

GREEN INTELLECTUAL CAPITAL AND SUSTAINABLE PERFORMANCE: SYSTEMATIC LITERATURE REVIEW

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Abstract: Growing demands for sustainable business practices are driving organizations to develop strategic capabilities that strike a balance among economic, social, and environmental aspects. One capability gaining increasing attention is Green Intellectual Capital (GIC), which plays a role in integrating environmentally oriented knowledge, competencies, and organizational systems to enhance sustainable performance. This study aims to analyze the evolution of literature regarding the relationship between Green Intellectual Capital and sustainable performance using a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The review reveals that GIC is a strategic asset contributing to sustainable performance both directly and through various mechanisms such as green innovation, green supply chain management, green human resource management, green entrepreneurial orientation, and environmental awareness. These findings indicate that GIC functions as a green strategic capability capable of transforming environmental knowledge into innovation and sustainable business practices. However, the effectiveness of GIC is influenced by contextual factors, such as environmental uncertainty and industry characteristics. This study contributes to the field by mapping the mechanisms underlying the relationship between GIC and sustainable performance and by identifying opportunities for future research across various industrial sectors.

Keywords: *Green Intellectual Capital; Sustainable Performance*

Submitted: 2026-08-06; Revised: 2026-09-29; Accepted: 2026-09-30

1. Introduction

Climate change, environmental degradation, and rising demands for responsible business practices have transformed the organizational paradigm for creating competitive advantage. While corporate success was previously measured largely by financial performance, organizations are now required to create economic, social, and environmental value in a balanced manner. This shift has fostered the concept of sustainable performance, an organization's ability to generate sustainable economic results while simultaneously addressing social responsibilities and environmental protection (Fatima et al., 2023). This concept has gained importance alongside mounting pressure from governments, investors,

consumers, and the public to implement sustainable business practices, as well as global commitments to achieving the Sustainable Development Goals (SDGs) and Net Zero Emission targets (Oliveira et al., 2025).

To meet these demands, organizations must look beyond tangible assets and optimize intangible assets capable of generating long-term competitive advantage (Aslamiyah et al., 2024). One strategic asset garnering increasing attention is Green Intellectual Capital (GIC). Rooted in the concept of intellectual capital, Green Intellectual Capital integrates knowledge, competencies, organizational systems, and stakeholder relationships that are oriented toward environmental sustainability. It generally comprises three key dimensions: green human capital, green structural capital, and green relational capital, which collectively shape an organization's capacity to innovate in an eco-friendly manner, enhance resource efficiency, and strengthen sustainable competitiveness (Gaol & Lase, 2026).

Theoretically, the relationship between Green Intellectual Capital (GIC) and sustainable performance can be explained through the Resource-Based View (RBV), which posits that a firm's competitive advantage stems from assets that are valuable, rare, inimitable, and non-substitutable (Barney, 1991). From this perspective, GIC serves as a strategic resource enabling organizations to develop unique environmental capabilities, thereby enhancing economic performance while simultaneously meeting sustainability demands.

In line with these theoretical developments, research on GIC has increased significantly in recent years. Various studies demonstrate that GIC enhances sustainable performance, both directly and indirectly, through diverse organizational mechanisms. Prior research highlights the pivotal role of GIC in boosting sustainable performance via such mechanisms. Nguyen-Van et al. (2025) show that GIC improves sustainable performance through green ambidextrous innovation, while Ahmed et al. (2023) find that this relationship is strengthened by environmental awareness and green human resource management. Moreover, GIC has been shown to enhance sustainable performance through green entrepreneurial orientation and green supply chain management (Hu & Tresirichod, 2024; Martínez-Falcó et al., 2023) and serves as a source of competitive advantage in the hospitality and tourism industries (Elzek et al., 2024; Shazali et al., 2023). Research by Rouholamin et al. (2023) also confirms that integrating GIC with Green HRM and sustainable supply chain management can improve an organization's sustainability performance.

