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INSTITUTIONAL PRESSURES AND GREEN INNOVATION: A CASE OF CHINESE CHEMICAL COMPANIES

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ABSTRACT

This paper aims to explore the vital role of institutional pressures to improve Chinese chemical companies' implementation of green innovation. Data were collected from 414 chemical companies on the Chinese southeast coast using a quantitative survey questionnaire. This study uses the partial Least Square Structural Equation Modeling (PLS-SEM) for the purpose of data analysis. The analysis results revealed that coercive, normative, and mimetic pressures all directly positively impact green innovation. This study is one of the few that explore the institutional pressures as motivational role on green innovation adoption in Chinese chemical companies. The major contribution of this study is that it broadens the use of green innovation by integrating major and recent constructs in the green innovation literature while also providing instructive managerial implications through empirical evidence.

Keywords: *Institutional pressures; Green innovation; Chinese Chemical Sector; PLS-SEM*

INTRODUCTION

The increasing recognition of environmental pollution has led to a substantial surge in a significant rise in the attention given to ecological issues by a wide range of organizations worldwide (Chen et al., 2019). As a result, international discussion on environmental sustainability has grown in prominence worldwide. Consistent with the tenets of sustainable development, manufacturing enterprises across the globe are progressively shifting from a profit-driven approach to one that considers both economic and environmental objectives to fulfill the rising demands for sustainable environmental practices (Shafiq, 2021). Compared with developed countries, developing countries like China have been facing many environmental issues in the past few decades as its economy expands. According to the Ministry of Ecology and Environment (2022), the negative economic impact of ecological damage in China amounted to 0.78 trillion yuan, while the cost of pollution loss reached 1.5 trillion yuan in the year 2021. Thus, these costs can be seen as economic damage caused by unsustainable development practices, ultimately hindering Chinese long-term economic growth and development.

Additionally, environmental degradation can have a severe impact on human health, as well as on the overall quality of life of the population. European Environment Agency (2023) released that air pollution is responsible for 10% of all cancer incidences in Europe. Similarly, Ma et al. (2023) mentioned that the rapid economic growth in the eastern region of China has substantially increased industrial pollution. In 2022, this region, known for its high industrial activity, was responsible for more than half (53.75%) of the cancer villages. To summarize, China's chemical industry has long been an important contributor to the nation's heavily industrialized economy, yet, it continues to be associated with significant environmental issues, including pollution and greenhouse gas emissions.

Based on institutional theory, institutional pressures (including coercive, normative, and mimetic pressure) must reshape the organization's business strategy and organizational processes to explore new opportunities and develop emerging markets (Teece, Pisano, and Shuen, 1997). The sharply increasing environmental pollution issues have significantly impacted the enterprise's environmental management (Qi et al., 2021). Under this condition, institutional pressures have pushed companies (Lisi et al., 2019) to adopt and implement green activities and practices, like green innovation, to satisfy legitimacy and environmental sustainability requirements. Based on this background, we found that Chinese chemical companies have been stressed by institutional pressures (coercive, normative, and mimetic pressure) to adopt green practices to satisfy environmental sustainability requirements and organizational legitimacy (Lisi et al., 2019). A swelling rank of scholars agree to meet the external stakeholder's requirements. Chemical companies must improve their green capacities to survive and develop in a complex and changing competitive environment (Borsatto & Amui, 2019). On the other hand, there is an ongoing debate regarding this relationship. For instance, one holds a long-held economic viewpoint that institutional pressures limit chemical companies' motivation to pour money in green innovation (Ren et al., 2018). Some managers believe adopting green innovation into the production processes to meet external pressures is irresponsible for the company's performance (Ge et al., 2018). To tackle this conflicting view, this study utilizes the institutional theory to examine how institutional pressure affects green innovation adoption in Chinese chemical companies.

