

A conceptual framework of green supply chain integration toward enterprise performance through ambidextrous green innovation: an organizational capability perspective

Impact of GSCI
on EP

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Abstract

Purpose – This study explores the impact of green supply chain integration (GSCI) on enterprise performance (EP) from an organizational capability perspective. Additionally, this study investigated the mediating effect of ambidextrous green innovation (AMGI) and the moderating effect of green legitimacy (GL).

Design/methodology/approach – This study followed a five-step systematic review of the literature to ensure the auditability and repeatability of the concept development process: (1) formulation of the question, (2) research area orientation, (3) selection and evaluation of research literature, (4) data analysis and synthesis and (5) reporting and application of results.

Findings – This study clarified the concepts and dimensions of four relevant variables and, based on the organizational capability theory (OCT), ambidextrous innovation theory (AIT) and new institutional theory (NIT), explained the interactions among these variables and proposed a conceptual framework. In addition, an agenda for future research has been suggested.

Originality/value – This study provides a new direction for future GSCI research and practice in emerging economies. Enterprises should focus on developing GSCI capabilities to promote its positive impact on enterprise performance through AMGI adoption. Moreover, they must emphasize the acquisition of GL, which provides a certain degree of security, to realize the benefits of AMGI.

Keywords Green supply chain integration, Ambidextrous green innovation, Green legitimacy, Enterprise performance

Paper type Conceptual paper

1. Introduction

With global climate change and the public's increasing environmental awareness, environmental enterprise behavior has garnered attention from government regulators and all sectors of society; countries are proposing carbon neutrality targets one after another. The carbon footprint of enterprise operations covers all segments of the end-to-end supply



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chain, from production to consumption (Montoya-Torres *et al.*, 2015). Recent studies have indicated that green supply chain integration (GSCI) helps achieve joint emissions and economic cost reductions, and the overall planning of green supply chains has become a new focus for enterprise development (Ding, 2023).

However, there are inconsistent findings in the literature on the relationship between GSCI and enterprise performance (EP), with some studies suggesting a positive correlation (Han and Huo, 2020; Kong *et al.*, 2021) and others arguing for a negative or indeterminate relationship (Zhao *et al.*, 2021). This may be due to (1) the fact that the current definition of the GSCI concept remains static and does not address how enterprises, particularly those in emerging economies, can manage the uncertainties in their business processes (Wong *et al.*, 2020). (2) Lack of focus on mechanisms of action. Sahu *et al.* (2023) argued that supply chain management should be aligned with strategic cooperation, environmental orientation, risk management and sustainability. The same holds true for the GSCI, which serves as the cornerstone of green supply chain management. Therefore, redefining GSCI from a new perspective and broadening its connotation to adapt to the increasingly turbulent business environment is imperative. In addition, according to Xie and Zhu (2022), the value of GSCI can only be truly recognized by opening the “black box” between GSCI and EP and analyzing the transmission mechanism of its impact (Xie and Zhu, 2022).

Therefore, this study has two main objectives: First, to redefine GSCI from a dynamic perspective based on organizational capability theory (OCT) to broaden its connotation. Second, based on the realistic context of emerging economies, we propose a conceptual framework model of the impact of GSCI on EP with ambidextrous green innovation (AMGI) as the mediating variable and green legitimacy (GL) as the moderating variable, drawing upon ambidextrous innovation theory (AIT) and new institutional theory (NIT) to shed light on the mechanism of GSCI's impact on EP.

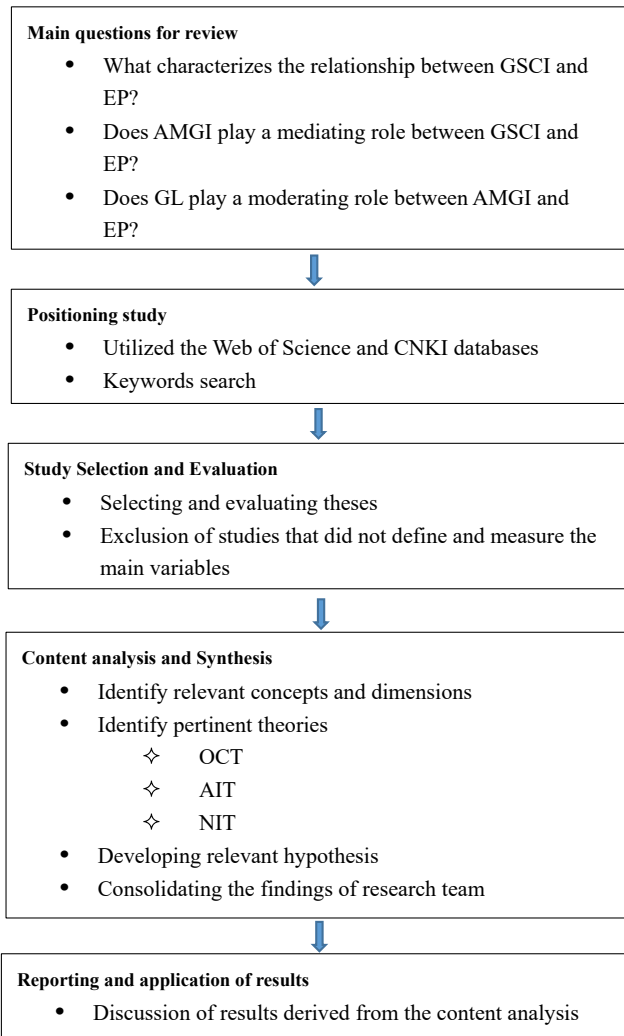
The remainder of this paper is organized as follows: First, the methodology of the conceptual paper is stated, which helps improve the rigor of the conceptual framework. Second, we present the conceptual framework of this study. Finally, a future research agenda is proposed, and the conclusions are summarized.

