among authors, institutions, keywords, and countries shape the intellectual and geographical landscape of green building research in the region?

LITERATURE REVIEW

In the past two decades, green buildings in Asia have focused mostly on environmental benefits such as energy conservation, emission reduction, and ecological sustainability (Chen & Luo, 2020; Leong et al., 2023; Zhao et al., 2023). Green building initiatives aim to preserve the climate and urban environment through innovations in building design, construction methods, and materials (Wardhana et al., 2023), particularly in densely populated Asian cities (Thakur, 2023).

However, despite the green benefits there are various key economic issues arise include high initial costs, long-term cost recovery, and barriers to implementation over the past two decades in the Asia countries. High initial costs are a major challenge in the design and construction stages, particularly due to

the higher costs of green materials and features (Hussain Ahram & Syed Zakaria, 2023; W. Shen et al., 2018; Taherkhani, 2023; Zhang et al., 2018). Long-term cost recovery is also a concern in the operational stage (Hussain Ahram & Syed Zakaria, 2023). Barriers to implementation include financial pressure, technical limitations, inadequate promotion, and difficulty in obtaining green materials (W. Shen et al., 2018; Susanto & Sujana, 2023; Taherkhani, 2023; Tam, 2014).

Despite the potential long-term benefits, economic viability remains unclear due to information, behavior, and policy factors (Zhang et al., 2018). Green finance can help bridge the investment gap, with Asia contributing significantly to this area (Debrah et al., 2022). Market demand, technological advancement, and government support are crucial for the adoption of green buildings in developing countries like Thailand, where financial pressure, technical limitations, and inadequate promotion are identified as barriers (W. Shen et al., 2018; Taherkhani, 2023). The existing literatures shows that the China's government has played a significant role through a mix of regulatory, market-based instruments (Y. Shen & Faure, 2021) and evolution of policies and tools over the past two decades (He et al., 2023). Meanwhile, the implementation of green building policies in Indonesia faces challenges related to effectiveness, legal level, and social momentum, suggesting the involvement of various sectors and stakeholders for effective implementation (Maramis & Lumunon, 2022; Sahid et al., 2021). Similarly, the challenges faced by Vietnam include the need for comprehensive regulations, slow adoption, and lack of governmental support (Nguyen & Gray, 2016). Contrarily, the key success factors in Singapore's green building implementation with over 30% of buildings being Green Mark certified, provides valuable lessons emphasizing the importance of government policy, incentives, legislation and industry strong support (Hatmoko et al., 2017). In the past two decades, the adoption of green building technologies in Asia has been hindered by a lack of technical capabilities and various challenges. For instance, in Thailand, "skilled in energy systems" was identified as one of the top two most important green technical capabilities, while in Indonesia and Malaysia, lack of awareness, expertise, and budget were identified as barriers to green building adoption (Hatmoko et al., 2017; Sahid et al., 2021; W. Shen et al., 2018; Yee Sin et al., 2021).

In conclusion of the literature, the last two decades have marked a significant period of evolution, challenges, and achievements in the domain of green building implementation across Asia. The comprehensive reviews from various scholars and studies provide a rich tapestry of insights that underline the multifaceted nature of green building issues in the region, encapsulating environmental benefits, economic hurdles, policy and regulatory frameworks and technological advancements. This conclusion synthesizes these insights, acknowledging the progress made while highlighting the persistent and emerging

challenges that need addressing to foster the broader adoption of green buildings in Asia.

RESEARCH METHODOLOGY

Bibliometrics is the process of organising, coordinating and analysing bibliographic data from scientific publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002). In addition to standard descriptive data like publication year, major author categorization, and publishing journals, it also includes sophisticated methods like document co-citation analysis (Wu & Wu, 2017). In order to produce a full bibliography and reliable results, a successful literature review requires an iterative process that includes the discovery of appropriate keywords, literature search, and careful analysis (Fahimnia et al., 2015). Considering this, the study aimed to concentrate on high-caliber publications since they provide insightful information about the theoretical stances influencing the development of the field of study. The study used the SCOPUS database for data gathering in order to guarantee data fidelity (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste & Paithankar, 2017). Furthermore, only papers published in carefully peer-reviewed academic journals were taken into consideration, with books and lecture notes purposefully left out in order to guarantee the inclusion of high-quality publications (Gu et al., 2019). Notably, papers from 2004 to February 2024 were collected for further research thanks to Elsevier's Scopus, which is renowned for its broad coverage.