Green innovation refers to organizational practices that promote environmental innovation and provide legitimacy for institutional pressures (Chen et al., 2018). Due to the struggle between resource restrictions and environmental harm experienced by Chinese chemical firms, the transfer of industrial organizations' primary attention to green innovation is particularly relevant. Combined with institutional theory and green innovation literature review, it is not difficult to find that institutional pressures as motivation factors influence green innovation adoption (Burki, 2018; Kawai et al., 2018; Qi et al., 2021). Furthermore, Li et al. (2019) stressed that green innovation as a sustainable environmental management practice is considered a meaningful way to satisfy a company's sustainability development. However, compared with developed countries, developing countries (like China) have their own concerns about adopting green innovation (Ning et al., 2022). Ge et al. (2018) mentioned that most Chinese managers decide against updating green innovation because they consider it to be a high-risk, high-investment, and long-return, and investment returns cannot be realized in the short term. Many Chinese chemical companies will be conflicted because they are unable to balance the issues of cost and legality. Some may even take the risk of ignoring external pressures and simply considering maximizing short-term gains. To solve this issue, this paper offers empirical findings to managers on adopting green innovation, elucidating the link between institutional pressures and green innovation in Chinese chemical companies.

The following are the primary contributions of this study. We combine institutional theory with green innovation literature to uncover the unexplored driving pressures of green innovation (Li et al., 2016). Plus, we highlight the Chinese context, which differs from most previous studies,

emphasizing more developed countries. Since there are significant differences between developed and developing countries, this furthers the value of theoretical completion.

This study reviews the literature on institutional pressures and green innovation and builds a new theoretical framework. Next, this research performs an empirical test to confirm the relationship between those key factors. More specifically, three hypotheses were proposed and investigated. In the last part, this study mentions the conclusion and discussion of the findings, implications, and upcoming study.

RESEARCH BACKGROUND AND HYPOTHESES DEVELOPMENT

Theoretical review

This study draws upon the institutional theory to explore and clarify the relation between institutional pressures and green innovation in the context of the Chinese chemical sectors. The notion of institutional pressures in influencing the adoption of green innovation can be examined from the institutional theory standpoint. Huang & Chen (2022) states that once companies are institutionally recognized, they have the meaning of existence. In other words, green innovation emphasizes social responsibility. Based on this view, institutional theory largely dominates the company's green practices adoption (e.g., Junqi Liu et al., 2020; Singh et al., 2022). The institutional theory was proposed by DiMaggio and Powell (1983), who pointed out several institutional pressures in the organizational management field, such as regulatory bodies (coercive), resource and product consumers (normative), and other firms that produce similar products and services (mimetic). In particular, coercive pressure refers to the official and informal pressures on the company to comply with social culture, political and legal obligations (Burki & Ersoy, 2019). For example, companies are applying pollution control technology in response to governmental regulations. In contrast, normative pressure is associated with professionalization. As Saeed et al. (2018) highlighted, company managers arrange to specify their working procedures and environment to satisfy the professional organization's requirements. In this context, normative pressure harmonizes business behavior among all industry members, including suppliers, end-users, and competitors (Agarwal et al., 2018). Conversely, mimetic pressure emerges from business environment uncertainty. When top managers are uncertain about their business execution due to new business or advancements in technology, they will likely try to imitate and learn from successful firms, particularly their competitors (Choi et al., 2019). This study applies institutional theory to investigate how these different (i.e., coercive, normative, and mimetic) institutional pressures influence Chinese chemical companies' adoption and implementation of green innovation.

Green innovation

Green innovation is defined as "a process that contributes to the creation of new products and technologies to reduce environmental risks, like pollution and negative consequences of resource exploitation" (Castellacci et al., 2017, p. 1037). The more firmly the significance of institutional, social, and economic sustainability is established, the more reasonable the investment in green innovation (Saunila et al., 2018). The primary purpose of green innovation is to enhance the performance of green products and services for end users (Karimi, Sayyadi, and Shahabaldini, 2021). Meanwhile, green innovation positively influences corporate competitive advantage (Chen et al., 2006).