2. Methodology

This study utilizes the systematic literature review methodology proposed by Denyer and Tranfield (2009), which aims to overcome the shortcomings of traditional narrative reviews (Tranfield *et al.*, 2003). Figure 1 outlines the steps involved in the content analysis.

The first step involved formulating the review questions. The responses to these questions facilitate the determination of the scope and content of relevant theories.

The second step involved identifying relevant literature using databases and keywords. This study explores the impact of GSCI on EP from the perspective of organizational capabilities in emerging economies, with AMGI as a mediating variable and GL as a moderating variable. The variables involved are notably novel, and in order to analyze their definitions and dimensions in depth, it is necessary to synthesize relevant global research results and reflect the characteristics of emerging economies. The Web of Science is renowned for its authoritative and comprehensive coverage in the social sciences, ensuring high standards and strict protocols (Mariani *et al.*, 2023). The literature in this database accurately reflects the research results in a specific field (Marques *et al.*, 2018). CNKI is recognized by Chinese academics as a full-coverage and authoritative database that contains articles that can represent the research results and characteristics of China, the world's number one emerging economy, in relevant fields. This study chose to search the Web of Science and CNKI. In addition, we used four main keywords: “GSCI,” “EP,” “AMGI” and “GL” as well as their synonyms, to ensure a comprehensive exploration of the concepts and



Source(s): Authors' own work

Figure 1.
Methods for
conducting a
systematic literature
review

dimensions. A combination of keyword searches was used to identify studies related to the relationships between these variables.

Table 1 summarizes the findings of the literature search and the selection process. The process begins with searches for pertinent literature using distinct single-variable search titles and abstracts, followed by searches involving a combination of two or more variables. This methodology serves the dual purpose of enhancing our understanding of the concepts and dimensions relevant to the variables under scrutiny and shedding light on the relationships between these variables. Table 1 illustrates that a smaller number of articles were retrieved when employing a single keyword, except in the case of “EP”. Moreover, the count further decreased when two-keyword combinations were used. This implies that the field and content of our study have novel characteristics.

Table 1.
Search keywords and
results

Key words	Equivalent keywords and search strings	Number of articles
GSCI	GSCI; green supply chain collaboration and supply chain collaborative green innovation	276 (47)
AMGI	AMGI; exploratory and exploitative green innovation and ambidextrous eco-innovation	14 (4)
GL	GL; environmental legitimacy; environmental organizational legitimacy and environmental legitimacy pressure	508 (25)
EP	EP; firm performance and corporate performance	15,685 (5)
GSCI and AMGI	GSCI; green supply chain collaboration; supply chain collaborative green innovation and AMGI; exploratory and exploitative green innovation and ambidextrous eco-innovation	1 (1)
GSCI and EP	GSCI; green supply chain collaboration; supply chain collaborative green innovation and EP; firm performance and corporate performance	64 (4)
AMGI and GL	AMGI; exploratory and exploitative green innovation; ambidextrous eco-innovation and GL; environmental legitimacy; environmental organizational legitimacy and environmental legitimacy pressure	1 (1)
AMGI and EP	AMGI; exploratory and exploitative green innovation; ambidextrous eco-innovation and EP; firm performance and corporate performance	2 (2)
GL and EP	GL; environmental legitimacy; environmental organizational legitimacy; environmental legitimacy pressure and EP; firm performance and corporate performance	1 (1)
Three or more keywords	—	0

Note(s): The numbers in () indicate the number of articles initially screened by reading their titles and abstracts
Source(s): Authors' own work

The third step involved the selection and evaluation of the studies. We first eliminated duplicate and editorial articles and then initially screened 90 relevant articles by reading their titles and abstracts to ensure that no valuable articles were overlooked. Subsequently, after reading the full text of the articles, the scope was narrowed down to 78 articles, excluding those that did not provide definitions, dimensions or theories related to the variables of interest.

The fourth step involved conducting a content analysis and synthesizing the selected literature. A meticulous content analysis was conducted on the 78 selected articles. During this process, articles were thoroughly reviewed with a specific focus on identifying the definitions and dimensions of the primary research variables and their interconnections. Each article was evaluated based on its relevance to the central research questions. To consolidate their findings, the researchers organized a two-day workshop in which they deliberated on their findings and engaged in in-depth discussions and exchanges. Additionally, an Excel spreadsheet was used to document the reasons for article inclusion, along with the primary theoretical and empirical findings.

3. Conceptual framework

3.1 Basic concepts and dimensions

3.1.1 Green supply chain integration. With the growing demand for environmentally friendly practices, scholars have begun to incorporate the concept of supply chain integration into environmental management, develop the concept of GSCI, and explore its dimensional components (Table 2). As shown in Table 2, the definition of GSCI has evolved and expanded

Sources	Definition	Dimension	Impact of GSCI on EP
Wu (2013)	GSCI is defined as companies working with their supply chain partners to manage environmental behavior within and across organizations	Three dimensions (GII, GSI and GCI)	97
Wong <i>et al.</i> (2015)	GSCI is a way for companies to leverage resources and capabilities among supply chain partners	Four dimensions (GII, GSI, GCI and GCSI)	
Lo <i>et al.</i> (2018)	GSCI is defined as the extent to which manufacturers and their supply chain partners strategically collaborate and synergistically manage within and across organizational processes to improve environmental performance	Three dimensions (GII, GSI and GCI)	
Kong <i>et al.</i> (2021)	GSCI relates to the extent to which manufacturers work strategically with suppliers and customers as well as internal functions, to meet environmental requirements	Three dimensions (GII, GSI and GCI)	
Han and Huo (2020)	GSCI can be defined as the extent to which a manufacturer builds a strategic relationship with its supply chain partners and collaboratively integrates environmental concerns into the within and across organizational processes	Three dimensions (GII, GSI and GCI)	
Note(s): GII: green internal integration, GSI: green supplier integration, GCI: green customer integration and GCSI: green community stakeholders integration Source(s): Authors' own work			Table 2. Concepts and dimensions related to GSCI