Data search strategy

The data search terms for article retrieval were determined by the study using a screening sequence. The study was started by putting together 2,786 articles by querying the Scopus database with the online TITLE ("Green building") AND issues. Subsequently, the query string was changed to emphasise by adding the search phrases "Green building" AND (topics OR problems OR challenges). 1,241 articles that were included after the refinement were included in the bibliometric study. All papers pertaining to green building issues in Asia included in the Scopus database as of February 2024 were included in the analysis as criterion in Table 1 and 2.

Table 24: The search strings

Scopus	TITLE-ABS-KEY ("green buildings" AND (issues OR problems OR challenges)) AND (EXCLUDE (PUBYEAR , 1992) OR EXCLUDE (PUBYEAR , 1996) OR EXCLUDE (PUBYEAR , 1998) OR EXCLUDE (PUBYEAR , 1999) OR EXCLUDE (PUBYEAR , 2000) OR EXCLUDE (PUBYEAR , 2001) OR EXCLUDE (PUBYEAR , 2002) OR EXCLUDE (PUBYEAR , 2003)) AND (EXCLUDE (DOCTYPE , "re") OR EXCLUDE (DOCTYPE , "ch") OR EXCLUDE (DOCTYPE , "cr") OR EXCLUDE (DOCTYPE , "bk") OR EXCLUDE (DOCTYPE , "sh") OR EXCLUDE (DOCTYPE , "ed") OR EXCLUDE (DOCTYPE , "tb") OR EXCLUDE (DOCTYPE , "no") OR EXCLUDE (DOCTYPE , "er") OR EXCLUDE (DOCTYPE , "cp")) AND (EXCLUDE (LANGUAGE , "Chinese") OR EXCLUDE (LANGUAGE , "Spanish") OR EXCLUDE (LANGUAGE , "Korean") OR EXCLUDE (LANGUAGE , "French") OR EXCLUDE (LANGUAGE , "German") OR EXCLUDE (LANGUAGE , "Italian") OR EXCLUDE (LANGUAGE , "Persian")) AND (EXCLUDE (SRCTYPE , "d") OR EXCLUDE (SRCTYPE , "p") OR EXCLUDE (SRCTYPE , "k"))
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Table 1: The selection criterion is searching

Criterion	Inclusion	Exclusion
Timeline	2004 – 2024 (Feb)	< 2004
Literature type	Article	Non-Article
Source type	Journal	Non-Journal
Language	English	Non-English

Source: Author's Analysis (2024)

Data analysis

The study used VOSviewer, a widely used bibliometric software used to analyze and visualize scientific literature (Van Eck and Waltman, 2010). VOSviewer enables mapping of co-authorship, co-citation, and keyword co-occurrence networks through intuitive visualizations, clustering related items, and generating density maps. Its interactive interface and compatibility with major bibliometric databases allow efficient exploration of large datasets. The software also supports metric computation and customizable visualizations. By translating complex bibliometric data into clear visual maps and charts, VOSviewer helps identify research trends, thematic clusters, and collaboration networks, providing valuable insights into the intellectual structure and development of a research field.