According to the past literature review, green innovation has increased organizational flexibility and cost efficiency (Morant and Millán, 2017), which can help reduce environmental challenges

(Foo et al., 2019), improve resource efficiency (Qi et al., 2021), open up new opportunities for eco-friendly practices (Song and Choi, 2018), decrease pollution rates (You et al., 2019), increase recycling, and save energy. From the firm's decision-making perspective, green innovation enables an organization to achieve competitiveness (Borsatto and Amui, 2019), enhance environmental performance (Kraus, Rehman, and García, 2020), boost their economic performance (Asadi et al., 2020), and significantly build their green reputation (Dangelico, 2017). In other words, green innovation is a significant tool that can assist society, institutions, and firms in reaching ecological responsibility and plays a significant role in gaining competitiveness (Chu et al., 2019) and enhancing economic performance in the face of environmental concerns. However, both Zhao et al. (2018) and Lisi et al. (2019) highlighted that few businesses have been able to merge green innovation into their strategies, practices, and resources due to the intricate nature of the process. Thus, this study will deeply explore the direct relationships between institutional pressures and green innovation.

Institutional pressures and green innovation

The institutional pressures highlight that companies are social entities and profit-making entities, and they are under tremendous pressure to fulfill institutional expectations to gain social legitimacy and valuable resources (DiMaggio & Powell, 1983). Conversely, failure to meet institutional expectations may jeopardize organizational performance and long-term growth (Scott et al., 2004). Thus, DiMaggio and Powell (1983, p.7) stressed that three types of institutional pressures contribute to "an organizational propensity to converge on a single practice in a given industry": 1) coercive, 2) normative, and 3) mimetic pressure. First, due to the issues of scarce resources and environmental degradation, the Chinese governments (local and national government bodies) have exerted coercive pressures on chemical companies by increasing environmental supervision and tax policies (Li and Huang, 2017; Yang, 2018). Based on DiMaggio and Powell's (1983) view, enterprises will attach importance to political power and institutional legitimacy for social reputation and economic rewards. In other words, coercive pressure is typically considered to have the greatest institutional pressure influence on the Chinese chemical company's GI (Cousins et al., 2019). As a result, Chinese chemical companies that do not abide by them Chinese environmental regulations risk will face legal consequences. In a more extreme scenario, Chinese governments can also disqualify the organization from the business market.

Second, younger-generation customers and the public significantly impact their companies' normative pressure to adopt green innovation due to their enhanced environmental expectations. As Bhatia and Gangwani (2021) and Kalyar et al. (2020) stressed that the younger generation of Chinese customers is growingly eco-friendly awareness and prefers to consume "green" products. At the same time, many internal and external professionals as well as environmentalists exert pressure on chemical sectors to take environmental management strategies in the daily processes. For instance, Bag et al. (2022) and Chien (2014) mentioned that international trade barriers also stimulate companies to adopt green innovation. Zhu, Cordeiro, and Sarkis (2013) believed that export and sales to international customers and consumer pressures mainly motivate companies to adopt green practices.

Last, mimetic pressure occurs when a firm can imitate its competitors' successful behaviors. Companies may "imitate" competitors simply because of their success. It is easy to understand that they will also become successful by imitating the behavior of successful competitors. In particular, the eco-products of some developed countries' chemical companies (such as the US and British) have higher prices, improve their brand reputation, and explore new markets via green innovation implementation. Thus, Chinese chemical companies also want to imitate this environmental strategy to improve their performance outcomes. As Zhu and Sarkis (2007)

mentioned, due to globalization, Chinese chemical companies now have the possibility to learn and mimic the successful behaviors of their international competitors, particularly those foreign companies operating in China. More generally, because green innovation is successful green practice, Chinese chemical companies are willing to try green innovation and expect GI to bring economic benefits to firms (Yang, 2018).

