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What motivates firms to adopt a green supply chain and how much does it matter?

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This study integrates the elaboration likelihood model, institutional theory, and the image management perspective to identify the internal and external forces that can effectively drive firms to adopt a green supply chain. Using survey data from a sample of 246 firms in the Chinese manufacturing sector, we empirically examine how the internal green process and green product innovation of firms and different types of external institutional pressures contribute to their adoption of a green supply chain, which in turn can explain the variation in their environmental and new-product development performance. Results of our structural equation modeling analysis reveal that the internal green process and green product innovation of firms and three types of external institutional pressures (i.e., coercive, normative, and mimetic pressures) play an important role in driving green supply chain adoption. Moreover, firms can improve their environmental and new-product development performance by adopting a green supply chain. In addition, though the image management motivation of firms tends to play a negative moderating role in the relationship between their green process innovation and green supply chain adoption, such motivation positively moderates the contribution of coercive pressure to their green supply chain adoption. Our findings can help explain why emerging-market firms tend to adopt a green supply chain and do not follow the pattern predicted by classical strategic management theories. The results of our study clearly demonstrate the determinants and consequences of the adoption of a green supply chain of firms and confirm that their green supply chain adoption can exert a positive effect on their environmental and new-product development performance. Overall, our research highlights the importance of recognizing internal innovation and external institutional forces in driving the green supply chain adoption of firms, which in turn will contribute to their environmental and new-product development performance. In this regard, our study extends the stream of research on green supply chains and sheds new light on the importance of abandoning the conventional supply chain and adopting a green one. Our study also provides important implications for research, practice, and policymaking.

KEYWORDS

green supply chain, green process innovation, green product innovation, institutional pressure, environmental performance, new-product development performance

1 Introduction

With the growing global population and continuous economic development, problems related to natural resources and the environment have become increasingly serious. Resource shortage, environmental pollution, and climate change have become the main bottlenecks restricting the sustainable development of the global economy. Accordingly, the

establishment of a collaborative governance system for reducing pollution and carbon emissions has become a global objective, to which major countries have responded by actively promoting the creation and improvement of green supply chain systems (Green et al., 2012; Khan et al., 2023). At present, the traditional supply chain has yet to completely detach itself from the high-input, high-consumption, and high-emissions development mode; thus, ecological and environmental problems have become increasingly prominent, and the green development situation remains serious. By contrast, a green supply chain can integrate environmental protection ideas with green procurement, green manufacturing, green distribution, reverse logistics, and other links and covers the processes of upstream procurement, production, downstream logistics, and recycling, thereby minimizing the production of hazardous chemicals, emissions, solid wastes, and other toxic substances in the whole supply chain (Chin et al., 2015; Micheli et al., 2020).

The literature presents different perspectives to explain why firms should establish a green supply chain. For example, using data from manufacturing firms, Cheng and Sheu (2012) examined the effect of relationship orientation on interorganizational strategy quality in green supply chains and demonstrated the important role of opportunistic behavior in negatively moderating such a relationship. Most important, the possible opportunistic behavior of some players in the green supply chain management may lead to wastage of various resources and thus reduce the possible benefits of the supply chain integration (Wong et al., 2021). Moreover, the use of appropriate governance mechanisms may reduce possible opportunistic behavior and enhance commitment and trust among the players within a supply chain, which may lead to high-quality green supply chains (Li et al., 2014; Yang et al., 2021). In addition, a couple of studies attempted to extend this stream of research by examining the importance of designing a closed-loop supply chain and implementing circular economy strategies (Amir et al., 2022; Tavana et al., 2022) or spread green ideologies across supply chain practices to help firms gain a competitive advantage (e.g., Zaid et al., 2018; Wang et al., 2020). However, despite the interest and efforts in exploring the mechanisms and importance of the development and enhancement of green supply chains and the considerable progress, prior research on green supply chains lacks a systematic conceptual framework that can extend the field's reach to the current dynamic environment. Given the potential benefits of the facilitation of green process and product innovation to meet customers' needs, some scholars argued that firms can establish a green supply chain through such innovation (Silva et al., 2019). Green process innovation emphasizes a firm's ability to improve its existing processes and develop new modes to achieve energy conservation, emissions reduction, pollution prevention, and enhanced energy and resource utilization efficiency in its entire production process (Huang and Li, 2015; Tian and Wang, 2019). This type of innovation can improve firms' environmental and corporate financial performance (Xie et al., 2019; Wang and Liu, 2022). Meanwhile, green product innovation can enable firms to meet customers' environmental protection demands, focus on the use and recycling of environment-friendly materials, reduce raw material and energy wastage in compliance with environmental regulations, and prevent health and safety risks (Chen et al., 2017). Firms can adopt green designs, choose green materials, implement green procurement processes, promote green packaging, and advocate green transportation and waste product recycling to realize green environmental protection in their product cycle and minimize the negative impact of their products on the environment (Tariq et al., 2017). In addition, the government, customers, competitors, and other stakeholders can exert coercive, normative, and mimetic pressures on firms to promote green supply chain practices (Zhu and Sarkis, 2007). Governments have implemented environmental legislation, cap-and-trade laws, low-carbon subsidies, and other measures at the macro level to guide firms in their adoption of a green supply chain (Mondal and Giri, 2022a; b). The establishment of a green supply chain is inevitable, but some challenges and opportunities must be considered, because a supply chain involves multiple links and interests. If firms follow national carbon emissions reduction standards, then emissions reduction costs will increase, and the final consumers will bear the high retail and wholesale prices (Cheng et al., 2017). Moreover, firms' emissions reduction is closely related to its cost. Therefore, the high cost of green technologies can hinder most firms from adopting a green supply chain to reduce their emissions, because it may substantially increase their costs (Govindan et al., 2014; Waltho et al., 2019). In addition to the risk of design defects in their green process (Rostamzadeh et al., 2018), failure in their machines or facilities (Rostamzadeh et al., 2018), and uncertainties in their supply of key green raw materials, firms can encounter other operational risks, supply risks, product recovery risks, financial risks, demand risks, and government- and organization-related risks in the process of implementing a green supply chain (Pourjavad and Shahin, 2020). In the face of such risks, firms may be unable to manage a green supply chain and operate with green supply chain resilience; thus, their suppliers, distributors, and logistics service providers may lack coordination (Brusset and Teller, 2017).