The bibliometric analysis process in this research involved datasets containing information on publication year, title, author name, journal, citation, and keywords. The data were export in PlainText format obtained from the Scopus database, covering the period from 2004 to February 2024. These datasets were analyzed using VOSviewer software version 1.6.20, employing VOS clustering and mapping techniques to examine and generate maps. Unlike the Multidimensional Scaling (MDS) approach, VOSViewer focuses on situating items within low-dimensional spaces, ensuring that the proximity between any two items accurately reflects their relatedness and similarity. While sharing similarities with the MDS approach, VOSViewer diverges by employing a more

appropriate method for normalizing co-occurrence frequencies, such as the association strength (AS_{ij}) calculated as:

$$\frac{AS_{ij} \times C_{ij}}{W_{ij}}$$

According to Van Eck and Waltman (2010), the index used in VOSviewer measures the observed co-occurrences of items relative to their expected co-occurrences under statistical independence. Based on this index, the software positions items on a map by minimizing the weighted sum of squared distances between pairs, often applying LinLog/ modularity normalization to improve clustering (Appio et al., 2016). Visualization techniques in VOSviewer reveal patterns grounded in these mathematical relationships, enabling analyses such as keyword co-occurrence, citation analysis, and document co-citation analysis. Keyword co-occurrence analysis allows tracking the evolution of research topics over time and identifying prominent themes (Li et al., 2016). Citation analysis helps uncover key research trends, techniques, and historical significance, while co-citation analysis maps the intellectual structure of a field through network-based approaches (Appio et al., 2016; Fahimnia et al., 2015; Liu et al., 2015).

RESULTS AND FINDINGS

RQ 1: What are the publication trends in green building issues in Asia for the last 20 years?

The Figure 1 show the number of journal articles published on green building issues in Asia that were indexed by Scopus over a 20-year period (2004 to 2024 (Feb)). There seems to be a steady increase in the number of publications over the timeframe, indicating a growing interest in "Green Building Issues in Asia". This could be due to a number of factors, including rising awareness of environmental impact of buildings, growing interest in green building practices, rapid urbanisation in Asia that need for more sustainable construction methods to reduce the environmental impact of new buildings as well as many Asian governments have implemented policies to promote green building practices, such as tax breaks and subsidies. The figure also shows that the highest publications recorded were from 2021 to 2023. During these three years, there are 109 up to 175 publications recorded per year. By considering these trends, patterns, and potential influences, it can be concluded from the bibliometric analysis that recently green buildings issues are seriously discussed in high impact articles from various perspectives.

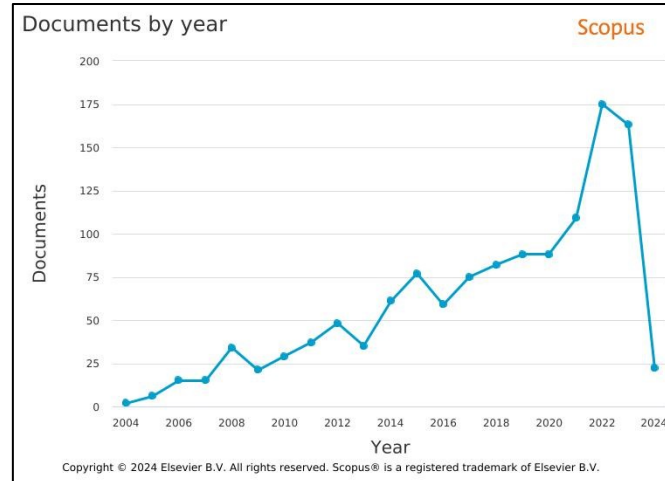


Figure 1: Plotting document publication by years.
Source: Scopus's Analysis (2024)

In line with the literature synthesis, this trend reflects the regional shift from conventional construction paradigms toward more environmentally conscious and resource-efficient building practices. It also signals a maturation of the research domain, transitioning from descriptive explorations of “green” principles to data-driven, policy-oriented, and performance-based analyses. Hence, the consistent growth over two decades underscores not only the enduring relevance of green building research in Asia but also the region’s role as a critical contributor to global sustainability discourse.

Who are the most influential researchers and countries contributing to the advancement of green building studies within the region?

The Figure 2 and Table 3 shows the top 10 authors based on the number of publications in green building issues in Asia indexed by Scopus. The most prolific researcher in the field is Guo Z. with the highest number of publications (7 journal articles) accounting for 0.56 percent of the total publications. The rest of the authors in Figure 2 shows 5 publications each, contributing 0.40 percent to the total publications. The top 10 authors have made significant contributions to the research on green building issues in Asia, collectively accounting for more than half (56%) of the total publications in the dataset. The remaining

publications are distributed among a larger number of authors, with 430 unique authors listed.