Nevertheless, existing literature still reveals several gaps. First, the mechanisms explaining the relationship between GIC and sustainable performance remain inconsistent, as prior studies have employed diverse mediating variables such as green innovation, environmental awareness, green entrepreneurial orientation, and green supply chain management. Second, findings regarding the contingency factors influencing this relationship lack consensus; environmental uncertainty has been shown to weaken the link between GIC and sustainable performance (Wenli et al.), whereas green ambidexterity and green servant leadership have not demonstrated significant moderating effects (Martínez-Falcó et al.; Elzek et al.). Third, research on GIC has largely focused on the manufacturing sector and developing nations, leaving studies on service sectors such as hospitality and tourism relatively limited (Shazali et al.; Elzek et al.). Furthermore, most prior studies have utilized quantitative approaches within specific contexts, failing to provide a holistic overview of the evolution of concepts, theories, methodologies, and the patterns of relationships between variables.

Beyond the inconsistency of empirical results, several research gaps remain unaddressed. First, the majority of past studies have focused on testing causal relationships via quantitative

methods, yielding findings that are context-specific and difficult to generalize. Second, GIC research has been dominated by the manufacturing sector and large enterprises in developing countries such as China, Pakistan, Vietnam, and Malaysia, while studies concerning the service sector, hospitality, tourism, MSMEs, and public organizations remain relatively scarce. Third, the use of diverse mediating and moderating variables across studies has prevented the formation of a definitive conclusion regarding the primary mechanisms explaining the impact of Green Intellectual Capital on sustainable performance. Fourth, to date, relatively few studies have integrated these empirical findings through a Systematic Literature Review (SLR) approach capable of providing a comprehensive overview of the evolution of GIC research.

Addressing this gap, this study aims to conduct a Systematic Literature Review (SLR) on the relationship between GIC and sustainable performance, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The study not only identifies publication trends but also maps the theories employed, research characteristics, industry sectors, countries of study, analytical methods, mediating and moderating variables, and the directions of relationships between variables. Unlike previous empirical studies that focused on a single organizational context, this research presents a systematic synthesis of empirical evidence to provide a more comprehensive understanding of the role of Green Intellectual Capital in enhancing sustainable performance.

This study is expected to make both theoretical and practical contributions. Theoretically, it enriches the literature on Green Intellectual Capital by synthesizing empirical findings regarding the mechanisms driving sustainable performance through the lenses of the Resource-Based View. Furthermore, the study identifies various mediating and moderating variables that may explain inconsistencies in prior research results, thereby serving as a foundation for developing conceptual models in future studies. From a practical perspective, the findings offer insights to managers, policymakers, and practitioners regarding strategies to develop Green Intellectual Capital as a strategic asset for enhancing organizational competitiveness, fostering green innovation, and achieving sustainable performance.

2. Research Method

This study employs the Systematic Literature Review (SLR) method to identify, evaluate, and synthesize research concerning green intellectual capital and sustainable performance. The study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Oduro, 2024). PRISMA provides a clear and structured approach for identifying, selecting, assessing, and reviewing relevant research articles. The stages of this method are detailed in Figure 1.