In the context of this study, Chinese chemical companies will face these varying degrees of institutional pressures (Yang et al., 2020), particularly when adopting the green innovation to fulfill environmental requirements, customer demands, and government supervision (Awan et al., 2019). Also, the external pressures from regulators, customers, and competitors can significantly affect Chinese chemical companies' GI adoption. Thus, the hypotheses are formulated as follows:

H1: Coercive pressure is positively connected with green innovation.

H2: Normative pressure is positively connected with green innovation.

H3: Mimetic pressure is positively connected with green innovation.

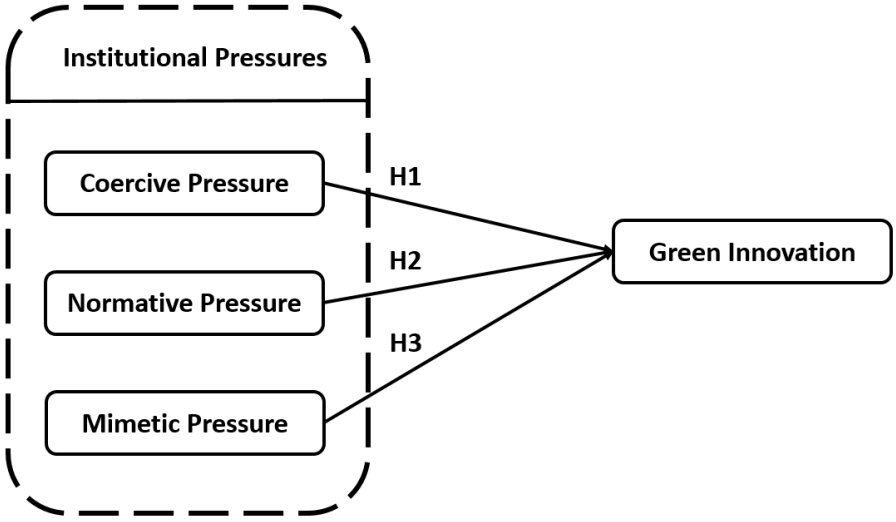

Figure 1: Research framework

METHODS

Data collection process

This paper focuses on Chinese southeast coast chemical industry. It has historically consumed large resources, generated more waste, and implemented more environmental practices than other industries. China was chosen as the empirical environment for this study because of the large proportion the Chinese chemical industry contributed to overall globalized industrial output and resource demand (Karimi et al., 2021). The data were collected using an online administrative approach. As with many investigations in the chemical sector, the respondents were also chosen using a purposive sampling method (Mahmud et al., 2020; Seman et al., 2019). This paper pays attention to the Chinese southeast coast (such as Tianjin, Guangzhou Province, Shanghai, Zhejiang Province, and so on). These regions have maintained high economic efficiency and solid economic vitality in China for a long time (Wang, Chan, and Yang, 2021). Moreover,

73% of the companies in this area have been named among China's top 500 chemical companies (Hong et al., 2019). Most of those who responded had experience in middle and senior management. It is in line with Carter et al.'s findings, who came to the conclusion that middle managers (like purchasing managers) can possibly encourage the gradual implementation of environmental practices.

After discarding seven responses with excessive missing values and incomplete responses, a total of 414 responses were kept. Overall, the sample size for this study of 414 reached the 153 minimum requirements for sample, with a 0.15 effect size and a power level of 0.95 in a post-hoc power analysis (Fink, 2015). Most of the respondents came from Tianjin (24.39%) and Guangdong Province (24.39%); 40.57% came from local firms, 35.26% were senior managers, and the chemical companies have a 6–10-year history of 34.45%, and 35.99% own a bachelor's degree.

Measurement procedure

At the beginning of the measurement procedure, two phases needed preparation, 1) pre-tested for content validity, and 2) The survey items in English were translated into Chinese. In the first phase, we invited four experienced academicians to examine seven survey items for appropriateness and ambiguity. Following feedback, the questionnaire was revised to measure appropriateness better. Then, the questionnaire was distributed to three green innovation practitioners. They double-checked whether the survey items were appropriate for their existing business environment. As a result of the pre-test process, a collection of the questionnaire displays high content validity. In the second phase, the survey was translated from English into Chinese. Both versions were proofread by bilingual professors, who also commented on some ambiguities. We modified the questionnaire and pilot-tested it with 11 Chinese chemical companies.