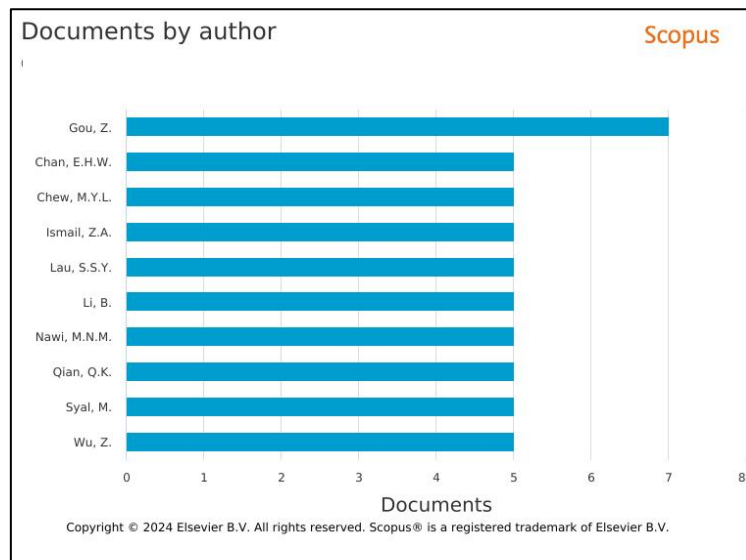


Figure 2: 10 Top Authors in publication of green buildings issues in Asia
Source: Scopus's Analysis (2024)

Table 3: Number of Publications for Top Researchers

Author Name	Number of Publication	Percentages
Gou, Z.	7	0.56
Chan, E.H.W.	5	0.40
Chew, M.Y.L.	5	0.40
Ismail, Z.A.	5	0.40
Lau, S.S.Y.	5	0.40
Li, B.	5	0.40
Nawi, M.N.M.	5	0.40
Qian, Q.K.	5	0.40
Syal, M.	5	0.40
Wu, Z.	5	0.40

Source: Scopus's Analysis (2024)

Based on the author names analysis, it appears that researchers from various countries in Asia are contributing to this field. The institutional affiliations and author backgrounds suggest strong representation from China, Malaysia, and Singapore, countries that have established institutionalized research programs and policy frameworks supporting sustainable construction. The clustering of co-authored works also points to active research networks and

collaborative initiatives, which are instrumental in advancing cross-border knowledge exchange on sustainability issues.

This finding reinforces the earlier literature synthesis, which emphasized China's regulatory leadership, Singapore's Green Mark policy success, and Malaysia's growing focus on sustainable construction technologies as catalysts for regional transformation. Nevertheless, the relatively limited contributions from emerging economies such as Indonesia, Vietnam, and the Philippines highlight a research disparity that warrants future attention to ensure equitable and regionally representative advancements in sustainable building practices.

What are the dominant research themes or subject areas and keyword clusters that define the intellectual structure of this field?

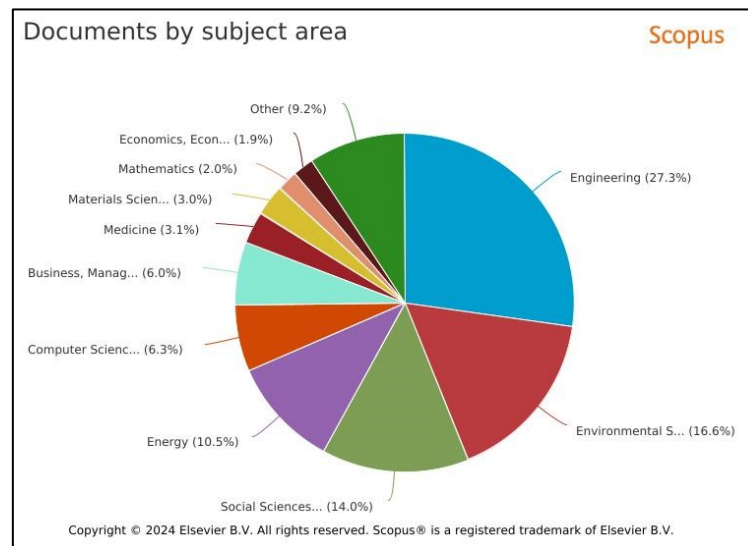


Figure 3: Type of document by subject of research
Source: Scopus's Analysis (2024)