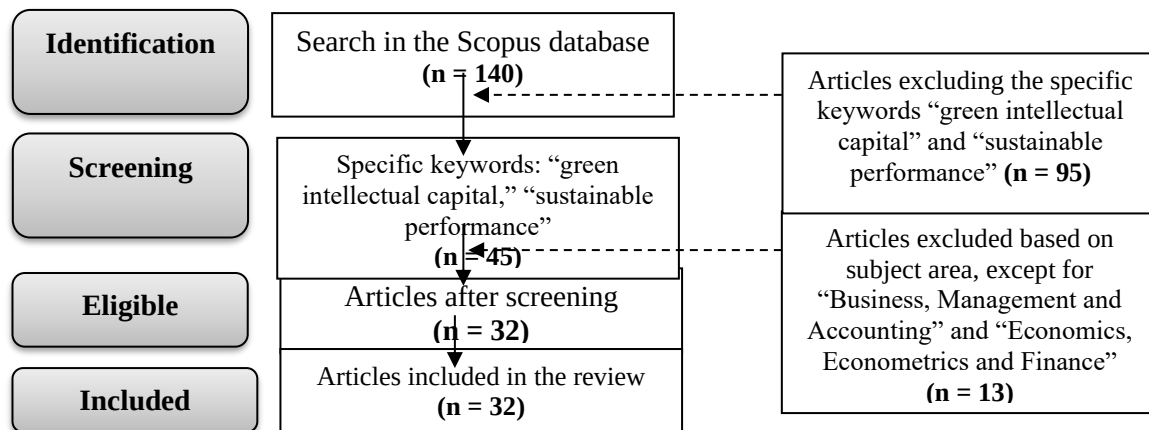


Figure 1. PRISMA Diagram

3. Results and Discussion

3.1. Results

Results of literature identification and selection

The literature selection process was conducted using the PRISMA method. An initial search of the Scopus database yielded 140 articles. Following a screening process using the specific keywords "green intellectual capital" and "sustainable performance," 45 relevant articles were identified. Subsequently, based on subject area criteria, 13 articles were excluded because they did not fall within the fields of Business, Management, and Accounting or Economics, Econometrics, and Finance. Consequently, 32 articles met the inclusion criteria and were utilized for the literature review analysis. These selected articles were then analyzed to identify research trends, empirical findings, and research gaps concerning green intellectual capital and sustainable performance.

Characteristics of the articles used

The characteristics of the articles included in this literature review are presented in Table 1. The table summarizes the general profile of the selected studies, including the number of articles analyzed, publication period, data source, research focus, methodological approach, and the most frequently examined variables.

Table 1. Characteristics of the articles used

Charaterictics	Note
Number of articles analyzed	32 articles based on the PRISMA selection results
Publication year range	2023–2025
Literature database	Scopus
Primary focus of the study	The relationship between green intellectual capital and sustainable performance
Research approach	The majority employ a quantitative approach using survey methods and Structural Equation Modeling (SEM) analysis

Charaterictics	Note
Widely studied variables	Green intellectual capital, sustainable performance, green innovation, green human resource management, green supply chain management, green leadership, and green entrepreneurial orientation
Research object	Organizations and companies across various industrial sectors, such as manufacturing, hospitality, tourism, agriculture, supply chain, and small and medium-sized enterprises
Study area	Developing and developed countries, such as Vietnam, Malaysia, Spain, Iran, Egypt, and others.
Supporting theories	Various theoretical approaches, particularly the Resource-Based View (RBV), Social Cognitive Theory, and the sustainability management perspective

Based on the analysis of articles obtained through the PRISMA selection process, this study reviewed 32 articles discussing the relationship between green intellectual capital and sustainable performance. The analyzed articles were published between 2023 and 2025, with the primary sources obtained from the Scopus database. In terms of methodological characteristics, most studies employed a quantitative approach using survey methods and Structural Equation Modeling (SEM) analysis to examine the relationships among research variables. The reviewed studies not only focused on the direct effect of green intellectual capital on sustainable performance but also explored various mediating and moderating variables, including green innovation, green supply chain management, green human resource management, green leadership, and environmental uncertainty.

Regarding research objects, the analyzed articles covered various industrial sectors, including manufacturing, hospitality, tourism, agriculture, medical equipment industries, and small and medium-sized enterprises. This indicates that the concept of green intellectual capital has developed as a strategic resource that is relevant not only to production-based industries but also to service and tourism sectors. Geographically, previous studies were conducted in various countries, including Vietnam, Malaysia, Spain, Iran, and Egypt, demonstrating global attention toward the role of green intellectual capital in supporting sustainable performance achievement. Overall, the findings indicate that green intellectual capital is considered a strategic organizational asset capable of creating competitive advantages through the enhancement of green innovation, operational efficiency, and the achievement of sustainable performance.