In summary, most previous studies that explored how to promote the green upgrading of supply chains tended to focus largely on external factors, such as external drivers or the resistance encountered by firms, in the process of adopting a green supply chain, and those to effectively understand the process of the adoption of green supply chain practices from the internal and external perspectives of such firms have yet to be conducted. Despite the importance of adopting a green supply chain to achieve sustainable development, firms are hesitant to abandon their traditional supply chain in favor of a green one owing to the risks and obstacles involved. In this study, to fill the research gaps in the literature and boost the confidence of firms and persuade other firms to completely abandon their traditional supply chain in favor of a green one, we address three interrelated research questions. 1) What are the internal and external forces that can drive firms to adopt green supply chain practices? 2) How can the adoption of green supply chain practices help firms improve their environmental and new-product development performance? 3) Under what conditions can internal and external forces influence a firm's adoption of a green supply chain? Building on the elaboration likelihood model (ELM) and image management and institutional perspectives, we propose a comprehensive model. By considering the green product and green process innovation proactively adopted by firms as the

central path and the coercive, normative, and mimetic pressures imposed by the government, customers, and competitors as the peripheral path, we aim to investigate the most effective persuasion methods for firms to change and adopt a green supply chain from internal and external perspectives and empirically analyze whether the change and adoption of a green supply chain can enhance their environmental and new-product performance. Firms may be motivated by maximum rewards and minimal punishment to effectively manage their image; thus, we also incorporate firm image management motivation into the conceptual framework by examining its moderating role in shaping the effect of internal and external drivers on green supply chain adoption. We hope to enrich the literature by extending the scope of green supply chain research and providing important guidelines on how to persuade firms to abandon their conventional supply chain and actively adopt a green one.

The rest of this paper is organized as follows: Section 2 introduces the theoretical background and hypotheses, Section 3 presents an overview of the data and research methods, Section 4 reports the empirical findings, Section 5 focuses on the discussion and implications, and Section 6 concludes the study and provides suggestions for future research avenues.

2 Theoretical background and hypothesis development

As a persuasion theory that describes attitudinal change, the ELM posits that people change their attitude through the central and peripheral paths of persuasion. In the central path, the change in the attitude of an individual is processed through the thorough processing and careful review of the available information. Individuals who follow this path generally engage in active participation, which is regarded as the most influential persuasion paradigm. Meanwhile, individuals who follow the peripheral path are satisfied with their current cognition and unwilling to spend energy analyzing information and can easily be persuaded by peripheral factors. Therefore, such individuals generally engage in passive participation (Petty and Cacioppo, 1986; Crano and Prislin, 2006). The ELM has been widely cited in academic research for its ability to clearly illustrate how individuals can be persuaded to change their attitude (Pasadeos et al., 2008). The use of this model has also been expanded, from the consumer sector to other areas, including e-commerce platforms (Wang and Yang, 2021), start-up financing (Moradi and Badrinarayanan, 2021), and crowdfunding (Ba et al., 2022). Although the ELM has become ubiquitous in practice, the media environment and consumer choices have drastically changed since the advent of the Internet. Therefore, the ELM must be rerecognized and improved and not be taken as the sole theoretical basis for persuasion (J. Kitchen et al., 2014).

We also refer to image management theory in building our model. The theory illustrates the process through which people try to manage and control their image in the mind of others. Image management motivation refers to the degree to which people manipulate and control their image in the mind of others. The stronger the relation between individuals and their motivation, the more valuable and closer their motivation, and the stronger their image management motivation. Individuals consciously control their behavior to influence the impression of their target audience (Leary and Kowalski, 1990). Organizations exert considerable effort in creating a positive image to satisfy others and be positively viewed by their stakeholders (Perks et al., 2013) and adopt various methods, such as self-promotion and ingratiation (Bolino and Turnley, 1999), the rational use of social media (Schniederjans et al., 2013), and camouflage (Benson et al., 2015).

We also built our model on institutional theory, which emphasizes social factors that can influence organizational behavior, including coercive, normative, and mimetic pressures. Among the different types of pressures, coercive pressure refers mainly to formal or informal pressure exerted by the government to force firms to change their behavior, such as through rewards or punishment policies (Chu et al., 2018). Under mandatory policies, the development of firms with low resource utilization efficiency and high pollution discharge will be restricted, and those with substandard wastewater and waste gas discharge may be punished. The government can also exert external pressure on firms by providing tax reliefs, subsidies, low-interest-rate financing, and other incentives (Nie et al., 2016; Russi et al., 2016). Normative pressure stems from the standards set by industry associations, media and public supervision, and other sources, such as educational institutions, industry groups, nongovernment organizations, suppliers, and customers (Zhu et al., 2013; Chu et al., 2017). Meanwhile, mimetic pressure mainly comes from competitors. When companies are uncertain about their technologies, goals, or circumstances, they may imitate the behavior of other firms to solve similar problems (DiMaggio and Powell, 1983). Similarly, if a major competitor that adopted a green strategy is favored by customers, then other companies in the same industry will likely follow suit (Chu et al., 2018; Qin et al., 2021). Previous studies showed that the three types of pressures can positively influence e-commerce transformation intention (Lin et al., 2020) and encourage firms to adopt sustainable supply chain management practices (Dai et al., 2021). Specifically, the three types of pressures can play a positive role in improving firms' energy-saving ability (Zhang et al., 2022) and green supply chain management (Bag et al., 2022) and the circular economy (Arranz et al., 2022).

Our study explores the methods used to persuade firms to adopt a green supply chain, the results of their green supply chain adoption, and the situation that drove the firms to switch to a different supply chain. Our study initially refers to the ELM by taking the two measures of green product innovation and green process innovation, which firms positively adopt, as the central route. Meanwhile, by referring to institutional theory and image management theory, our study takes the coercive, normative, and mimetic pressures that firms passively bear as the peripheral route. Our study also uses image management motivation as a moderating variable to understand the causes and consequences of firms' green supply chain adoption. As shown in Figure 1, Hypotheses 1 and 2 indicate that green process innovation and green product innovation, as the central path, will positively influence firms' adoption of a green supply chain, respectively, and Hypotheses 3, 4, and 5 indicate that coercive, normative, and mimetic pressures, as the peripheral path, will positively influence firms' adoption of a green supply chain, respectively. Given the willingness of firms to manipulate and control their image in the mind of others, Hypotheses 6a and 6b propose that image management motivation will play a moderating role in the relationship between green process innovation and green product innovation

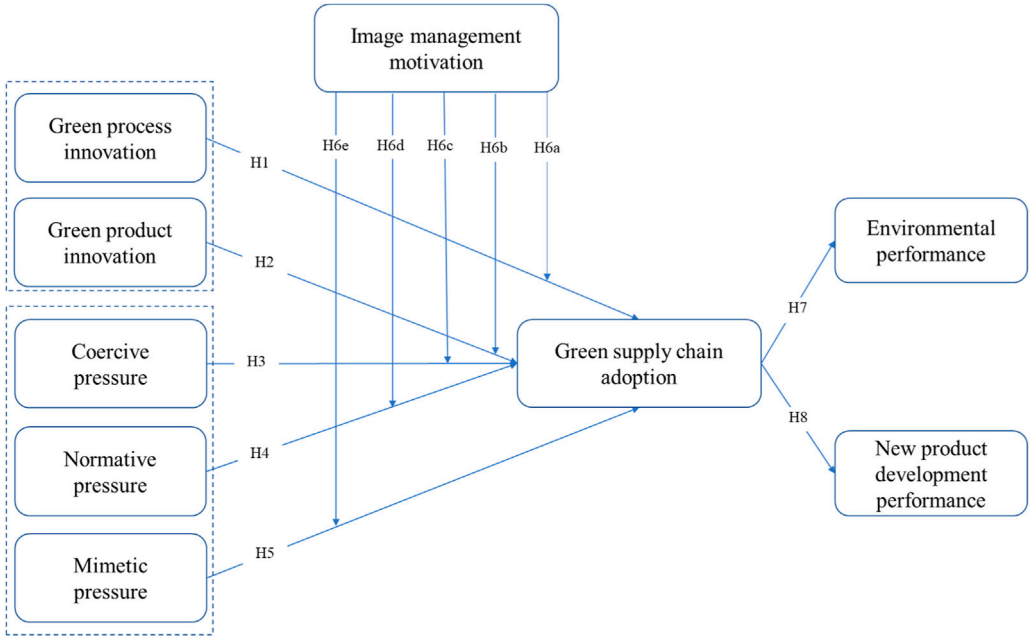

FIGURE 1
Conceptual model.