over time. The initial GSCI primarily focused on environmental orientation and internal and external process management (Wu, 2013), whereas more recent literature incorporates the characteristics of strategic cooperation (Lo *et al.*, 2018; Kong *et al.*, 2021; Han and Huo, 2020). These features provide a robust foundation for the further development of the field. However, the current definition of the GSCI concept remains static and does not address how enterprises, particularly those in emerging economies, can manage the natural uncertainties and dynamics inherent in their business processes (Wong *et al.*, 2020). According to Sahu *et al.* (2023), supply chain management should align with strategic cooperation, environmental orientation, risk management and sustainability. The same holds true for GSCI, which serves as the cornerstone of green supply chain management. Therefore, redefining GSCI from a dynamic perspective and broadening its connotation to adapt to the increasingly turbulent internal and external business environments is imperative. In response to this demand, this study applies OCT to the GSCI field, redefining GSCI from a dynamic perspective.

Organizational capabilities are closely linked to resource-based theory (RBV), which explores leveraging resources and capabilities, for competitive advantage (Huo, 2012). The RBV emphasizes an enterprise's resources and capabilities, covering organizational culture, values, resources, capital, operational processes and collaborative communication (Newbert, 2007). This aligns with the static-level connotations of GSCI. GSCI's environmental orientation reflects organizational culture and values in environmental management, while strategic cooperation and process management involve resources, capital, operational processes and collaborative communication. As the business environment becomes more volatile, RBV has been extended to focus on dynamic capabilities. Dynamic capabilities extend the RBV, emphasizing organizations that proactively capture, integrate and reconfigure resources to adapt to environmental changes and foster ongoing innovation (Song and Zhang, 2018).

Existing studies have begun to focus on the dynamic characteristics of the GSCI. Wong *et al.* (2015) argued that the GSCI empowers organizations to access, bundle and leverage internal and external resources and capabilities, thereby enhancing the success of environmental management. Zhou *et al.* (2020) argue that GSCI facilitates the sharing of environmental risks and responsibilities through strategic cooperation and collaborative

green innovation. So, we argue that GSCI can be considered a dynamic capability and define it as an enterprise's ability to strategically collaborate with its supply chain partners in environmental protection. This capability aims to enhance environmental performance, increase efficiency and sustainability and adapt to evolving market conditions. The GSCI comprises green internal integration (GII), green supplier integration (GSI) and green customer integration (GCI). The components redefined from a dynamic capability perspective are listed in [Table 5](#).

3.1.2 Ambidextrous green innovation. AMGI originated from AIT. This theory aims to guide organizations in simultaneously pursuing exploratory and exploitative innovations and securing a competitive advantage. Scholars have extended this theory to green innovation, giving rise to the AMGI, which they define based on the three perspectives detailed in [Table 3](#).

This study focuses on the micro-level AMGI of enterprises, encompassing both the product and technological levels, which aligns with environmental knowledge. Therefore, this study adopts the environmental knowledge perspective, classifying AMGI into two dimensions, exploitative green innovation (EGI) and exploratory green innovation (ERGI), as defined in [Table 5](#), following [Benner and Tushman \(2003\)](#) and [Lubatkin et al. \(2006\)](#).

3.1.3 Green legitimacy. GL, introduced by [Chang and Chen \(2013\)](#) based on [Suchman's \(1995\)](#) organizational legitimacy concept, extends organizational legitimacy into the environmental domain and forms a subset ([Zhou et al., 2021](#)). Owing to recent and diverse research, GL lacks a standardized conceptualization, with varied definitions based on different perspectives (see [Table 4](#)). This study explores whether GL incentivizes the translation of the AMGI into EP, focusing on the public recognition of green innovation in emerging economies. Thus, GL is defined as the extent to which an enterprise is acknowledged by the public as engaging in green innovation.

As shown in [Table 4](#), scholars have employed various dimensional approaches to study GL. These distinctions in defining GL dimensions are primarily based on the specific audiences associated with GL. New institutional theory (NIT) posits that an organization's

Perspective	Definition	Sources
Based on the novelty of environmental knowledge	ERGI refers to the use of new environmental knowledge, information and capabilities by enterprises for the development of entirely new green products, processes and services EIGI refers to the improvement of existing green products, processes and services by enterprises based on existing environmental knowledge, information and capabilities	Wang et al. (2020) , Sun and Sun (2021) , Asiaei et al. (2023) , Meiting et al. (2023)
Based on the novelty of the technology	Breakthrough green innovation is innovation by enterprises that break out of the existing green technology trajectory Incremental green innovation is innovation by enterprises that build upon existing green technology tracks	Zeng and Li (2022) , Jia et al. (2022) , Wang and Liu (2020)
Based on the novelty of the product	Exploratory green product innovation refers to the creative development of environmentally friendly new products Exploitative green product innovation focuses on improving the green performance of existing products	Zhao et al. (2022)
Source(s): Authors' own work		