Thematic analysis

Based on a review of articles obtained through a literature selection process using the PRISMA method, several key themes emerged as the focus of research concerning green innovation, green intellectual capital, green governance, and sustainable performance. A thematic analysis was conducted by categorizing research findings based on conceptual similarities, relationships between variables, and the theoretical and empirical contributions of each study.

a. The role of green innovation in sustainable performance

A primary theme in the literature is the role of green innovation as a corporate strategy for enhancing sustainability performance. Most studies indicate that green innovation

contributes positively to achieving sustainability goals by encouraging companies to develop more environmentally friendly products, processes, and technologies. Green innovation is not solely focused on reducing environmental impact; it also creates economic value through resource efficiency, lower operational costs, and an enhanced corporate image among stakeholders. Research shows that companies capable of integrating environmental innovation into their business strategies tend to be better at striking a balance between economic, social, and environmental aspects (Martínez-Falcó et al., 2023; Nguyen-Van et al., 2025).

b. Green Intellectual Capital as a Strategic Corporate Resource

The second theme relates to green intellectual capital, which is viewed as an intangible asset that supports the successful implementation of sustainability practices. Based on the Resource-Based View (RBV) perspective, internal resources that are valuable, difficult to imitate, and capable of providing competitive advantages are important factors in improving firm performance. The literature indicates that green intellectual capital, consisting of green human capital, green structural capital, and green relational capital, plays a significant role in developing organizational capabilities to generate green innovations. Knowledge, competencies, organizational culture, and relationships with stakeholders serve as essential capital for companies in responding to sustainability demands (Ahmed et al., 2023; Nguyen-Van et al., 2025; Shazali et al., 2023).

c. Green Leadership and Green Governance in Driving Sustainable Transformation

The next theme highlights the importance of leadership and governance aspects in supporting the implementation of green strategies. Previous studies have found that green leadership and green governance play important roles in building organizational commitment toward sustainability practices. Environmentally oriented leaders are able to create an organizational culture that supports green innovation, enhance employee participation, and direct company resources toward achieving sustainability goals. Furthermore, green governance mechanisms ensure that environmental strategies are not merely formal policies but are effectively implemented in the company's operational activities (Elzek et al., 2024; Nguyen-Van et al., 2025).

d. The Role of Organizational Capabilities in the Relationship between Green Strategy and Sustainable Performance

Several studies indicate that the relationship between green strategies and sustainable performance does not always occur directly but is often influenced by specific organizational capabilities. Variables such as green ambidextrous innovation, green entrepreneurial orientation, and green governance quality have been identified as mechanisms that strengthen the impact of green resources on sustainability performance. These findings suggest that merely possessing green resources is insufficient; companies must also have the capability to manage and integrate these resources into innovations and sustainable business practices (Hu & Tresirichod, 2024; Rouholamin et al., 2023).

e. The Role of Contingency Factors in Sustainability Implementation

The final theme relates to moderating factors that influence the effectiveness of green strategies. Several studies have examined internal and external factors that can strengthen or weaken the relationships among variables, such as stakeholder pressure, leadership characteristics, and industry conditions. The findings indicate that the success of sustainability implementation largely depends on a company's ability to align green strategies with its organizational characteristics and business environment. Therefore, sustainability approaches should consider contextual factors to ensure that the

implemented strategies generate optimal impacts (Hu & Tresirichod, 2024; Martínez-Falcó et al., 2023).

Overall, the findings of the thematic analysis indicate that research on sustainable performance has evolved from an approach focusing primarily on environmental practices toward a more comprehensive perspective that incorporates internal resources, organizational capabilities, and governance mechanisms. Green intellectual capital, green innovation, and green governance have consistently emerged as three key elements in explaining how companies achieve sustainable performance. Based on these findings, there remains an opportunity for future research to develop an integrative model that connects green resources (green intellectual capital), governance mechanisms (green governance quality), innovation capabilities (green innovation), and leadership characteristics (female leadership) in explaining sustainable performance, particularly in the hospitality industry, which has a high dependence on natural resources and local stakeholders.

