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Enterprise Innovation in The Distribution Sector Such as Logistics and Trade Towards Green and Sustainable Development

Thuy Linh NGUYEN[1], Thi Anh Phuong TRAN[2], Duc Tam LE[3], Thong Van PHAM[4]

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Abstract

Purpose: Despite significant commitments between corporations and the government on green supply chain, green logistics and sustainable production, the adoption of green and sustainable trading innovation in Vietnam continues to face many obstacles. The objective of this study is to approach the decision to adopt green and sustainable trading innovation from the perspective of the enterprise. **Research Design, Methodology and Approach:** A cross-sectional study with the participation of 651 employees and managers at distribution enterprises such as logistics, supply, and delivery enterprises in southern Vietnam was conducted to assess business innovation decisions through innovation awareness. Partial least squares structural equation modelling (PLS-SEM) was proposed to evaluate the structural relationships of the model. **Results:** The research results show that the decision to innovate an enterprise is directly positively affected by the perception of marketing innovation, process innovation and organizational innovation; in which process innovation and organizational innovation are mediators for the perception of marketing innovation. **Conclusions:** This study makes a significant contribution by demonstrating the impact of marketing innovation awareness on the entire process that leads to enterprise innovation decisions to fulfil customer expectations and competitive pressure in the context of the green supply chain, green logistics and sustainable production.

Keywords: Competitive Pressure, Customer Expectation, Distribution Enterprises, Innovation Perception, Logistics, Trade.

JEL Classification Code: D2, D7, D4

1. Introduction

Innovation can be seen as the foundation for the success of many businesses in recent times (Drucker, 1998). It is the mechanism by which the entrepreneur either generates new wealth-producing resources or endows current resources with greater capacity to generate prosperity (Drucker, 1998). Innovation helps businesses grow and thrive (Chesbrough, 2006; Drucker, 1998). In the process of formation and development step by step, whether more or less, it is inevitable that an enterprise can avoid the appearance of weaknesses related to products/services, production

1 First Author. Lecturer, Greenwich Department, FPT University, Hanoi, Vietnam. Email: linhnt70@fe.edu.vn
2 Second Author. Lecturer, Faculty of Business Administration, FPT University Can Tho Campus, Vietnam. Email: phuongtta2@fe.edu.vn
3 Third Author. Lecturer, Faculty of Economics and Construction Management, Mientrung University of Civil Engineering, Vietnam. Email: leductam@muce.edu.vn
4 Corresponding Author. Lecturer, Faculty of Basic Sciences, Thu Duc College of Economics and Technology, Vietnam. Email: pttm5642@gmail.com

processes, working processes, strategies marketing, or organizational structure (Coskun et al., 2008). Therefore, investing in and conducting innovation activities will help the company detect its limitations early and quickly improve or change those weaknesses to grow and develop stronger (Tucker, 2002), especially in emerging countries.

In the context of green and sustainable development, enterprise innovation's role in limiting climate change and environmental pollution cannot be denied (Greenland et al., 2023). Despite significant commitments between enterprises and the government on green supply chain, green logistics and sustainable production, corporate innovation adoption towards green and sustainable development in Vietnam still has many challenges (Nguyen & Dekhili, 2019; TA et al., 2020). These challenges come with the growth of the business as well as the ability to reduce the impact of distribution, logistics, trade and manufacturing operations on the environment (Hoang Tien et al., 2020; TA et al., 2020). According to Li and Qamruzzaman (2023), pollution concerns created by rising industrialization and urbanization are major challenges for businesses and governments. Another economic consequence related to agriculture is that due to the impact of pollution, such as soil and water pollution, producers face reduced crop yields and poor quality (Li & Qamruzzaman, 2023) while Vietnam is a leading agricultural exporter. Hence, in the contemporary setting of global integration and continual innovation in technology, processes, and production methods (in a green and sustainable orientation), the role of firm innovation must be evaluated and prioritized.