The Figure 3 shows the research themes or subject areas covered in a collection of Scopus documents related to green building issues in Asia. The breakdown of the information recorded the largest slices were dominated by Engineering (27.3%), Environmental science (16.6%) and Social Sciences (14.0%). This suggests that research on green building in Asia tends to focus on the environmental and social impacts of green buildings, as well as the engineering challenges of designing and constructing them. There is also some

research on the economic and business aspects of green buildings, as well as on the use of computers and data in green building design and construction.

Engineering research has primarily focused on energy-efficient design, building performance optimization, and technological innovation in materials and systems, resonating with the literature on technological limitations and the need for green construction codes. Meanwhile, studies in Environmental Science have concentrated on emission reduction, resource efficiency, and life-cycle assessment, aligning with the identified environmental benefits of green buildings in the region. Social Science contributions, in contrast, reflect a growing recognition of human well-being, behavioral adaptation, and governance frameworks, emphasizing the role of stakeholder engagement, education, and regulatory policy in advancing green building adoption.

RQ 2:How the thematic focuses and research priorities in green building studies in Asia evolved over the past two decades based on keyword co-occurrence patterns?

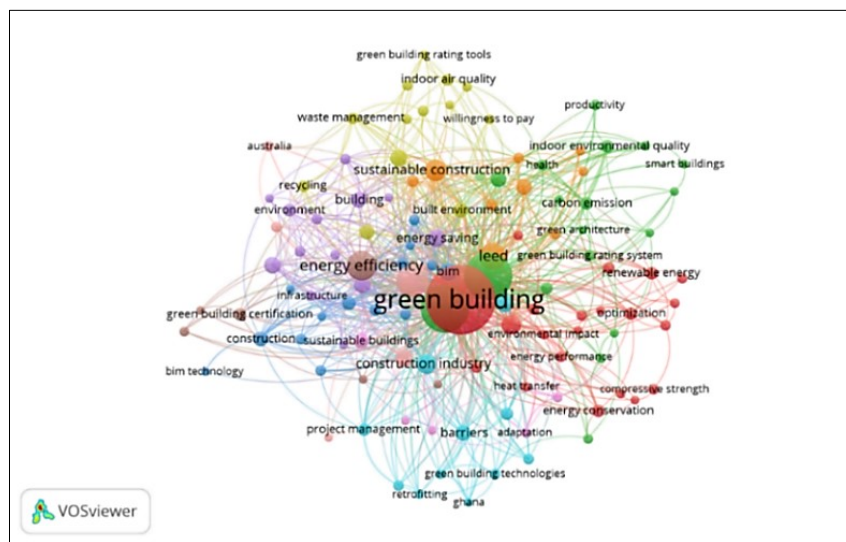


Figure 4: Network visualization map of keywords' co-occurrence
(2004-2024: 2 decades)
Source: VOS viewer's Analysis (2024)

The map in Figure 4 visually represents the relationships and prominence of various keywords within the green building issues in ASIA in two decades (2004 – 2024). The term "green building" is highly frequent, appearing 294 occurrences, indicating its central importance in the literature. The total link strength of 323 suggests strong connections with other terms, reinforcing its

significance in the context of green building issues in Asia. "Energy efficiency" is another highly emphasized concept, appearing 55 occurrences. The total link strength of 81 indicates a strong association with various related terms, highlighting the focus on energy-efficient solutions in green building discussions. "Sustainability" is a key theme, occurring 140 times, and has a substantial total link strength of 240. This indicates a broad and interconnected network of topics related to sustainability in the context of green buildings in Asia.