and the adoption of a green supply chain. Meanwhile, Hypotheses 6c, 6d, and 6e propose that image management motivation will play a moderating role in the effect of coercive, normative, and mimetic pressures on the adoption of a green supply chain, and Hypotheses 7 and 8 propose that firms' adoption of a green supply chain can positively influence their environmental and new-product development performance.

2.1 Green innovation and green supply chain adoption

Firms mainly conduct green supply chain management to solve the rocky relationship between their supply chain management and natural environment. Guided by sustainability, green elements have been integrated into supply chain management, including product design, material purchasing, the manufacturing process, the delivery of finished products, recycling, and other links. Green supply chain management is considered to be an effective method for reducing environmental hazards while meeting the ecological needs of end users (Srivastava, 2007; Bag et al., 2022). The construction of a green supply chain requires the joint efforts of all the firms in the supply chain. The green innovation practices actively conducted by firms mainly include green product innovation and green process innovation. By using nontoxic compounds or biodegradable materials, firms can improve their product design and recycling through green product innovation and thus reduce the negative impact of their products on the environment. Meanwhile, firms can introduce terminal and clean technologies into their product manufacturing process, change their existing production process, and reduce waste, waste gas, wastewater, and other pollutants generated in each stage of the production process through green process innovation to improve their resource and energy utilization efficiency (Severo et al., 2017; Xie et al., 2019).

As a positive environmental protection practice, if green product innovation integrates environmental protection factors into the product design and packaging, then green process innovation integrates environmental protection factors into the manufacturing process (Dangelico et al., 2016). Green product innovation and green process innovation can help firms not only gain a competitive advantage but also eliminate pollutant emissions from the source in the supply chain (Chen and Liu, 2020). Moreover, the implementation of green product and green process innovation practices may increase firms' likelihood of and effectiveness in adopting a green supply chain, which can provide them with new ideas (Chen et al., 2006). The green product and green process innovation practices of each firm in the supply chain are expected to prompt other firms to switch from the traditional to a green supply chain. Based on the above discussion, we propose the following hypotheses.

Hypothesis 1. Green process innovation will have a positive impact on a firm's green supply chain adoption.

Hypothesis 2. Green product innovation will have a positive impact on a firm's green supply chain adoption.

2.2 Institutional pressure and green supply chain adoption

According to institutional theory, firms' green product practices are generally affected by coercive, normative, and mimetic pressures (Huang and Chen, 2022). Coercive pressure is typically regarded as a

form of governance pressure that forces companies to comply with various government regulations and policies (Chu et al., 2018). Under mandatory policies, the development of firms with low resource utilization efficiency and high pollution discharge will be restricted, and firms with substandard wastewater and waste gas discharge may be punished. The government can also exert external pressure on firms by providing tax reliefs, subsidies, low-interest-rate financing, and other incentives (Nie et al., 2016; Russi et al., 2016). Normative pressure stems from a wide range of sources, including educational institutions, industry groups, nongovernment organizations, suppliers, and customers (Zhu et al., 2013; Chu et al., 2017), whereas mimetic pressure mainly comes from competitors. If a major competitor that adopted a green strategy is favored by customers, then other companies in the same industry will likely follow suit (Chu et al., 2018; Qin et al., 2021).

The efforts of governments around the world in addressing environmental deterioration issues have increased the environmental protection awareness of industries and the popularity of green supply chain adoption. Therefore, as coercive, normative, and mimetic pressures increase, firms will likely adopt a green supply chain; thus, we propose the following hypotheses.

Hypothesis 3. Coercive pressure will have a positive impact on a firm's green supply chain adoption.

Hypothesis 4. Normative pressure will have a positive impact on a firm's green supply chain adoption.

Hypothesis 5. Mimetic pressure will have a positive impact on a firm's green supply chain adoption.

2.3 Interactive effect of green innovation and image management motivation

Image management motivation mainly includes motivation to improve one's social status, promote the development of an ideal identity, obtain valuable resources, protect oneself from potential harm, and avoid social exclusion (Leary and Kowalski, 1990). People with high image management motivation will pay little attention to themselves, focus considerably on the interests of others and their social environment, engage in prosocial behavior, and tend to practice green consumption (Zhang et al., 2019). At the organizational level, owing to locational and situational differences, firms will tend to adopt different image management strategies to influence how they are viewed by others. Under the influence of different image management motivations, firms will project themselves differently depending on the situation to enhance their corporate image (Bolino et al., 2008). To leave a deep and lasting impression on their stakeholders, firms will attach considerable importance to their market, employer, financial, and CSR images and spare no expense in investing in social capital, product development and diversification, public relations, and social response (Highhouse et al., 2009). In terms of product development, with the increasing environmental awareness of the public, firms' increased investment in green products and green processes may not only prevent the occurrence of potential crises, such as environmental protests and legal penalties, but also raise consumers' expectations on their environment friendliness and sustainability and hence leave a favorable green impression on their stakeholders (Chen, 2010). Firms with a positive green image can gain substantial economic returns from their green product and green process innovation (Xie et al., 2019); thus, other firms may shift from the traditional to a green supply chain. The creation of a green image is one of the corporate image management motivations of firms. When firms have high green image management motivation, they may be willing to adopt a green supply chain through green product and green process innovation. Based on the above discussion, we propose the following hypotheses.

Hypothesis 6a. A firm's image management motivation will play a positive role in moderating the relationship between its green process innovation and green supply chain adoption.

Hypothesis 6b. A firm's image management motivation will play a positive role in moderating the relationship between its green product innovation and green supply chain adoption.