Table 3.
Concepts related
to AMGI

Sources	Audience	Definition	Dimension	Impact of GSCI on EP
Chang and Chen (2013)	Stakeholder	The extent to which an organization's environmental goals and activities are consistent with its stakeholders' widely shared environmental norms, beliefs and value systems	Single dimension	<div>99</div> <div>Table 4. Concepts and dimensions related to GL</div>
Fu <i>et al.</i> (2022)	Government and citizens	Businesses' environmental protection behaviors are considered desirable or appropriate by governments and citizens	Two dimensions (Citizen legitimacy at the individual level and government legitimacy at the collective level)	
Ge <i>et al.</i> (2016)	Government and regulatory agencies, suppliers customers and partners	External acceptance of the enterprise's actions and products	Two dimensions (Political legitimacy and commercial legitimacy)	
Yu <i>et al.</i> (2021)	Governments, consumers, nongovernmental organizations and competitors	The extent to which enterprises obtain the approval of stakeholders in their operating environment as a result of their green innovation behavior	Three dimensions (coercive legitimacy, normative legitimacy, mimetic legitimacy)	
Zhou <i>et al.</i> (2021)	Public	The consistency of an enterprise's environmental performance with the general expectations of society	Two dimensions (Environmental legitimacy in the formal system and in the informal system)	
Wang and Huang (2022)	Governments, consumers, nongovernmental organizations and competitors	The extent to which an enterprise's green activities and behaviors are accepted, supported and recognized by the outside world	Three dimensions (coercive legitimacy, normative legitimacy, mimetic legitimacy)	
Source(s): Authors' own work				

behavior and characteristics are shaped by the institutional environment within which it operates, which encompasses laws, regulations, norms, political structures and sociocultural elements. A three-dimensional classification offers a more nuanced response to the institutional environment in which an enterprise is situated (Colwell and Joshi, 2013). Therefore, this study categorizes GL into three dimensions: green coercive legitimacy, green normative legitimacy and green mimetic legitimacy, as shown in Table 5.

3.1.4 Enterprise performance. EP is crucial for measuring corporate goal attainment (Zeng *et al.*, 2010) and reflecting the effectiveness of goal implementation (Bernardin and Cascio, 1988). It serves as a vital management tool for the enterprise's strategic direction and control (Agyabeng-Mensah *et al.*, 2020). Initially, the focus was on financial aspects; however, with evolving sustainable and green development concepts, EP now emphasizes balanced economic, social and environmental development (Büyükkzan and Karabulut, 2018). The purpose of enterprises carrying out GSCI and AMGI is to pursue a balanced development of the economy, society and environment. Thus, we define EP as the economic, environmental and social benefits achieved through GSCI and AMGI. This considers their interests, social responsibilities and environmental protection. Following the triple bottom-line model, EP was categorized into three dimensions: environmental performance (ENVP), economic performance (ECOP) and social performance (SOCP), as shown in Table 5.

3.2 Research hypotheses and conceptual framework

3.2.1 Green supply chain integration and enterprise performance. The GSCI has emerged as a pivotal strategy for enterprises to enhance their environmental performance (Zhou *et al.*, 2020). It also yields economic benefits to companies by optimizing resource utilization (Rao and Holt, 2005). The GSCI assumes a crucial role in advancing the overall well-being of stakeholders and communities and safeguarding employees' health and safety. It serves as a catalyst for steering society toward a greener and lower-carbon trajectory (Geng *et al.*, 2017). Consequently, we propose the following hypothesis:

H1. GSCI has a positive effect on EP.

3.2.2 The mediating effect of ambidextrous green innovation. AIT underscores the presence of uncertainty in enterprises' development processes. This is particularly evident in emerging economies, as they are in the post-technological development stage and face the challenge of green transformation, needing to address both the pressures of "increasing quantity" and "improving quality." AMGI can effectively help emerging economies address these challenges. This is because both ERGI and EIGI can confer competitive advantages. Among these, ERGI is more conducive to acquiring long-term competitive advantages, while EIGI excels in providing short-term financial benefits for enterprises (Wang and Liu, 2020). According to the "ambidextrous innovation equilibrium," enterprises undertaking both ERGI and EIGI can effectively manage the risks associated with green innovations, facilitating higher performance and sustainable development (March, 1996; Wang and Liu, 2020; Asiaei *et al.*, 2023). Therefore, we propose the following hypothesis:

H2. AMGI has a positive effect on EP.

The literature notes the challenges in AMGI, such as dilemmas in green innovation project selection, innovation failure risks and resource limitations (March, 1996; Eslami and Melander, 2019; Wong *et al.*, 2020). The OCT posits that an enterprise's ability to coordinate and integrate resources helps address these challenges. GSCI is considered the dynamic capability of an organization (Huo, 2012; Zhou *et al.*, 2020). Among them, GII is an internal capability and GSI is an external capability. GII is not only capable of absorbing knowledge from supply chain partners and integrating it into the enterprise's system to promote EIGI but also capable of breaking down the boundaries of innovation and fostering new ideas by interacting with GCI and GSI to promote ERGI (Huo, 2012; Wong *et al.*, 2020; Jia *et al.*, 2022). In addition, collecting customer feedback through GCI helps optimize AMGI's direction and strategy and reduce commercial uncertainty, whereas GSI helps reduce technological uncertainty (Wong *et al.*, 2020; Jia *et al.*, 2022). Therefore, we propose the following hypothesis:

H3. GSCI has a positive effect on AMGI.

From H2, it is inferred AMGI positively influences EP. Considering H3, GSCI positively affects AMGI, suggesting AMGI mediates between GSCI and EP. Therefore, we propose the following hypothesis:

H4. AMGI mediates the effect between GSCI and EP.