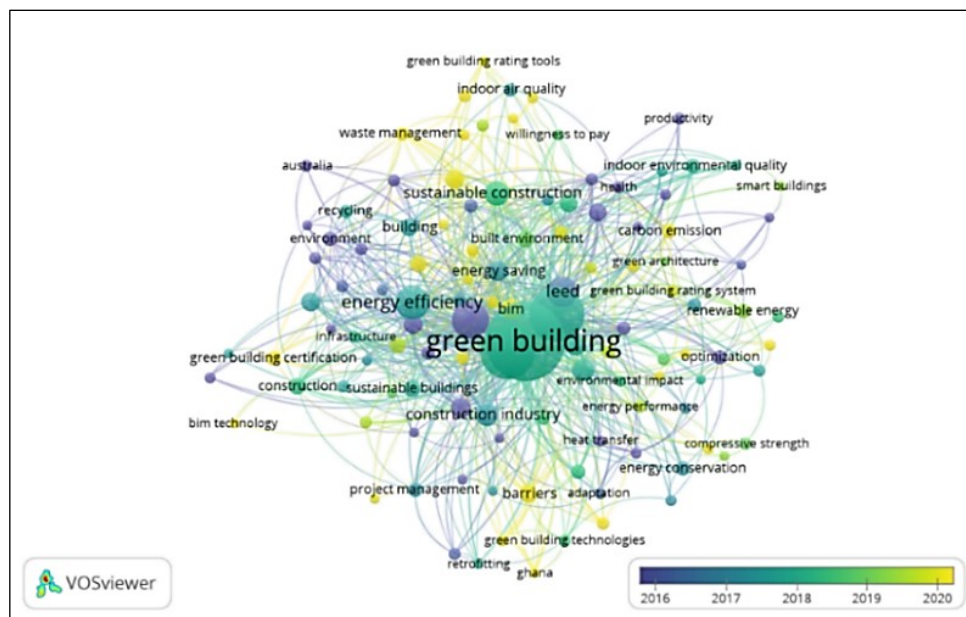


Figure 5: Network Visualization Map of Keywords' Co-Occurrence
 (2014 – 2024: Recent decade)
 Source: VOS viewer's Analysis (2024)

Meanwhile, the visual mapping in Figure 5 is a network visualization map of keywords co-occurrence that representing the recent decade from 2014 up to 2024 (February) on green buildings issues in Asia. The result shows the relationship on keywords on "Green building" that refers to rating system which is a central term with strong links to other keywords such as LEED, BIM, green building certification, and sustainable construction. This suggests that green building rating systems are a major issue on green building research in Asia. The next keywords is "Energy" related keywords like energy saving, energy efficiency, and renewable energy are also prominent and interconnected. This reflects the importance of energy efficiency in green buildings. There is a cluster of keywords around "indoor environment" including indoor air quality, health, and productivity. This suggests a focus on creating healthy and productive indoor

spaces in green buildings. There are also several other prominent keywords like “waste management”, “recycling” and “sustainable construction” form another cluster, indicating a concern for sustainable building practices throughout a building's life cycle. Overall, the network visualization map shows that recently green building research in Asia is focused more on attributes in developing green buildings that create energy-efficient, healthy, and environmentally friendly buildings.

A comparative analysis of the keyword co-occurrence maps in Figure 4 and Figure 5 reveals a significant evolution in the thematic focus of green building research in Asia over the past twenty years. During the earlier period (2004–2023), the keyword network was dominated by broad conceptual terms. These patterns suggest that the earlier body of literature was largely conceptual, focusing on defining the scope, importance, and environmental implications of sustainable construction in the Asian context. In contrast, the recent decade (2014–2024) exhibits a noticeable shift toward application-oriented and technology-driven themes. This reflects the field's maturation from conceptual discussions to the integration of practical assessment tools, digital technologies, and standardized rating systems. The emergence of interconnected keywords indicates a growing concentration on optimizing building performance and reducing carbon footprints through technological innovation.