2.4 Interactive effect of institutional pressure and image management motivation

When making strategic decisions, firms will bear coercive, normative, and mimetic pressures from the government, institutions, their partners, and their suppliers. Whether such pressures can change firms' behavior will depend on the cognition of their manager (Liang et al., 2007; Ogbanufe et al., 2021). Firms' image management strategy will change with the pressure exerted by their stakeholders. With increasing pressure, firms may adopt four different image management strategies, that is, clarifying their position, clarifying their initial position, repairing their image, and adjusting their position. Firms will not easily fold under pressure but will gradually yield when the pressure reaches a certain level and then move from symbolic to substantive action (D. van Halderen et al., 2016). Although firms' environmental awareness has increased owing to regulatory, competitive, and marketing pressures, such awareness will not immediately lead to the adoption of green supply chain practices (Zhu et al., 2005). When firms' image management motivation increases further, they will be forced to forgo their self-concern and address the interests of others and their social environment and thus engage in green-oriented behaviors (Zhang et al., 2019). In other words, only when firms have high image management motivation will they be forced to adopt a green supply chain under coercive, normative, and mimetic pressures. Based on the above discussion, we propose the following hypotheses.

Hypothesis 6c. Image management motivation will positively moderate the relationship between coercive pressure and a firm's green supply chain adoption.

Hypothesis 6d. Image management motivation will positively moderate the relationship between normative pressure and a firm's green supply chain adoption.

Hypothesis 6e. Image management motivation will positively moderate the relationship between mimetic pressure and a firm's green supply chain adoption.

2.5 Green supply chain adoption and environmental performance

Environmental performance refers to the achievement and effect of environmental pollution management on the business activities of a firm, including the reduction of wastewater, waste gas, waste, and other harmful substances, to improve its material and energy use efficiency (Nakashima et al., 2006). Firms can build a green supply chain integration mechanism that incorporates environmental standards with the code of conduct of their employees, their business decisions, resource management, and other links. Through information sharing, collaboration, and other internal and external integration mechanisms, firms in a supply chain can improve their internal, supplier, and customer information-processing capabilities; reduce uncertainties in their green product and green process innovation; and indirectly improve their environmental performance (Wong et al., 2020). At the same time, green supply chain management practices, such as green procurement, investment recovery, and customer participation in environmental issues, can help improve firms' environmental performance (Zhu et al., 2012). In summary, when firms switch from the traditional to a green supply chain, they will be expected to show a marked improvement in their environmental performance. Thus, we propose the following hypothesis.

Hypothesis 7. A firm's green supply chain adoption will have a positive impact on its environmental performance.

2.6 Green supply chain adoption and new-product development performance

The rapid changes in the market have substantially intensified competition among firms. Only by constantly developing new products can a firm meet the needs of and create value for its customers (Kavadias and Ulrich, 2020). New-product development performance refers to the extent to which a firm can successfully sell new products. This type of performance includes the financial and nonfinancial results of a firm attempting to develop new products and can be measured using multiple indicators, such as profit, return on investment, market share, and sales revenue (Najafi Tavani et al., 2013). Green supply chain management is viewed by many firms as a future development direction. To meet the environmental protection needs of their partners and customers, firms must change their new-product development strategies (Millson and Wilemon, 2006). In addition, firms should adopt green supply chain management practices in their green procurement, ecological design, internal environmental management, customer cooperation, and investment recovery to achieve a circular economy (Bag et al., 2022). When firms switch to green supply chain management, they will be expected to frequently introduce green products into the market. By introducing new green products that can meet the expectations and demands of the government, the society, and the public, firms can substantially improve their new-product development performance. Thus, we propose the following hypothesis.

Hypothesis 8. A firm's green supply chain adoption will positively affect its new-product development performance.

3 Methodology

3.1 Sampling and data collection

To examine the proposed hypotheses, we collected data on manufacturing firms in China through a survey. We believe that China is an ideal research setting to examine our conceptual framework. First, China is currently the second-largest economy in the world in terms of the nominal GDP and the largest emerging economy, accounting for a large proportion of the global economic growth. According to the World Bank, China is the largest contributor to world economic growth by contributing around 39%, on average, to the global economic growth during the period of 2013–2021, which exceeded the total contribution of the G7 economies. Second, China has become one of the most crucial and influential economies in the world in facilitating and leading green technology innovation. China implemented a series of policies to encourage and support market-oriented green technology innovation activities. The market-oriented green technology innovation system is expected to be largely improved by 2025 owing to China's green technology innovation for its green and low-carbon development. Last, as China aims to pursue low-carbon and sustainable growth in the long term, many firms are embracing China's rapid transition to a green economy and thus investing considerably in green innovation to seize new business opportunities. Hence, an increasing number of firms in China are improving their green innovation capabilities as a response to the country's long-term goal of sustainable development.

To collect the data, we carefully designed the survey process. We randomly selected a sample of 600 firms from a list of Chinese manufacturing firms offered by a marketing research company. To develop the survey questionnaire, we first created an English questionnaire and then translated it into Chinese, with the assistance of two professional bilingual translators. To further ensure conceptual equivalence between the original English and translated Chinese versions of the questionnaire, we back translated the Chinese version into English, with the help of two additional bilingual translators (Brislin, 1980). In addition, before formally administering the survey, we conducted a series of in-depth interviews with senior managers of the Chinese firms to check the validity of our measures, then further modified some questionnaire items based on the feedback from the interviews. Conducting a survey on and collecting reliable data from firms in China are known to be challenging. The development of a positive relationship with the respondents is important to enhance the response rate and improve the quality of the survey data (Peng and Luo, 2000). Thus, we hired a highly renowned marketing research company with extensive experience in collecting firm data to conduct the formal survey and maintained a positive

relationship with the firms in the local Chinese market. With our careful survey procedure, we received a total of 358 responses. We obtained 246 useable responses after excluding 12 responses that had a number of missing values for some key variables, which represented an effective response rate of 41.0%.

Nonresponse bias may occur in a survey-based research; hence, we checked for potential nonresponse bias by comparing the early and late responding firms in terms of key firm characteristics (e.g., number of employees and firm age). The results of the t-statistics indicated that no statistically significant differences existed between the early and late responding firms in terms of the number of employees and firm age. Therefore, nonresponse bias was not likely a serious concern in our study (Armstrong and Overton, 1977). In addition, we checked for possible common method variance (CMV), which may emerge in the collection of self-reported data through a survey. Therefore, we performed Harman's one-factor test by conducting principal component factor analysis, with all the items for the multiple-item constructs included. The results of the unrotated factor analysis demonstrated that no general apparent factor emerged in the factor analysis and accounted for most of the variance (i.e., greater than 50%), with the first factor accounting for only 48.3% of the total variance in the data. Therefore, CMV was not likely a serious concern in our study.

3.2 Variables and measurement

To measure the variables, namely, the dependent, independent, and moderating variables, we used multiple-item seven-point Likert scales (1 = strongly disagree to 7 = strongly agree). All the measurement scales were well developed and widely used in the literature, which we further modified for our study.