3.2.3 The moderating effect of green legitimacy. Addressing how enterprises can effectively translate AMGI into EP is critical for sustainable development (Wang and Huang, 2022). Developed Western countries rely on a robust legal framework for green intellectual property rights to address this issue (Pei *et al.*, 2013; Yang and Wang, 2020). However, in emerging economies, the legal system for green intellectual property rights is weaker, and the notion of relying on formal property rights systems to protect the benefits of AMGI behaviors is met with challenges (Yang and Wang, 2020). According to the NIT, organizational legitimacy influences enterprise innovation (Janssen and Nonnenmann, 2017). Green legitimacy, as an

extension of organizational legitimacy, facilitates the translation of AMGI into EP. This is because (1) enterprises that are highly recognized by government departments are more likely to obtain policy support and subsidies and (2) enterprises that are highly recognized by customers and the public can promote their green innovations more effectively. These provide stronger channels and institutional support for AMGI commercialization, which helps companies benefit from AMGI (Pei *et al.*, 2013). Therefore, this study proposes the following hypothesis:

H5. GL has a moderating effect on the relationship between AMGI and EP.

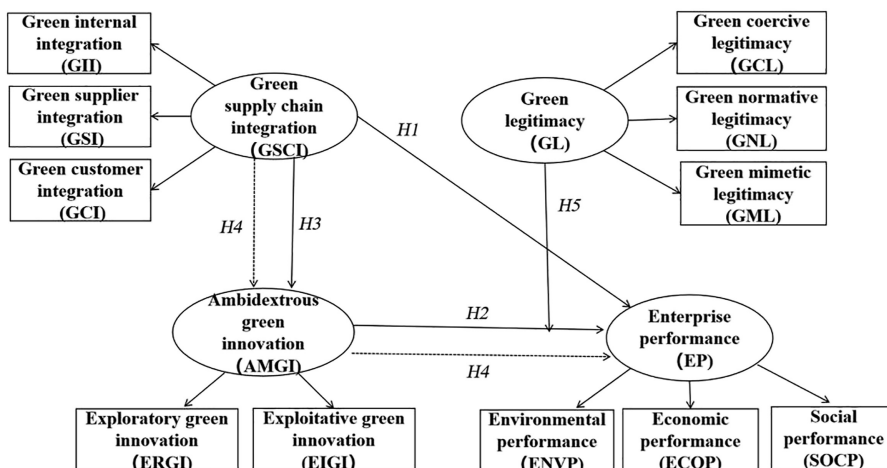
Based on the analysis of the basic concepts and dimensions described above and the hypotheses formulated, the framework is visually represented in Figure 2 and Table 5, which provide the dimensions of the variables and their definitions.

4. Future research agenda

The framework presented in this study introduces three theories from the GSCI literature: OCT, AIT and NIT. This framework enables future research to comprehend and evaluate the connection between GSCI and EP in emerging economies and its mechanisms of action from an organizational capabilities perspective; however, it is imperative to acknowledge that these theories remain incompletely substantiated. Thus, future research should concentrate on empirical investigations to rigorously examine these theoretical relationships.

The conceptual framework proposed in this study exclusively incorporates GL as a boundary condition. Subsequent research should delve into the mechanisms through which other factors influence GSCI and EP. For instance, investigating the impact of governmental environmental protection strategies and corporate executives' environmental awareness on GSCI outcomes warrants further study.

Finally, traditional studies on supply chain integration have revealed the existence of certain "dark sides" in integration relationships. These aspects encompass conflicts and power dependencies in cooperation that affect the prognosis of supply chain integration outcomes. Therefore, the association between GSCI and EP is complex. Future research could focus on delineating the various pathways through which GSCI has positive and negative



Source(s): Authors' own work

Figure 2.
The model of
conceptual framework

Table 5.
Dimensions of relevant
variables and their
definitions in
this study

Variable	Dimension	Definition	Source
GSCI	GII	Different departments within enterprise work together to address in-house environmental issues through information sharing and collaboration	Teece <i>et al.</i> (1997), Song and Zhang (2018), Huo (2012), Wong <i>et al.</i> (2015), Zhou <i>et al.</i> (2020), Lo <i>et al.</i> (2018), Kong <i>et al.</i> (2021), Han and Huo (2020)
	GSI	The enterprise works closely with its core suppliers to understand environmental risks and responsibilities, share information, set common goals, and work together to address environmental issues	
	GCI	The enterprise works closely with its core customers to understand environmental risks and responsibilities, share information, set common goals and work together to address environmental issues	
AMGI	ERGI	The enterprise utilize new environmental knowledge, information and capabilities to develop new green products, processes and services	Benner and Tushman (2003), Lubatkin <i>et al.</i> (2006), Wang <i>et al.</i> (2020), Sun and Sun (2021), Asiaei <i>et al.</i> (2023), Meiting <i>et al.</i> (2023)
	EIGI	The enterprise utilize existing environmental knowledge, information and capabilities to make incremental, small changes to existing green products, processes and services	
GL	CL	Enterprise is recognized by governments and regulators for green innovation	Colwell and Joshi (2013), Chang and Chen (2013), Zhou <i>et al.</i> (2021), Yu <i>et al.</i> (2021)
	NL	Enterprise is recognized by stakeholders such as the market, industry, environmental organizations and customers for green innovation	
	ML	Enterprise is recognized by imitating other enterprises that have succeeded with green innovations	
EP	ECOP	Improvement of the profitability of enterprises	Geng <i>et al.</i> (2017), Agyabeng-Mensah <i>et al.</i> (2020), Han and Huo (2020)
	ENVP	Improvement of the environmental impact of enterprises	
	SOC	Improvement of the social impact of enterprises	
Source(s): Authors' own work			

effects while also examining the cumulative effects of these divergent pathways. This comprehensive approach is essential to fully comprehending how GSCI shapes EP and offers practical guidance to enterprises.

5. Discussion and conclusions

This study’s conclusions mainly include three aspects. First, the definitions and dimensions of the relevant concepts, such as GSCI, EP, AMGI and GL, are clarified (see Table 5). It is worth emphasizing that this study regards GSCI as a dynamic capability, representing a novel dynamic-level definition from the organizational capability perspective. It fosters a deeper mutual understanding among supply chain partners and empowers enterprises to absorb external knowledge, update information and execute flexible innovation and operations more

effectively. These enhancements enable the realization of sustainable performance in complex and evolving environments, addressing the requisites of the lean, agile, resilient and green era (Sahu *et al.*, 2023), responding to Sahu *et al.*'s (2018a, b) call for researchers to devise more effective approaches for achieving sustainability in green supply chain management.