Regarding enterprise innovation decision-making towards green and sustainable development in Vietnam, a few studies have been undertaken, particularly from a corporate standpoint (Dey et al., 2022). Based on the research of Ngo and Ngo (2023), green commitment strongly influences sustainable development, in which green commitment plays an intermediary role between green innovation, corporate social, and green HRM. In addition, Ngo and Ngo (2023) insisted that green knowledge sharing moderated the interaction between green innovation, human resource management, corporate social responsibility, and sustainable development. According to Le and Govindan (2024), green innovation (management, process, and product innovation) and technological innovation were positively associated with corporate performance. The highlight of this study is the emphasis on the moderating role of managerial environmental concern. In the other study, Le et al. (2024) demonstrated that three factors strongly impacted green innovation (green management, product, and process) in the current context: corporate social responsibility, environmental strategy, and corporate sustainable development. In line with this, Tseng et al. (2022) insisted that sustainable supply management and process management are the main cause components. The preceding studies on the topic of business innovation in Vietnam towards green and sustainable development have shown the importance of product, management, and process innovation, as well as the role of social responsibility; however, these studies have only mentioned the issue of environmental awareness, while awareness prior to green innovation has not been mentioned.

It can be concluded that there are significant research gaps in existing studies. These gaps are related to innovation awareness before making decisions for enterprises to innovate towards green and sustainable development. According to Khalilzadeh et al. (2024), decision-making is a complex behaviour that requires cognitive activity, specifically parts of the brain; therefore, cognition is an inseparable process in the decision-making process (TRAN et al., 2024). Although previous studies emphasize green innovation in relation to product innovation, process innovation, organizational innovation, etc., no study has examined the cognitive link between them. In addition, most former researchers indicated that the decision to innovate a business not only promoted but also strengthened the company's competitive advantage (Skordoulis et al., 2020) or customer satisfaction (Ayinaddis, 2023; Mahmoud et al., 2018) while lacking consideration of meeting the requirements of competitive pressure and customer expectations. Based on these research gaps and the current significance of corporate innovation, this study aims to take a behavioural epistemology approach to the distribution enterprise innovation in the context of green and sustainable development via the organism–response paradigm (Mehrabian, 1974). Organisms refer to innovation awareness (marketing innovation perception, process innovation perception, and organizational innovation perception) before making innovation decisions as a cognitive process of individuals in the enterprise. In alignment with this, responses refer to enterprise innovation decision-making, including competitive pressure responses and customer expectation responses. The uniqueness of this study is the emphasis on the role of innovation perception when referring to marketing innovation perception related to all aspects such as product/service, price, distribution and promotion. On the other hand, process innovation perception and organizational innovation perception are also mentioned in association with enterprise innovation decision-making. As a result, this study offers significant contributions in both theoretical and practical aspects for policymakers and managers in such distribution, trading, and logistics sectors towards green and sustainable development.

2. Literature and Hypothesis development

2.1. Literature Review

Former researchers and economists have also given many different definitions of innovation in many different situations and times. According to Schumpeter and Swedberg (2021), the definition of "innovation" or "improvement" is a "new combination" of resources, equipment, knowledge, technology, ... In line with this, Drucker and Maciariello (2014) defined innovation as the process of equipping new capabilities and improving or increasing utilities. At the corporate level, innovation refers to a company's ability to assimilate and adopt new ideas leading to the development and launch of new product lines (Rubera & Kirca, 2012). On the other hand, the Oslo Handbook (OECD) also provides an objective way of defining and classifying types of innovation (Manual, 2005). The Manual (2005) mentioned that innovation was mainly concerned with product technology and process innovation. In line with this, former scholars have agreed to two main categories of innovation, such as product and process innovation (Audretsch et al., 2014; Brouwer, 1991; Rousseau et al., 2016). In addition, Innovation can be understood as "the implementation of a new or significantly improved product (goods/service) or process, a new marketing method, or a new organisational measure in practice, in the work organisation or in external relations" (Manual, 2005). As a result, many international business scholars have asserted that innovation can be classified into four categories: product, process, marketing, and organisational (Atalay et al., 2013; Kalkan et al., 2014; Lee et al., 2019). However, the prior perception of innovation leading to enterprise innovation decision-making was rarely mentioned in previous studies (Russell et al., 2020).