Following prior research (e.g., Chen et al., 2006; Xie et al., 2019; Wang et al., 2021; Zameer et al., 2021), we measured green process innovation using three items asking the respondents to assess their level of green process innovation. Similar to prior studies (e.g., Chang, 2018; Xie et al., 2019; Chen and Liu, 2020; Wang et al., 2021), we used a five-item scale to measure the firms' degree of green product innovation. To measure the three types of pressures (i.e., coercive pressure, normative pressure, and mimetic pressure), we systematically reviewed relevant prior studies. Following the literature (e.g., Dubey et al., 2016; Bag et al., 2022), we adopted four items to measure the degree of perceived coercive pressure and normative pressure and three items to measure the degree of perceived mimetic pressure. Following prior studies (e.g., Sarkis et al., 2010; Mitra and Datta, 2014; Asif et al., 2020), we measured the firms' green supply chain adoption using seven items. To measure the degree of the firms' image management motivation, we adopted four items from the literature (e.g., Yun et al., 2007; Philp and Nepomuceno, 2020; Cheng et al., 2022). Furthermore, to measure the firm performance outcomes, we used two subdimensional performance measures (i.e., environmental performance and new-product development performance). Following prior studies (e.g., Seman et al., 2019; Zameer et al., 2021), we adopted five items to measure the firms' environmental performance. Following prior studies (e.g., Jeong et al., 2006; Xiao et al., 2021), we adopted six items to measure the firms' new-product development performance. The items asked the respondents to assess the broad dimensions of their firm's new-product development performance relative to that of their main competitors in the industry over the past 3 years. In addition, we incorporated a number of controls into the analysis to rule out any alternative explanations, including firm size, firm age, and industry type. Following prior research (e.g., Park and Xiao, 2020; Xiao et al., 2021), we measured firm size using the logarithm of the number of employees and firm age using the number of years since the establishment of the firm. To control for the potential effect of industrial differences, we created a dummy variable that took the value of 1 if the firm domain was industrial and 0 for other domains (Park and Xiao, 2021).

4 Empirical analyses and results

4.1 Construct reliability and validity

We empirically tested the hypotheses by performing partial least squares structural equation modeling with SmartPLS (Richter et al., 2016). We first examined the reliability and validity of the measures before testing the hypotheses. The results are reported in Table 1, which presents the mean, standard deviation, factor loading, and reliability and validity of each construct and its indicators. As shown in Table 1, the factor loading of all the constructs was statistically significant and higher than 0.80, which indicated the strong reliability of the measurement model (Chin, 1998; Hulland, 1999). In addition, we checked the reliability of each construct by calculating its Cronbach's alpha and composite reliability (CR) values and found that all the Cronbach's alpha and CR values were higher than 0.80, which clearly exceeds the 0.70 cutoff (Nunnally, 1978; Fornell and Larcker, 1981) and provided further evidence of the reliability of the measurement model. To further check the reliability and convergent validity of the measures, we adopted the approach recommended by Fornell and Larcker (1981); that is, we calculated the average variance extracted (AVE) value of each construct. The results in Table 1 demonstrated that the AVE value of all the constructs was higher than 0.7, which exceeds the 0.50 cutoff and provided strong evidence of the adequate convergent validity and reliability of all the measures used in our study (Fornell and Larcker, 1981).

To assess the discriminant validity of the constructs used in the study, we compared the square root of the AVE of each construct and the absolute value of the correlation between a construct and all the other constructs. The results of the discriminant validity testing are reported in Table 2, which suggested that the square root of the AVE of each construct was greater than the absolute value of the correlation between a construct and all the other constructs, which provided strong evidence of the adequate discriminant validity of the measures we adopted for our study (Fornell and Larcker, 1981). Following the approach recommended by Henseler et al. (2015), we further checked the discriminant validity of the measures by assessing the heterotrait-monotrait ratio (HTMT) of the correlations. The results of our HTMT testing indicated that all the HTMT correlation values were not higher than 0.85, which provided further evidence of the adequate discriminant validity of all the measures we used in our study. Last, we assessed the predictive validity of each latent construct using Stone–Geisser's Q2 (Stone, 1974; Geisser, 1975). The results of our predictive validity assessment suggested that the cross-validated communality and redundancy values were greater than zero, which provided strong evidence of the predictive validity of the model (Fornell and Cha, 1994).

TABLE 1 Descriptive statistics and validity assessments.

Construct and indicators	*Mean*	*STD*	*FL*
Green process innovation (AVE = 0.825, alpha = 0.894, CR = 0.934)			
Our firm is engaged in processes that reduce the emission of hazardous material	5.207	1.162	0.912
Our firm is engaged in processes that reduce consumption of electricity, water, gas, and petroleum	5.240	1.170	0.896
Our firm is engaged in processes that recycle, reuse, and reproduce material and decrease the use of raw material	5.386	1.197	0.918
Green product innovation (AVE = 0.799, alpha = 0.937, CR = 0.952)			
Our firm chooses the materials of the product that produce the least amount of pollution for conducting product development or design	5.419	1.331	0.894
Our firm chooses the materials of the product that can reduce the harmful effects to health	5.451	1.231	0.895
Our firm chooses the materials of the product that consume the least amount of energy and resources for conducting product development or design	5.329	1.307	0.913
Our firm uses the least amount of materials to comprise the product for conducting product development or design	5.329	1.207	0.888
Our firm would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting product development or design	5.451	1.261	0.878
Coercive pressure (AVE = 0.826, alpha = 0.930, CR = 0.950)			
There are a large number of environmental regulations or restrictions imposed by the government on our firm's industry	5.337	1.357	0.908
There are frequent government inspections or audits on our firm to ensure that the firm is in compliance with environmental laws and regulations	5.362	1.378	0.894
Our firm tries to reduce or avoid the threat of current or future internal environmental legislations through adopting green innovation	5.289	1.260	0.908
Financial incentives offered by the government, such as grants and tax reductions, are significant motivators for our firm to adopt green innovation	5.203	1.440	0.924
Normative pressure (AVE = 0.783, alpha = 0.908, CR = 0.935)			
Industrial associations or professional organizations encourage our firm to take energy-saving measures	5.443	1.177	0.879
The public expects our firm to adopt energy-saving measures	5.533	1.208	0.895
Customers expect to cooperate with firms with strong energy-saving awareness	5.508	1.182	0.895
The adoption of energy-saving measures in the industry is high	5.626	1.209	0.870
Mimetic pressure (AVE = 0.810, alpha = 0.883, CR = 0.927)			
Our competitors who have adopted green supply chain have greatly benefitted	5.207	1.041	0.896
Our competitors who have adopted green supply chain are favorably perceived by others in the same industry	5.252	1.064	0.907
Our competitors who have adopted green supply chain are favorably perceived by their suppliers and customers	5.224	1.076	0.897
Image management motivation (AVE = 0.834, alpha = 0.934, CR = 0.953)			
Our firm is concerned that other firms will think we made a poor choice	5.215	1.293	0.922
Our firm thinks other firms will think we are smart for adopting green supply chain	5.211	1.327	0.914
Our firm worries that other firms will think we are stupid for adopting green supply chain	5.293	1.302	0.908
Our firm is NOT concerned that other firms will think we are stupid for adopting green supply chain	5.297	1.315	0.910
Green supply chain adoption (AVE = 0.793, alpha = 0.956, CR = 0.964)			
Our firm invests resources in programs in the design for disassembly, reuse, recycling, recovery of material, components, parts	5.411	1.303	0.884
Our firm invests resources in programs in the environmentally friendly product design	5.455	1.330	0.905
Our firm invest resources in programs in the effective management of environmental risks affecting our business	5.435	1.341	0.898
Our firm invest resources in programs in the environmental improvement of packaging and transportation	5.402	1.290	0.909
Our firm invest resources in programs in the improvement of our enterprise's overall environmental situation	5.341	1.321	0.909
Our firm invest resources in programs in the environmentally friendly manufacturing processes	5.358	1.304	0.893

(Continued on following page)

TABLE 1 (*Continued*) Descriptive statistics and validity assessments.