Moreover, new clusters have emerged around the theme of indoor environmental quality, encompassing keywords such as indoor environment, air quality, health, and productivity. This thematic evolution suggests that research has broadened to include human well-being and occupant comfort as critical dimensions of sustainability, aligning with the global paradigm shift toward healthy and livable buildings. Another emerging cluster includes waste management, recycling, and life-cycle assessment, signifying a holistic concern for sustainability across the entire building lifecycle from material selection to post-occupancy waste reduction.

Overall, the comparison between the two periods indicates a transition from general sustainability discourse to specialized, interdisciplinary, and performance-based research orientations. While earlier studies established the conceptual foundation of green building in Asia, the recent decade has been characterized by empirical investigations that emphasize technological integration, certification mechanisms, and human-centered design. This progression reflects the growing maturity of the field and the region's

commitment to aligning built environment practices with both global sustainability frameworks and localized environmental priorities.

RQ 3: How do collaboration and co-occurrence networks among authors, keywords and countries shape the field's intellectual and geographical development?

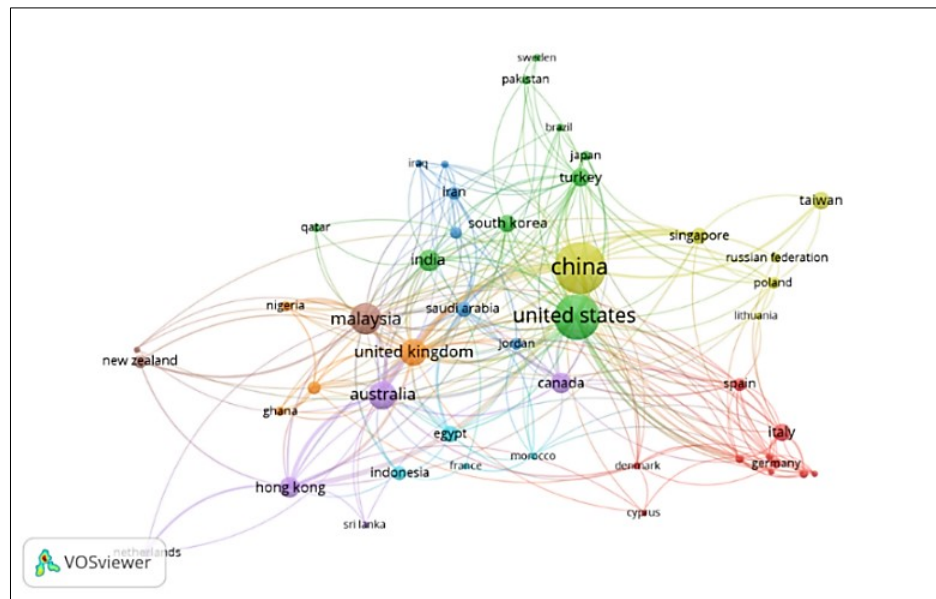


Figure 6: The Co-Authorship Collaboration Countries
Source: VOS viewer's Analysis (2024)

Figure 6 presents the VOSviewer map illustrating co-authorship collaborations among countries based on citations in green building research in Asia. The visualization reveals the formation of distinct regional clusters, notably the China–Singapore–Malaysia–South Korea–Taiwan nexus and the Japan–Australia–United States cluster. These clusters represent intellectual sub-communities, or epistemic networks, that generate specialized knowledge on sustainable construction, energy-efficient design, and life-cycle assessment (Appio et al., 2016; Liu et al., 2015).

The observed collaboration patterns empirically support the literature on green building evolution in Asia. Dominant clusters, particularly China–Singapore–Malaysia–South Korea–Taiwan, reflect concentrated research efforts in countries with advanced institutional frameworks, strong policy support, and robust funding mechanisms (Hatmoko et al., 2017; Shen & Faure, 2021; He et al., 2023). Circle size in the map indicates citation volume, with China leading, followed by Singapore, Malaysia, and the United States, while line thickness

represents the strength of collaborative ties, highlighting the strong partnership between China and Singapore.