Second, a conceptual model assessing the impact of the GSCI on EP was formulated based on OCT, AIT and NTT, incorporating AMGI as the mediating variable and GL as the moderating variable (see Figure 2). This overcomes the issue in previous studies, where the mechanism of action was not considered in the relationship between the GSCI and EP, thus providing a new perspective for understanding the relationship in emerging economies.

Third, future research agendas are outlined. These research directions encompass how to effectively navigate direct conflicts and dependency issues among supply chain partners during corporate GSCI practices. A comprehensive study of these facets will enrich the theoretical framework surrounding GSCI and provide valuable insights for GSCI practitioners actively engaged in environmental conservation initiatives.

This study offers the following four theoretical contributions: First, applying OCT to the GSCI field provides a novel dynamic perspective for GSCI from the standpoint of organizational capabilities. Second, the relationship between GSCI and EP in emerging economies is clarified from the perspective of OCT. Third, the mechanism of GSCI's role in shaping EP is investigated from the AMGI perspective. Fourth, the incentive effect of GL on the transformation from AMGI to EP was emphasized.

The managerial implications of this study encompass three principal aspects. First, enterprises should cultivate GSCI capabilities to promote mutual understanding within the supply chain for efficient business operations. This enhances EP in a changing environment. Second, enterprises can leverage GSCI for EP through the AMGI. Enterprises should integrate customers' green demands and suppliers' technology and knowledge and conduct AMGI to achieve short-term objectives and long-term performance. Finally, enterprises engaged in AMGI should build relationships with governmental entities, suppliers and other stakeholders to enhance GL. This process facilitates the translation of AMGI outcomes into business performance. This process will facilitate the translation of AMGI results into business performance.

References

- Agyabeng-Mensah, Y., Afum, E. and Ahenkorah, E. (2020), "Exploring financial performance and green logistics management practices: examining the mediating influences of market, environmental and social performances", *Journal of Cleaner Production*, Vol. 258, 120613, doi: [10.1016/j.jclepro.2020.120613](https://doi.org/10.1016/j.jclepro.2020.120613).
- Asiaei, K., O'Connor, N.G., Barani, O. and Joshi, M. (2023), "Green intellectual capital and ambidextrous green innovation: the impact on environmental performance", *Business Strategy and the Environment*, Vol. 32 No. 1, pp. 369-386, doi: [10.1002/bse.3136](https://doi.org/10.1002/bse.3136).
- Benner, M.J. and Tushman, M.L. (2003), "Exploitation, exploration, and process management: the productivity dilemma revisited", *Academy of Management Review*, Vol. 28 No. 2, pp. 238-256, doi: [10.5465/amr.2003.9416096](https://doi.org/10.5465/amr.2003.9416096).
- Bernardin, H.J. and Cascio, W.F. (1988), "Performance appraisal and the law", *Personnel and Human Resource Management*, pp. 235-247.
- Büyükoçkan, G. and Karabulut, Y. (2018), "Sustainability performance evaluation: literature review and future directions", *Journal of Environmental Management*, Vol. 217, pp. 253-267, doi: [10.1016/j.jenvman.2018.03.064](https://doi.org/10.1016/j.jenvman.2018.03.064).
- Chang, C.H. and Chen, Y.S. (2013), "Green organizational identity and green innovation", *Management Decision*, Vol. 51 No. 5, pp. 1056-1070, doi: [10.1108/md-09-2011-0314](https://doi.org/10.1108/md-09-2011-0314).