Construct and indicators	*Mean*	*STD*	*FL*
Overall, our firm tend to invest resources in adopting green supply chain management	5.427	1.400	0.835
Environmental performance (AVE = 0.731, alpha = 0.908, CR = 0.931)			
In our firm, there is a reduction of air emission level compared it to 3 years ago	5.476	1.181	0.867
In our firm, there is a reduction of water wastage level compared it to 3 years ago	5.472	1.202	0.807
In our firm, there is a reduction of soil wastes level compared it to 3 years ago	5.492	1.281	0.853
In our firm, there is a decrease of consumption for hazardous/harmful/toxic materials compared it to 3 years ago	5.435	1.200	0.886
In our firm, there is overall improvement of an environmental situation relative to the main competitor(s) in 3 years ago	5.411	1.290	0.858
New product development performance (AVE = 0.796, alpha = 0.949, CR = 0.959)			
New products/services at our firm generally achieve its market share objectives	5.134	1.534	0.860
New products/services at our firm generally achieve its sales and customer use objectives	5.110	1.588	0.912
New products/services at our firm generally achieve its sales growth objectives	5.289	1.418	0.892
New products/services at our firm generally achieve its profit objectives	5.329	1.452	0.898
Our new products/services meet their performance objectives	5.297	1.456	0.907
Overall, our new products/services are successful	5.285	1.538	0.884

Note: N = 246. AVE, average variance extracted; CR, composite reliability; STD, standard deviation; FL, factor loading. Due to space constraints, detailed measurement items are omitted, which are available from the authors upon request.

TABLE 2 Correlations among the variables and discriminant validity.

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Firm size	–											
2. Firm age	0.298	–										
3. Industry type	−0.016	0.020	–									
4. Green process innovation	0.054	0.084	0.056	***0.909***								
5. Green product innovation	0.010	0.051	−0.023	0.575	***0.894***							
6. Coercive pressure	0.018	0.104	0.025	0.594	0.611	***0.909***						
7. Normative pressure	−0.040	0.028	0.008	0.562	0.636	0.558	***0.885***					
8. Mimetic pressure	0.168	0.097	0.094	0.561	0.583	0.513	0.565	***0.900***				
9. Image management motivation	0.068	0.019	−0.044	0.365	0.323	0.300	0.325	0.407	***0.913***			
10.Green supply chain adoption	0.025	0.059	0.010	0.633	0.702	0.688	0.634	0.597	0.268	***0.891***		
11. Environmental Performance	0.063	0.091	−0.013	0.502	0.620	0.522	0.565	0.466	0.252	0.644	***0.855***	
12. New product development performance	−0.045	0.053	0.003	0.588	0.641	0.661	0.547	0.446	0.328	0.678	0.530	***0.892***

Note: *N* = 246. Values in italicized bold denote the square root of the average variance extracted (AVE) of each construct.

4.2 Hypothesis assessment

After examining the measurement model to check the reliability and validity of the measures we used in our study, we tested the hypotheses on the internal and external forces that may drive firms to adopt a green supply chain and the conditions under which such forces more or less matter as well as how the adoption of a green supply chain may matter for firms to improve their environmental and new-product development performance. Thus, we conducted structural model analysis. Multicollinearity may emerge and become a serious concern; thus, we examined the variance inflation factor (VIF) values. The results of our VIF assessment suggested that all the VIF values were below 4.56, which is fairly below the commonly recommended cutoff of 10 (Hair et al., 1998). Therefore, multicollinearity was not likely to be a serious issue in our analysis (Burns and Bush, 2000). Nevertheless, we mean centered all the independent and moderating variables to further address the multicollinearity concerns when we developed the interaction terms for examining the moderating effect of image management motivation.

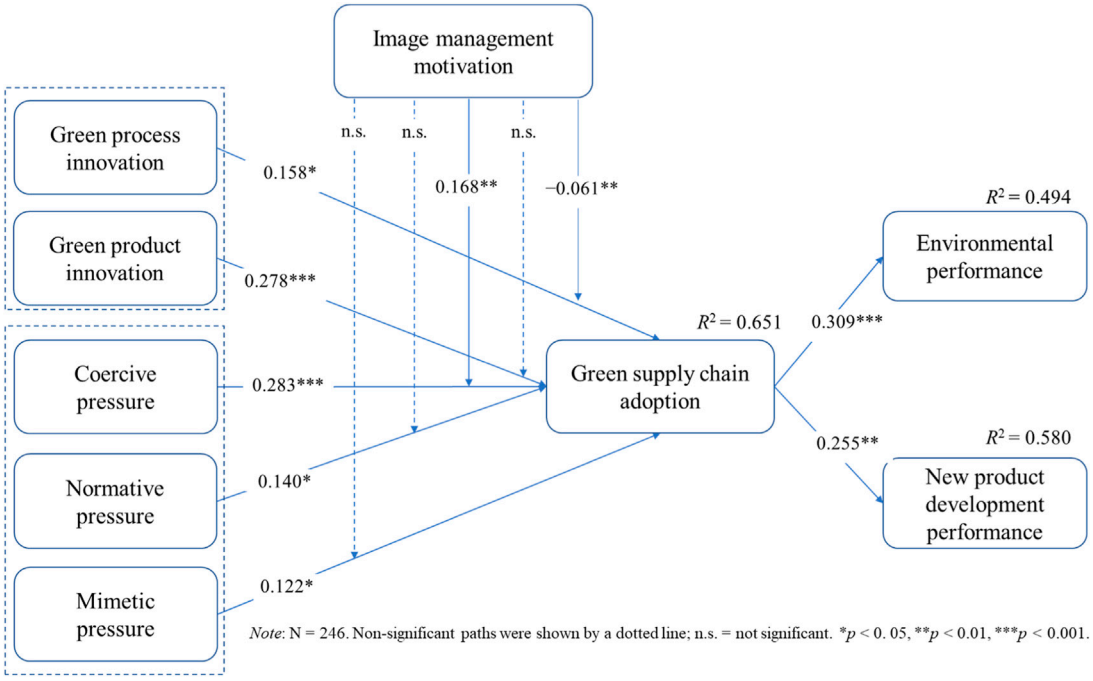

FIGURE 2
Estimated results from the structural equations analysis.