Geographically, China and Singapore serve as central nodes, steering the intellectual development of the field and influencing both regional and global research directions. Environmentally, clusters align with thematic priorities such as energy efficiency, emission reduction, sustainable materials, and urban ecological sustainability (Chen & Luo, 2020; Leong et al., 2023; Zhao et al., 2023; Wardhana et al., 2023). Economically and technologically, the network reveals structural disparities: countries with lower research participation, such as Indonesia, Vietnam, and the Philippines, are positioned peripherally, reflecting constraints in technical expertise, policy enforcement, and financial resources (Hussain Ahram & Syed Zakaria, 2023; Maramis & Lumunon, 2022; Nguyen & Gray, 2016; Taherkhani, 2023).

Policy factors are evident in the network, with Singapore's dense collaborations reflecting proactive Green Mark initiatives and cross-sector engagement, while China's centrality corresponds to extensive regulatory support and sustained research funding (Hatmoko et al., 2017; Shen & Faure, 2021; He et al., 2023). Overall, the co-authorship network confirms that countries with strong institutional and policy frameworks dominate knowledge creation and dissemination in Asian green building research. The patterns highlight persistent regional disparities, underscoring the need for inclusive collaboration, capacity building, and policy harmonization to establish a more balanced and sustainable research ecosystem across Asia.

DISCUSSION AND CONCLUSION

Over the past two decades, this study concludes that green building research in Asia has demonstrated sustained growth, reflecting increasing scholarly engagement, rapid urbanization, and supportive institutional and policy frameworks. China, Singapore, and Malaysia have consistently emerged as central contributors, serving as epistemic hubs where academic research, technological innovation, and policy implementation intersect. These countries define the epistemological contours of green building discourse in the region, while smaller or less-resourced nations, such as Vietnam, Indonesia, and the Philippines, remain peripheral, highlighting persistent asymmetries in knowledge production and circulation.

Keyword co-occurrence analyses indicate a thematic shift from broad sustainability discussions toward specialized, application-oriented, and technology-driven research, including energy efficiency, digital design tools (BIM), life-cycle assessment, indoor environmental quality, and circular economy practices. This evolution reflects the maturation of the field, signaling a transition from conceptual policy frameworks to operationalized technological and human-centered practices, consistent with urban transition theory (Hodson &

Marvin, 2010). Co-authorship and co-occurrence networks further demonstrate that countries with strong institutional and policy capacity function as central knowledge hubs, forming epistemic communities, such as China–Singapore–Malaysia–South Korea–Taiwan and Japan–Australia–USA, while peripheral nations experience limited integration into these networks.

The observed collaboration patterns and regional clustering also highlight processes of policy diffusion, exemplified by the circulation of green building rating systems, including Singapore’s Green Mark, Malaysia’s GBI, and China’s Three-Star System. Adoption and influence are mediated by institutional strength, regulatory coherence, and developmental capacity, emphasizing that effective policy transfer requires structural alignment and targeted capacity-building support rather than mere emulation (Hatmoko et al., 2017; Shen & Faure, 2021). From a political ecology perspective, the concentration of research power mirrors broader resource and institutional asymmetries, underscoring the importance of multi-scalar governance approaches and epistemic justice to ensure that localized knowledge from emerging economies informs regional sustainability agendas (Swyngedouw & Heynen, 2003). These insights have several practical implications for urban planning and policy: integrating green buildings into broader urban infrastructure strategies; fostering co-production of knowledge between researchers, policymakers, and industry; providing targeted support for underrepresented Southeast Asian nations to democratize sustainability knowledge; and using bibliometric intelligence to monitor and align research output with regional sustainability priorities.

Overall, green building research in Asia serves as both a mirror and a driver of sustainable urban transitions. It reflects regional inequalities and institutional strengths while simultaneously catalyzing technological innovation, policy development, and evidence-informed planning. Strengthening collaboration, capacity, and equitable knowledge dissemination will be essential to advance inclusive, low-carbon, resource-efficient, and resilient urban development, ensuring that Asia’s green building agenda aligns with both global sustainability frameworks and local environmental and socio-economic priorities.

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