In this paper, we followed the format for measure scales that Memon et al. (2023) recommended as the standard format. Following the steps of 1) explaining the factor's definition, 2) selecting the appropriate measurement items to complete the scale design. Coercive pressures defines to the formal/informal pressures exerted on companies to comply with social, cultural, political, and legal obligations (Burki, 2018). Normative pressure ensures consistent business practices among industry members, including suppliers, end-users, and competitors (Agarwal et al., 2018). Mimetic pressure derives from uncertainty in the business climate. Next, both coercive, normative, and mimetic pressure, these three items. Are from the thinking of Ahmed et al. (2019) and Zhu & Geng (2013). Based on the remarks of Ahmed et al. (2019) and Zhu & Geng (2013), we take a four-item scale to measure coercive pressure and a three-item scale to measure normative pressure. When it comes to green innovation, it signifies the development of new ideas, products, services, procedures, and environmental management systems that can effectively address environmental challenges (Li et al., 2018). This paper measures green innovation using a three-item scale developed by Chen et al. (2006) and Zhang and Ma (2021).

According to Podsakoff, MacKenzie, and Podsakoff (2012), as a procedure to reduce common method variance, all four items were used on a 7-point Likert scale. To ensure the validity of the questionnaire, its sequence was logical, and its instructions and wording were understandable, 10 top managers with experience with Chinese chemical companies completed a pilot survey. After that, this research tested a pilot test of the revised questionnaires on 40 target population respondents to find bugs and optimize the design of survey (Hulland, Baumgartner, and Smith, 2018).

DATA ANALYSIS AND RESULTS

This investigation employed the partial least squares structural equation modeling (PLS-SEM) (Cheah et al., 2021; Sarstedt et al., 2019b) due to the fact that it enabled us to investigate and predict the environmental management strategies involved in chemical companies. On the basis of the conceptual model (see Fig.1), PLS-SEM has an edge of assessing complicated structural frameworks, which are higher-order constructs (Becker et al., 2022; Sarstedt et al., 2019), sequential mediation (Hair, Howard, and Nitzl, 2020), and moderator assessments (Ringle, Sarstedt, and Becker, 2014). In accordance with the recommendation of Sarstedt and Cheah (2019), SmartPLS 4.0.8 was utilized in this investigation to evaluate the framework parameters.

Common method variance (CMV)

Strenuous efforts were made in this study to reduce CMV. A full collinearity approach was used to statistically analyze the negative impacts of any possible bias, as suggested by Kock and Lynn (2012). The variance inflation factor (VIF) values obtained from the full collinearity assessment ranged from 1.178 to 1.329, which are less than the 3.3 thresholds.

Assessment of measurement model

In accordance with Hair et al. (2017), convergence validity was assessed using factor loadings, Cronbach's alpha (α), rho_A, composite reliability (CR), and average variance extracted (AVE). As shown in Table 1, Hair et al. (2017) recommended that all items have loadings greater than 0.70. Furthermore, according to Hair et al. (2017), all structures with α, rho_A, CR, and AVE exceed the recommended values of 0.70 and 0.50. Therefore, the study established convergent validity.

Second, based on Sarstedt et al. (2017), discriminant validity implies that every factor is different from other factors utilized in the framework. This paper employed Heterotrait-Monotrait (HTMT) ratio to assess discriminant validity. HTMT ratio was below the threshold of 0.90 (Henseler et al., 2015), suggesting acceptable discriminant validity. Table 2 provides the detailed results.