The results of the structural equation analysis are reported in Figure 2. Specifically, the coefficient of determination R^2 was 0.651, 0.494, and 0.580 for green supply chain adoption, environmental performance, and new-product development performance, respectively. The high coefficient of determination R^2 demonstrated the adequate explanatory power of our structural model analysis. Then, we examined each hypothesis by assessing its path coefficient. The path coefficient results in Figure 2 suggested a significant positive relationship between the green process innovation (b = 0.158, $p < 0.05$), green product innovation (b = 0.278, $p < 0.001$), coercive pressure (b = 0.283, $p < 0.001$), normative pressure (b = 0.140, $p < 0.05$), mimetic pressure (b = 0.122, $p < 0.05$), and green supply chain adoption of the firms in China's manufacturing sector. In other words, the manufacturing firms in China, which pursue green process and green product innovation and experience strong coercive, normative, and mimetic pressures, are likely to adopt a green supply chain; thus, Hypotheses one to five were supported.

Furthermore, we assessed the potential role of image management motivation in moderating the effect of green process and green product innovation and coercive, normative, and mimetic pressures on green supply chain adoption. The results in Figure 2 suggested that contrary to our expectations, image management motivation played a statistically significant but negative moderating role in the relationship between green process innovation and green supply chain adoption (b = −0.061, $p < 0.01$); thus, Hypothesis 6a was rejected. However, as expected, we observed the statistically significant and positive moderating effect of image management motivation on the relationship between coercive pressure and green supply chain adoption (b = 0.168, $p < 0.01$); thus, Hypothesis 6c was supported. Contrary to our expectations, the results in Figure 2 show that the moderating effect of image management motivation on the relationship between green product innovation, normative pressure, mimetic pressure, and green supply chain adoption was statistically insignificant. Therefore, Hypotheses 6b, 6d, and 6e were not supported. Last, we examined the contribution of green supply chain adoption to the environmental and new-product development performance of the manufacturing firms in China. As shown in Figure 2, green supply chain adoption was statistically and positively associated with environmental (b = 0.309, $p < 0.001$) and new-product development (b = 0.255, $p < 0.001$) performance. Therefore, Hypotheses 7 and 8 were strongly supported. We discuss the potential implications of the results in the succeeding section.

5 Discussion and implications

5.1 Discussion and theoretical contributions

In this study, we attempt to determine why and the conditions under which firms may adopt green supply chain practices and the conditions under which firms can benefit from green supply chain adoption to enhance their environmental and new-product performance. We theorize and examine the central questions by developing and testing hypotheses on how internal green process and green product innovation and external institutional pressures can affect the adoption of a green supply chain. Our results demonstrate that relevant internal and external forces must be considered to understand why firms will likely adopt green supply chain practices and how the adoption of a green supply chain will benefit firms. In addition, we further theorize and examine

how firms' image management motivation may moderate the effects of internal and external forces on the adoption of a green supply chain. Our study makes important contributions to the rapidly emerging literature on green supply chain management and circular economy implementation.

First, our empirical analysis reveals that green process and green product innovation have a significantly positive impact on the firms' transformation and adoption of a green supply chain, thereby extending the literature on green process and green product innovation. Green innovation can help firms gain a competitive advantage, eliminate pollutant emissions from the source in the supply chain (Chen and Liu, 2020), improve their resource and energy utilization efficiency (Severo et al., 2017; Xie et al., 2019), and coordinate the relationship between their supply chain and natural environment in a positive way and promote the transformation of their traditional supply chain into a green supply chain. In other words, firms should first improve their green product and green process innovation ability or adopt green supply chain practices before attempting to transform their traditional supply chain.

Second, coercive, normative, and mimetic pressures have a significantly positive effect on the firms' adoption of a green supply chain. Among the different types of pressures, coercive pressure from the government exerts the greatest influence on the adoption of a green supply chain. As emphasized in the literature, though firms may increase their environmental awareness in response to multiple pressures, including regulation, competition, and marketing pressures, the increased awareness will not bring about substantial changes in their green supply chain practices (Zhu et al., 2005). However, our results demonstrate that to motivate firms to adopt a green supply chain, the government may motivate them to pay considerable attention to environmental issues and force them to assume additional environmental responsibilities by implementing government policies, laws, regulations, and industry standards and raising the environmental protection awareness of various stakeholders, such as consumers. Thus, firms will have no choice but to comply with such policies to avoid administrative punishment, receive tax incentives (Nie et al., 2016; Russi et al., 2016), and gain industry access and social recognition (Zhu et al., 2013; Chu et al., 2017). When high coercive and normative pressures are imposed on firms, they will likely adopt a green supply chain.

Previous studies showed that the successful adoption of green strategies by competitors will typically exert mimetic pressure on other firms to emulate their competitors and succeed (Chu et al., 2018; Qin et al., 2021). The results of our study support this argument and suggest that the government should consider introducing a highly market-oriented competition mechanism to motivate and encourage firms to adopt a green supply chain. The government can also encourage firms to make full use of their competitive advantage to compete in a green supply chain. In addition, the government should create an excellent business environment for firms that adopt a green supply chain by actively promoting and rewarding those that are committed to utilizing advanced technologies for a green supply chain or are in the process of adopting a green supply chain.

Firms' image management motivation plays a significantly negative moderating role in the relationship between green process innovation and green supply chain adoption. In other words, the positive influence of firms' green process innovation on their green supply chain adoption will weaken as their image management motivation grows, which contradicts our hypothesis. Green process innovation generally requires the improvement of the whole process at the operational and management levels; thus, the process will consume a large amount of manpower, capital, and time, which can prevent a firm from improving its corporate image (Li et al., 2017). When individuals' image management motivation increases further, they will forgo their self-concern under pressure and choose to address the interests of others and their social environment and then engage in green behaviors (Zhang et al., 2019). However, when firms expect to improve their image within a short period of time while consuming limited resources, their excessively high image management motivation will negatively affect their green supply chain adoption and will not improve their green process innovation ability. This new finding extends the application of image management theory. Moreover, image management motivation has no significant moderating effect on the relationship between green product innovation and green supply chain adoption. Previous studies showed that the driving effect of green product innovation is influenced by internal and external factors such as technological capability, green demand, and company laws and regulations (Cai and Zhou, 2014). For firms, green product innovation can bring about new products that can realize a high resource utilization rate and low pollution emissions, which can help firms not only gain a competitive advantage but also eliminate pollutants from the source in their supply chain (Chen and Liu, 2020). Green product innovation has become increasingly common among firms attempting to adopt green supply chain practices and plays a critical role in driving such firms to adopt a green supply chain regardless of their image management motivation.