- Colwell, S.R. and Joshi, A.W. (2013), "Corporate ecological responsiveness: antecedent effects of institutional pressure and top management commitment and their impact on organizational performance", *Business Strategy and the Environment*, Vol. 22 No. 2, pp. 73-91, doi: [10.1002/bse.732](https://doi.org/10.1002/bse.732).
- Denyer, D. and Tranfield, D. (2009), "Producing a systematic review", *The SAGE Handbook of Organizational Research Methods*, Sage Publications, Thousand Oaks, CA, pp. 671-689.
- Ding, J. (2023), "Design of a low carbon economy model by carbon cycle optimization in supply chain", *Frontiers in Ecology and Evolution*, Vol. 11, 1122682, doi: [10.3389/fevo.2023.1122682](https://doi.org/10.3389/fevo.2023.1122682).
- Eslami, M.H. and Melander, L. (2019), "Exploring uncertainties in collaborative product development: managing customer-supplier collaborations", *Journal of Engineering and Technology Management*, Vol. 53, pp. 49-62, doi: [10.1016/j.jengtecman.2019.05.003](https://doi.org/10.1016/j.jengtecman.2019.05.003).
- Fu, H., Zeng, S. and Sun, D. (2022), "Top-down or bottom-up? How environmental state attention and civic participation coordinate with green innovation", *Technology Analysis and Strategic Management*, pp. 1-13, doi: [10.1080/09537325.2022.2131515](https://doi.org/10.1080/09537325.2022.2131515).
- Ge, B., Jiang, D., Gao, Y. and Tsai, S.B. (2016), "The influence of legitimacy on a proactive green orientation and green performance: a study based on transitional economy scenarios in China", *Sustainability*, Vol. 8 No. 12, p. 1344, doi: [10.3390/su8121344](https://doi.org/10.3390/su8121344).
- Geng, R., Mansouri, S.A. and Aktas, E. (2017), "The relationship between green supply chain management and performance: a meta-analysis of empirical evidences in Asian emerging economies", *International Journal of Production Economics*, Vol. 183, pp. 245-258, doi: [10.1016/j.ijpe.2016.10.008](https://doi.org/10.1016/j.ijpe.2016.10.008).
- Han, Z. and Huo, B. (2020), "The impact of green supply chain integration on sustainable performance", *Industrial Management and Data Systems*, Vol. 120 No. 4, pp. 657-674, doi: [10.1108/imds-07-2019-0373](https://doi.org/10.1108/imds-07-2019-0373).
- Huo, B.F. (2012), "The impact of supply chain integration on company performance: an organizational capability perspective", *Supply Chain Management: An International Journal*, Vol. 17 No. 6, pp. 596-610, doi: [10.1108/13598541211269210](https://doi.org/10.1108/13598541211269210).
- Janssen, B. and Nonnenmann, M.W. (2017), "New institutional theory and a culture of safety in agriculture", *Journal of Agromedicine*, Vol. 22 No. 1, pp. 47-55, doi: [10.1080/1059924x.2016.1249444](https://doi.org/10.1080/1059924x.2016.1249444).
- Jia, T., Yan, R., Wang, Y. and Chen, Q. (2022), "Customer involvement, ambidextrous green innovations and firm Performance: the moderating role of product intelligence", *Science and Technology Progress and Policy*, Vol. 40 No. 7, pp. 91-101.
- Kong, T., Feng, T. and Huo, B. (2021), "Green supply chain integration and financial performance: a social contagion and information sharing perspective", *Business Strategy and the Environment*, Vol. 30 No. 5, pp. 2255-2270, doi: [10.1002/bse.2745](https://doi.org/10.1002/bse.2745).
- Lo, S.M., Zhang, S., Wang, Z. and Zhao, X. (2018), "The impact of relationship quality and supplier development on green supply chain integration: a mediation and moderation analysis", *Journal of Cleaner Production*, Vol. 202, pp. 524-535, doi: [10.1016/j.jclepro.2018.08.175](https://doi.org/10.1016/j.jclepro.2018.08.175).
- Lubatkin, M.H., Simsek, Z., Ling, Y. and Veiga, J.F. (2006), "Ambidexterity and performance in small-to medium-sized firms: the pivotal role of top management team behavioral integration", *Journal of Management*, Vol. 32 No. 5, pp. 646-672, doi: [10.1177/0149206306290712](https://doi.org/10.1177/0149206306290712).
- March, J.G. (1996), "Continuity and change in theories of organizational action", *Administrative Science Quarterly*, Vol. 41 No. 2, pp. 278-287, doi: [10.2307/2393720](https://doi.org/10.2307/2393720).
- Mariani, M.M., Machado, I., Magrelli, V. and Dwivedi, Y.K. (2023), "Artificial intelligence in innovation research: a systematic review, conceptual framework, and future research directions", *Technovation*, Vol. 122, 102623, doi: [10.1016/j.technovation.2022.102623](https://doi.org/10.1016/j.technovation.2022.102623).
- Marques, T., Reis, N. and Gomes, J.F. (2018), "Responsible leadership research: a bibliometric review", *BAR-Brazilian Administration Review*, Vol. 15 No. 1, doi: [10.1590/1807-7692bar2018170112](https://doi.org/10.1590/1807-7692bar2018170112).

- Meiting, M.A., Xiaojie, W.U. and Xiuqiong, W.A.N.G. (2023), "Technological imprint of top management team and ambidextrous green innovation of firms: mediating effect of environmental attention", *Journal of Systems and Management*, Vol. 32 No. 5, p. 976.
- Montoya-Torres, J.R., Gutierrez-Franco, E. and Blanco, E.E. (2015), "Conceptual framework for measuring carbon footprint in supply chains", *Production Planning and Control*, Vol. 26 No. 4, pp. 265-279.
- Newbert, S.L. (2007), "Empirical research on the resource-based view of the firm: an assessment and suggestions for future research", *Strategic Management Journal*, Vol. 28 No. 2, pp. 121-146, doi: [10.1002/smj.573](https://doi.org/10.1002/smj.573).
- Pei, Y., Jiang, X. and Liu, H. (2013), "Strategic flexibility, original innovation and firm competitiveness: the moderating effect of organizational legitimacy", *Studies in Science of Science*, Vol. 31 No. 3, pp. 446-455.
- Rao, P. and Holt, D. (2005), "Do green supply chains lead to competitiveness and economic performance?", *International Journal of Operations and Production Management*, Vol. 25 No. 9, pp. 898-916, doi: [10.1108/01443570510613956](https://doi.org/10.1108/01443570510613956).
- Sahu, A.K., Narang, H.K., Rajput, M.S., Sahu, N.K. and Sahu, A.K. (2018a), "Performance modeling and benchmarking of green supply chain management: an integrated fuzzy approach", *Benchmarking: An International Journal*, Vol. 25 No. 7, pp. 2248-2271, doi: [10.1108/bij-02-2017-0032](https://doi.org/10.1108/bij-02-2017-0032).
- Sahu, A.K., Raut, R.D., Gedam, V.V., Cheikhrouhou, N. and Sahu, A.K. (2023), "Lean-agile-resilience-green practices adoption challenges in sustainable agri-food supply chains", *Business Strategy and the Environment*, Vol. 32 No. 6, pp. 3272-3291, doi: [10.1002/bse.3299](https://doi.org/10.1002/bse.3299).
- Sahu, N.K., Sahu, A.K. and Sahu, A.K. (2018b), "Green supply chain management assessment under chains of uncertain indices: an intellectual approach", *Journal of Modelling in Management*, Vol. 13 No. 4, pp. 973-993, doi: [10.1108/jm2-07-2017-0068](https://doi.org/10.1108/jm2-07-2017-0068).
- Song, T. and Zhang, L. (2018), "A review and prospect of strategic flexibility", *Journal of South China University of Technology (Social Science Edition)*, Vol. 20 No. 6, pp. 8-24.
- Suchman, M.C. (1995), "Managing legitimacy: strategic and institutional approaches", *Academy of Management Review*, Vol. 20 No. 3, pp. 571-610, doi: [10.2307/258788](https://doi.org/10.2307/258788).
- Sun, Y. and Sun, H. (2021), "Green innovation strategy and ambidextrous green innovation: the mediating effects of green supply chain integration", *Sustainability*, Vol. 13 No. 9, p. 4876, doi: [10.3390/su13094876](https://doi.org/10.3390/su13094876).
- Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-533, doi: [10.1002/\(sici\)1097-0266\(199708\)18:73.0.co;2-z](https://doi.org/10.1002/(sici)1097-0266(199708)18:73.0.co;2-z).
- Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence-informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222, doi: [10.1111/1467-8551.00375](https://doi.org/10.1111/1467-8551.00375).
- Wang, J. and Huang, Q. (2022), "How can green innovative enterprises break out of the 'green trap': the roles of serendipity and green legitimacy", *Contemporary Finance and Economics*, No. 11, pp. 76-86.
- Wang, J. and Liu, J. (2020), "The impact of ambidextrous green innovation on the competitive advantage of Chinese manufacturing Firms: the moderating role of technological turbulence", *Science and Technology Management Research*, Vol. 40 No. 09, pp. 196-204.
- Wang, J., Xue, Y., Sun, X. and Yang, J. (2020), "Green learning orientation, green knowledge acquisition and ambidextrous green innovation", *Journal of Cleaner Production*, Vol. 250, 119475, doi: [10.1016/j.jclepro.2019.119475](https://doi.org/10.1016/j.jclepro.2019.119475).
- Wong, C.Y., Wong, C.W.Y. and Boon-Itt, S. (2015), "Integrating environmental management into supply chains: a systematic literature review and theoretical framework", *International Journal of Physical Distribution and Logistics Management*, Vol. 45 Nos 1-2, pp. 43-68, doi: [10.1108/ijpdlm-05-2013-0110](https://doi.org/10.1108/ijpdlm-05-2013-0110).