Table 1: Assessment of measurement model

Construct/Items	Factor Loadings	Cronbach's Alpha	AVE	CR
Coercive Pressure		0.688	0.807	0.515
CP1	0.697			
CP2	0.837			
CP3	0.678			
CP4	0.641			
Normative Pressure		0.610	0.793	0.561
NP1	0.726			
NP2	0.772			
NP3	0.748			
Mimetic Pressure		0.627	0.800	0.7572
MP1	0.714			
MP2	0.781			
MP3	0.773			

Green Innovation		0.621	0.797	0.568
GI1	0.717			
GI2	0.751			
GI3	0.790			

Note: CP = Coercive Pressure; NP = Normative Pressure; MP = Mimetic Pressure; GI = Green Innovation; CR = Composite Reliability; AVE = Average Variance Extracted

Table 2: Results of Heterotrait-Monotrait (HTMT)

Construct	CP	GI	MP	NP
CP				
GI	0.494			
MP	0.602	0.652		
NP	0.503	0.636	0.355	

Note: CP = Coercive Pressure; MP = Mimetic Pressure; NP = Normative Pressure; GI = Green Innovation

Assessment of structural model

Because the PLS-SEM evaluation of the path coefficients of the structures is grounded on a set of regression analyses, it was critical to ensure that collinearity issues did not occur in our structural model assessment. Hair, Page, and Brunsveld (2019) recommended that VIF values greater than five reveal collinearity between the predictor constructs. Collinearity is not a problem in the structural model. In this caes, the VIF values are less than the threshold of 5.

After that, according to Streukens and Leroi-Werelds (2016), to test the three hypotheses, the research framework was evaluated using a bootstrapping technique with 5000 subsamples. The results in Table 3 present that the link between coercive pressure and green innovation (β=0.128; p-value<0.01), normative pressure and GI (β=0.287; p-value=0.000), and mimetic pressure and green innovation (β=0.294; p-value=0.000) is significant. In this case, all the direct relationships hypothesized in H1 to H3 are confirmed.

Furthermore, the R^2, f^2, and Q^2 were found to analyze the structural model's quality. The framework has a high explanatory capacity; both coercive, normative, and mimetic pressure combined explain 27.80% (i.e., R^2=0.278) of the variance in green innovation. Regarding effect size (f^2), NP (f^2=0.100) and MP (f^2=0.100) are considered the most significant predictors of green innovation because it has a large effect size. Meanwhile, CP (f^2=0.018) on green innovation has a trivial effect (Cohen, 1988).

Ultimately, based on Geisser (1974) and Stone (1974), Stone-Geisser's Q^2 evaluated the framework's predictive relevance. According to the results obtained after applying the blindfolding procedure, green innovation (0.149) has Q^2 values > 0, denoting that the framework has predictive relevance.

Shmueli et al. (2019) mentioned PLS predict to explain an endogenous variable's predictive relevance that was not included in the sample (i.e., green innovation). The PLS-SEM model predicts all item values of performance outcomes with lower prediction error (like RMSE and MAE) than the linear model. Accounting to Shmueli et al. (2019), this implies that performance outcomes exhibited a strong prediction power.

Table 3: Assessment of structural model

Path Relationship	β	STDEV	*t*	*p*	Remarks
H1) CP -> GI	0.128	0.061	2.109	0.035	Supported
H2) NP -> GI	0.287	0.043	6.738	0.000	Supported
H3) MP -> GI	0.294	0.047	6.199	0.000	Supported

Note: CP = Coercive Pressure; MP = Mimetic Pressure; NP = Normative Pressure; GI = Green Innovation

DISCUSSION AND IMPLICATIONS

This investigation objective aims to explore institutional pressures and how to affect green innovation in Chinese chemical companies. Drawing from the institutional theory (DiMaggio & Powell, 1983), this research postulated coercive, normative, and mimetic pressure as motivation factors to influence Chinese chemical companies' green innovation adoption. In accordance with previous studies by Ahmed et al. (2019), Sun & Razzaq (2022), and Li et al. (2021), coercive, normative, and mimetic pressure directly affect green innovation in different countries and industries.