Furthermore, firms' image management motivation has no moderating effect on the relationship between either normative or mimetic pressure and their green supply chain adoption. However, image management motivation has a significantly positive moderating effect on the relationship between coercive pressure and firms' green supply chain adoption, which is consistent with the findings of prior research. In other words, as highlighted in the literature, firms may spare no expense in building their market, employer, financial, and corporate social responsibility images to leave a strong and lasting impression on their stakeholders (Highhouse et al., 2009). In terms of new-product development, to avoid violating government policies and regulations, firms will actively meet their consumers' environmental demands through new-product development and strive to create a positive image in the mind of their stakeholders (Chen, 2010). The results of our study can provide additional support for this argument by demonstrating that firms emphasize the importance of image management in their green supply chain adoption. In view of the important role of image management motivation in encouraging firms to adopt a green supply chain, the government may consider introducing incentive mechanisms that can guide or further encourage firms to adopt a green supply chain. For example, the government may identify some role model firms that have successfully adopted a green supply chain at the national, provincial, and regional levels, which would inspire other firms and innovators to adopt a green supply chain.

Last, consistent with the findings of previous studies, firms' adoption of a green supply chain plays a critical role in enhancing their environmental and new-product development performance.

Firms can adequately improve their environmental performance by adopting green supply chain practices, such as green procurement and investment recovery, and encouraging customer participation in environmental issues (Zhu et al., 2012; Wong et al., 2020). Green supply chain adoption can also improve the performance of new products and thus provide firms with strong motivation to adopt such a supply chain. Firms may also adopt green supply chain practices as an efficient mechanism to successfully develop new products.

5.2 Managerial implications

The results of our study can provide important implications for firms to effectively manage their supply chain. First, green product and green process innovation are important factors that can promote firms' adoption of a green supply chain. Thus, firms should pay attention to the importance of successful green product and process innovation in achieving successful green supply chain management. Moreover, given the important role of institutional pressures in promoting green supply chain adoption, especially as environmental protection and green development have increasingly become central national policies, firms should proactively carry out green innovation to successfully transform their traditional supply chain into a green-oriented one instead of passively reacting to the institutional pressures imposed on them. In other words, firms should be aware of the importance of actively, rather than passively, transforming environmental institutional pressures into motivation to adopt a green supply chain. In addition, image management motivation plays a negative moderating role in the relationship between green process innovation and green supply chain adoption, which may imply that firms' pursuit of short-term interests may prevent them from building a green supply chain through green process innovation. Therefore, firms should actively engage in green process innovation from a long-term perspective and establish an environmental image in the mind of the government and the public. Our results also demonstrate that the firms' green supply chain adoption positively contributes to their environmental and new-product development performance. Therefore, firms should be aware of the importance of adopting a green supply chain in enhancing their environmental and new-product development performance and make great strides in their green supply chain adoption. Specifically, firms should increase their investment and effort in environmental protection and integrate the concept of green and environmental protection into their daily business activities. Overall, the environmental and new-product development performance of firms can help in not only their vigorous green product and green process innovation but also the resolution of national environmental problems.

The results of our study can also offer important implications for policymakers. The government should play an important role in driving firms to adopt a green supply chain, with the aim of solving environmental protection and economic development issues, by utilizing different environmental regulations, considering that coercive, normative, and mimetic institutional pressures can positively promote firms' green supply chain adoption. The government should also guide and strengthen its policy support and other institutional mechanisms to encourage firms to adopt a green supply chain. Furthermore, given the importance of green product and green process innovation in driving firms' green supply chain adoption, the government should provide effective institutional incentives and support that will encourage or help firms achieve successful green product and green process innovation. The government should also build a green supply chain ecosystem that would guide the healthy development of firms, improve its legal system, implement environmental laws and regulations that will encourage firms to assume additional corporate environmental responsibilities, and emphasize the importance of building a well-developed overall mechanism that will coordinate the environmental responsibility efforts of various firms. Image management motivation positively moderates the contribution of coercive pressure to green supply chain adoption; hence, the government should focus on monitoring and inspecting heavy-polluting firms and increase its support for green supply chain development and green technology research and development at all levels. To do so, different government levels should guide and support firms in their pollution prevention activities, organize green supply chain competitions, improve green procurement standards, and highlight the importance of green and low-carbon product procurement. In addition, the government should actively offer incentives, such as tax reductions and investment subsidies, to firms or firm projects that have achieved success in green product innovation, green process innovation, and the establishment of a green supply chain; establish a continuous monitoring and evaluation process; and contribute to the evaluation of the impact of its relevant policy regulations and measures. To help firms fully understand the importance of developing and adopting a green supply chain, the government should impose relevant institutional pressures, such as regulations, laws, policies, and industry standards. To create an environment for firms that is conducive to develop and adopt a green supply chain, the government must integrate and make full use of various institutional forces to guide and encourage society to focus on green supply chain development.

5.3 Limitations and avenues for future research

Our study has some limitations that may provide several important avenues for future research. First, our focus on Chinese firms may raise concerns about the generalizability of our findings to other research contexts. Given the heterogeneity of competitive, cultural, and institutional environments across different economies, our findings based on Chinese manufacturing firms may not apply to firms in the service industry or those in advanced developed or other emerging economies. Therefore, future research should examine the validity of our conceptual framework by collecting a complete and rich dataset from other industries or economies. Conducting comparative studies may enable scholars to further examine our conceptual framework and improve our understanding of the environment and its impact on firms' strategic green innovation or green supply chain behaviors and practices. Second, our study focuses on the factors that may drive firms' green supply chain adoption. However, the transformation of a supply chain and

adoption of a green supply chain may involve highly complex and specific components or links within the green supply chain, such as green procurement, green manufacturing, green sales, green consumption, green recycling, and green logistics. Thus, we encourage future studies to further examine the specific components or dimensions of green supply chains and deepen our knowledge of the drivers of green supply chain adoption and its contribution to the environmental or new-product development performance of firms. Third, our study investigates only the effect of green product and green process innovation. Firms may have developed various competitive strategies to build their green innovation capabilities, and such strategies warrant further examination. Last, our research considers only two performance dimensions, namely, environmental and new-product development performance. Future research may extend our research by testing the effect of green supply chain adoption on other performance dimensions, such as cost- and flexibility-related performance outcomes, which may provide a complete picture of the impact of green supply chains. However, despite its limitations, we are confident that our study will serve as a stepping stone for the advancement of green supply chain research and stimulate future research to link green supply chain management with other innovative strategies, capabilities, and outcomes in different economies and contexts.

6 Conclusion

Owing to their increasing environmental awareness, people no longer pay attention to the innovation of simple green products and have become concerned about the entire process, from raw material procurement to sales on the market. This new trend has increasingly motivated firms to adopt a green supply chain. By integrating the ELM, institutional theory, and the image management perspective, we develop an integrative model to explore the influence of the internal and external forces driving the decision of firms to adopt a green supply chain, which in turn may positively contribute to their environmental and new-product development performance. In addition, we further examine how firms' image management motivation may moderate the effect of such forces on their green supply chain adoption. We empirically test our conceptual framework using survey data collected from a sample of 246 Chinese manufacturing firms, and the results provide broad support for our hypotheses. Our study makes important contributions to the literature by expanding the scope of green supply chain research and offers useful guidelines for firms engaged in green supply chain management.

Data availability statement

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

All the listed authors have made substantial, direct, and intellectual contributions to the work and have approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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