- Wong, C.Y., Wong, C.W. and Boon-itt, S. (2020), "Effects of green supply chain integration and green innovation on environmental and cost performance", *International Journal of Production Research*, Vol. 58 No. 15, pp. 4589-4609, doi: [10.1080/00207543.2020.1756510](https://doi.org/10.1080/00207543.2020.1756510).
- Wu, G.C. (2013), "The influence of green supply chain integration and environmental uncertainty on green innovation in Taiwan's IT industry", *Supply Chain Management: An International Journal*, Vol. 18 No. 5, pp. 539-552, doi: [10.1108/scm-06-2012-0201](https://doi.org/10.1108/scm-06-2012-0201).
- Xie, X.M. and Zhu, Q.W. (2022), "Innovative pivots or conservative shackles: how can green supply chain management practices spur corporate performance?", *Chinese Journal of Management Science*, Vol. 30 No. 5, pp. 131-143.
- Yang, J.H. and Wang, Y.R. (2020), "Innovation of intellectual property system in the new development pattern of double-cycle-centering on green low-carbon economy", *Qinghai Social Sciences*, No. 06, pp. 54-60.
- Yu, F., Xiao, C. and Hu, Z.P. (2021), "Impact of manufacturing firms' green innovation on government support : the mediating effect of legitimacy", *Science and Technology Progress and Policy*, Vol. 38 No. 9, pp. 90-99.
- Zeng, J. and Li, B. (2022), "Driving paths of enterprise green ambidextrous innovation from the configuration perspective", *China Population, Resources and Environment*, Vol. 32 No. 2, pp. 151-161.
- Zeng, S.X., Meng, X.H., Yin, H.T., Tam, C.M. and Sun, L. (2010), "Impact of cleaner production on business performance", *Journal of Cleaner Production*, Vol. 18 Nos 10-11, pp. 975-983, doi: [10.1016/j.jclepro.2010.02.019](https://doi.org/10.1016/j.jclepro.2010.02.019).
- Zhao, Y., Zhao, C., Guo, Y., Sheng, H. and Feng, T. (2021), "Green supplier integration and environmental innovation in Chinese firms: the joint effect of governance mechanism and trust", *Corporate Social Responsibility and Environmental Management*, Vol. 28 No. 1, pp. 169-183, doi: [10.1002/csr.2040](https://doi.org/10.1002/csr.2040).
- Zhao, Y., Hu, L., Long, Y., Ye, C., Wang, Z. and Ma, H.F. (2022), "The impact of multi-dimensional alliance knowledge search on the dual green innovation of construction companies-the adjustment of 'rules of the game'", *Soft Science*, Vol. 37 No. 5, pp. 47-53, doi: [10.3390/bioengineering10010047](https://doi.org/10.3390/bioengineering10010047).
- Zhou, C., Xia, W., Feng, T., Jiang, J. and He, Q. (2020), "How environmental orientation influences firm performance: the missing link of green supply chain integration", *Sustainable Development*, Vol. 28 No. 4, pp. 685-696, doi: [10.1002/sd.2019](https://doi.org/10.1002/sd.2019).
- Zhou, M., Govindan, K., Xie, X. and Yan, L. (2021), "How to drive green innovation in China's mining enterprises? Under the perspective of environmental legitimacy and green absorptive capacity", *Resources Policy*, Vol. 72, 102038, doi: [10.1016/j.resourpol.2021.102038](https://doi.org/10.1016/j.resourpol.2021.102038).

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