The investigation results revealed that among the three institutional pressures, coercive pressure had the least impact on the adoption of green innovation by Chinese chemical companies (H1 supported). This finding aligns with the perspectives expressed by Maulamin et al. (2020) and Zhu and Geng (2013), who found that while China's environmental laws and regulations, policy guidance, and annual governmental report measures have all been strengthened over the past five years, enforcement oversight has not been adequate. Additionally, Chinese chemical companies often adopt a "green" strategy as a pretext to achieve legitimacy and minimize external interference in their daily business operations.

Moreover, normative pressure and mimetic pressure significantly influence green innovation (H2 and H3 were supported). The investigation's results align with previous research by Maulamin et al. (2020), Qi et al. (2021), and El-Garaihy et al. (2022). In particular, Maulamin et al. (2020) discovered that normative pressure has a positive connection with companies' adoption of environmental strategies. Qi et al. (2021) found that normative and mimetic pressure would upgarde the enterprise environment. Indeed, the significant relationship supports the argument that normative pressure is the fundamental need for Chinese chemical companies to adopt and implement green innovation (El-Garaihy et al., 2022). According to the findings of this study, mimetic pressure (β=0.294) is the most important factor, followed by normative pressure (β=0.287). One possible explanation is that Chinese chemical enterprises' environmental development strategies are primarily intended to gain public recognition and thus increase their market share. That is, as consumers become more willing to pay for environmentally friendly products, Chinese chemical companies will adopt environmental management as a corporate strategy for profit.

Practical implications

Many studies have previously examined the synergistic influence of coercive, normative, and mimetic pressures on enterprise green strategic (Ning et al., 2022). This is also consistent with the findings of this paper, which demonstrate that both coercive, normative, and mimetic pressures positively affect Chinese chemical enterprises' green innovation adoption. Institutional

pressures as external pressures will increase overall societal and environmental awareness, which is critical for ensuring a suitable atmosphere for green innovation implementation.

Firstly, the government is supposed to reflect on how green innovation affects environmental protection. It should provide substantial governmental assistance to Chinese chemical companies to improve and upgrade green technology while also stimulating R&D and giving tax incentives to Chinese chemical companies that cut carbon emissions. Increase the number of funding channels and financial incentives available to large chemical companies while providing low-collateral loans to SEM companies to help them develop their environmental practices.

Secondly, institutions should establish a "government-enterprise-public" system to monitor and balance the steady growth of the green product market and encourage Chinese chemical companies' commitment to environmental responsibility. Establishing clear and open criteria for green product certification, improvements to the green innovation certification process, and providing consumers with trustworthy information on green innovation identification standards are all critical parts of the government's involvement in regulating green innovation. Top managers mandated that their chemical companies follow all environmental protection procedures. To ensure that their products satisfy the necessary environmental criteria, Chinese chemical companies must update materials, improve production methods, and reduce waste generation during the production process by implementing green innovation. For the public, various media channels would actively release information about environmental protection to increase public awareness and monitor their compliance with environmental regulations and standards.

Lastly, each company has one goal to enhance its financial benefits. Green innovation is the most effective strategy for battling competitors with environmentally friendly, green products and services in emerging markets (Singh et al., 2022). According to the study's results, managers can successfully improve market shares and financial benefits via green innovation. Only those who persevere in green innovation in the current period of environmental action survive and develop.

LIMITATIONS AND FUTURE DIRECTIONS

A few limitations exist in this investigation. To begin with, data are collected exclusively in Southeast China. Future research should investigate whether the findings apply to another part of China with complex institutional structures. Secondly, due to the cross-sectional data, we were unable to examine dynamic change in the green innovation field. Longitudinal data may be utilized to validate the framework in understanding how institutional pressures can influence green innovation. Additionally, Maaz et al. (2022) believe green dynamic capabilities as a new intangible asset to encourage and support the company's adoption of green innovation, then directly or indirectly help increase the organizational performance in an evolving business environment.

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