3.2. Discussion

Based on the literature review of 32 articles selected through the PRISMA method, research on green intellectual capital and sustainable performance has shown significant development in recent years. The findings indicate that green intellectual capital is not merely considered an intangible asset but also a strategic resource that enhances organizational capabilities in achieving sustainability. The Resource-Based View (RBV) perspective explains that valuable internal resources, which are difficult to imitate and capable of providing competitive advantages, are essential factors in supporting the success of corporate sustainability strategies.

Most studies demonstrate that green intellectual capital has a positive effect on sustainable performance. GIC enables companies to develop knowledge, competencies, organizational systems, and stakeholder relationships that support environmentally oriented business practices. Nguyen-Van et al. (2025) found that green intellectual capital improves sustainable performance both directly and through green ambidextrous innovation. Similarly, Shazali et al. (2023) revealed that GIC acts as a strategic asset in improving hospitality industry performance through the management of knowledge, human resources, and environmentally friendly business processes. Meanwhile, Ahmed et al. (2023) showed that green human resource management strengthens sustainable performance by enhancing environmental awareness and green intellectual capital.

The review also indicates that the relationship between green intellectual capital and sustainable performance is frequently influenced by green innovation as an underlying mechanism. Green innovation enables companies to transform green intellectual resources into operational practices that generate both economic and environmental value. Nguyen-Van et al. (2025) demonstrated that green ambidextrous innovation plays an important role in strengthening the relationship between green intellectual capital and sustainable performance. Furthermore, Martínez-Falcó et al. (2023) found that green supply chain management mediates the relationship between GIC and sustainable performance, suggesting that green resources become more effective when supported by sustainable business processes.

Beyond internal resources, previous studies emphasize the importance of green leadership and green governance in supporting sustainability transformation. Nguyen-Van et al. (2025) showed that green leadership enhances sustainable performance through the strengthening of green innovation. Meanwhile, Elzek et al. (2024) found that green servant

leadership contributes to the development of green intellectual capital, although it does not significantly strengthen the relationship between GIC and sustainable performance. These findings suggest that green leadership plays a role in establishing an organizational culture that supports sustainability, while governance mechanisms ensure that green strategies are consistently implemented.

Furthermore, the literature highlights that the success of green strategies is also influenced by organizational capabilities and contingency factors. Hu and Tresirichod (2024) found that green entrepreneurial orientation, green intellectual capital, and green supply chain management positively affect sustainable performance. However, environmental uncertainty weakens the relationship between GIC and sustainable performance because unstable environmental conditions may reduce the effectiveness of sustainability strategies. In addition, Rouholamin et al. (2023) demonstrated that green human resource management contributes to improving GIC, sustainable supply chain management, and sustainable performance, emphasizing the importance of integrating human resources, business processes, and environmental strategies.

Overall, the literature review findings indicate that sustainable performance is not solely determined by the existence of green intellectual capital but also by the company's ability to manage these resources through green innovation, leadership, governance, and organizational capabilities. These findings reinforce the RBV perspective that sustainable competitive advantage can be achieved when companies are able to develop and integrate internal resources into effective sustainability strategies. Therefore, future research has opportunities to develop an integrative model linking green intellectual capital, green governance quality, green innovation, and leadership characteristics such as female leadership in explaining sustainable performance, particularly in the hospitality industry, which has a high dependence on environmental resources and local stakeholders

4. Conclusion

Based on the literature review of 32 articles using the PRISMA method, it can be concluded that green intellectual capital plays an important role in improving sustainable performance. GIC serves as a strategic resource that enables companies to develop green innovations, enhance operational efficiency, and achieve sustainable competitive advantages. The relationship between GIC and SP not only occurs directly but is also influenced by organizational capabilities such as green innovation, green supply chain management, and green human resource management, while being supported by the roles of green leadership and governance. These findings reinforce the Resource-Based View perspective that the effective management of valuable internal resources is a key factor in achieving organizational sustainability.

Future research is recommended to develop more comprehensive models by incorporating factors such as green governance quality, green innovation, and leadership characteristics in explaining sustainable performance. In addition, future studies may expand the research scope to service sectors, particularly the hospitality and tourism industries, and employ longitudinal approaches to gain deeper insights into the implementation of sustainability strategies.

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