Recognizing the critical necessity of business innovation in the current setting, former researchers have undertaken research on corporate innovation towards green and sustainable development (Le et al., 2024; Le et al., 2022; Liu & Yan, 2018; Nguyen & Le, 2020; Yi et al., 2024). To better understand this topic, the authors conducted a systematic review of prominent and relevant previous studies related to corporate innovation towards green and sustainable development in the marketing and distribution sectors. There are two main approaches of previous studies related to business innovation towards green and sustainable development: (1) apply behavioural models and theories to predict or explain corporate innovation behaviour (Han & Chen, 2021; Shahzad et al., 2022); (2) construct the conceptual models based on the literature (Beneito et al., 2015; Jun et al., 2021; Le & Govindan, 2024; Le et al., 2024; Ngo & Ngo, 2023; Polas et al., 2023; Wasiq et al., 2023; Zailani et al., 2015).

In the first research approach, Han and Chen (2021) identified the determinants of eco-innovation adoption of small and medium enterprises in Malaysia. This study utilised the Theory of reasoned action (TRA) to explain the eco-innovation adoption via customer demands, rivalry pressures, firm innovative capabilities, managerial environmental concerns, and environmental regulation. In line with this, Shahzad et al. (2022) employed the Unified Theory of acceptance and use of technology (UTAUT2) to explain green innovation adoption via the mediating role of green behavioural intention. Although previous studies in this approach have explained the decision to innovate businesses towards green and sustainable development, the cognitive process when innovating is mentioned very vaguely and especially lacking contextual factors (Tran & Van Pham, 2024). On the other hand, Sahu et al. (2020) pointed out that behavioural theories have certain shortcomings in describing decision-making as contextual factors, lack of emphasis on factors such as mediators and moderators, and factors outside the theory.

In the second research approach, most of the previous studies related to decision-making towards green and sustainable development have built conceptual models through literature and related to internal and external factors of the enterprise (Beneito et al., 2015; Jun et al., 2021; Wasiq et al., 2023; Zailani et al., 2015). According to Zailani et al. (2015), external factors (environmental regulations and market demand) and internal factors (firm internal initiatives) were positively associated with green innovation initiatives (product innovation and process innovation). Besides, Beneito et al. (2015) indicated that competitive pressure (product substitutability, market size, and entry costs) was strongly associated with not only product innovation but also process innovation. On the other hand, Jun et al. (2021) provided a conceptual model for green innovation under the impacts of external partnership and cooperation, government support, rules and regulatory factors, market and customer factors, organizational and human resource factors, and technological factors. Similarly, Wasiq et al. (2023) offered the same conceptual model for green innovation as Jun et al. (2021) but added a new factor, green innovation strategy; however, green innovation strategy was not associated with green innovation while the other factors were positively correlated. Nevertheless, these studies lack consideration of the role of cognition in innovation decision-making while decision-making requires a great deal of cognitive effort (Tran & Van Pham, 2024). In alignment with this, Polas et al. (2023) offered a conceptual model of green innovation under the impacts of knowledge acquisition, knowledge dissemination, and knowledge responsiveness via environmental awareness (mediate variable). The results of this study indicated that all the factors in the conceptual model had positive relationships

with the sustainable development of enterprises through environmental awareness. Despite the fact that Polas et al. (2023) mentioned environmental awareness as a mediating variable, this study did not clarify the role of innovation perception (such as marketing innovation perception, process innovation perception, or organizational innovation perception).

2.2. Hypothesis Development

Decision-making is a procedure by which an individual or organisation acknowledges a choice or judgement that has to be made, collects and assesses information about alternates, and then chooses one of the possibilities (Tran & Van Pham, 2024). Hence, firm innovation decision-making towards green and sustainable development can be understood as the process by which an organisation acknowledges a choice or judgement in the context of innovation towards green and sustainable development. According to Shahzad et al. (2022), decision-making related to green innovation adoption was influenced by the components of the unified theory of acceptance and use of technology (such as performance expectancy, effort expectancy, hedonic motivation, social influences, facilitating conditions, and innovation cost) via the green behavioural intention as a mediating factor. In this approach, service or product users' perceptions of aspects such as expectation, motivation, social influence, cost, and condition were considered in relation to behavioural intentions (Shahzad et al., 2022); however, innovation awareness leading to innovation decision-making was not taken into account (Russell et al., 2020), whereas green behavioural intention was a low level of cognition that led to a decision or not (Tran & Van Pham, 2024). On the other hand, Zhou et al. (2019) emphasized the significant role of customer concentration in enterprise innovation decision-making while Beneito et al. (2015) affirmed the relationship between competitive pressure in the market and business innovation decisions (Boone, 2000). In another approach to firm innovation decision-making, Du et al. (2007) insisted that product and process innovations were the two main components, in which product innovation was mainly affected by customers and process innovation was influenced by suppliers (Geng et al., 2021). Based on the above findings, the following hypotheses were proposed:

H1: Marketing innovation perception is positively correlated with distribution enterprise innovation decision-making towards green and sustainable development;

H2: Process innovation perception is positively correlated with distribution enterprise innovation decision-making towards green and sustainable development;

H3: Organizational innovation perception is positively correlated with distribution enterprise innovation decision-making towards green and sustainable development;

As mentioned, innovation is the introduction of new products or services that add value, and improve the performance and efficiency of an organization (McFarthing, 2013). At the corporate level, innovation refers to a company's ability to assimilate and adopt new ideas leading to the development and launch of new product lines (Rubera & Kirca, 2012). In this research, innovation awareness refers to marketing innovation perception, process innovation perception, and organizational innovation perception. Marketing innovation perception is the awareness of the implementation of new marketing methods involving significant changes in product design or packaging, product placement, product promotion or pricing (Purchase & Volery, 2020). Process innovation perception refers to the awareness of the new work methods, the actual process design activity, and the execution of the change in all its complex technological, human, and organisational elements (Davenport, 1993). Organizational innovation perception has been consistently defined as the perceived adoption of a concept or behaviour that is novel to the organization (Wongtada & Rice, 2008). On the other hand, the association between innovation cognition and decision-making towards green and sustainable development was confirmed in previous studies (de Medeiros & Ribeiro, 2017; Fang & Zhang, 2021; Shahzad et al., 2022); however, most of them focused on decision-making from the customer's viewpoint instead of the enterprise's (de Medeiros & Ribeiro, 2017; Fang & Zhang, 2021). This research, therefore, looks into the connections between marketing innovation perception, process innovation perception, and organizational innovation perception in the context of the enterprise's perspective and decision-making towards green and sustainable development.

H4: Marketing innovation perception is positively correlated with process innovation perception in the context of green and sustainable development;

H5: Marketing innovation perception is positively correlated with organizational innovation perception in the context of green and sustainable development;

H6: Process innovation perception is positively correlated with organizational innovation perception in the context of green and sustainable development.

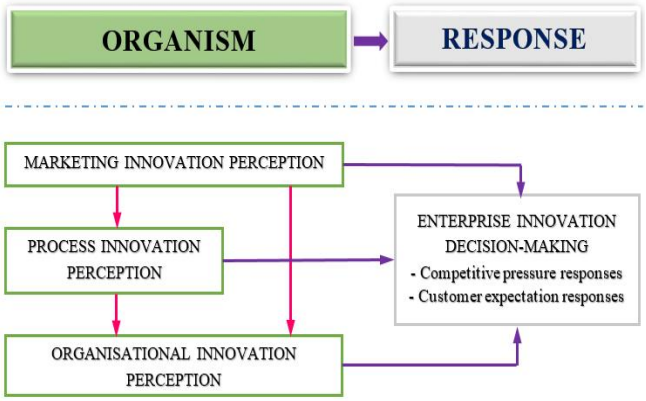

Figure 1: Proposed conceptual model of distribution enterprise innovation decision-making towards green and sustainable development

3. Methods

3.1. Data Collection and Measurement Scales

Data was collected through an online survey of individuals who are managers and employees at distribution enterprises in southern Vietnam. Using the convenience sampling method, the survey was conducted with the participation of more than 1000 respondents from March to May 2024; however, only 651 responses were valid and used for the study. Following the instructions of Hair Jr et al. (2021), the 10 times rule of sample size was applied in the PLS structural model. Therefore, this research was satisfactory in this requirement with 651 samples (Table 1).

A five-point Linkert scale was applied for the measurement instruments, as shown in Table 2. The initial scales were tested and checked for reliability through Cronbach's alpha coefficient using SPSS software.

Table 1: Respondents' description

Description	Indicator	N/651	Percentage
Gender	Female	397	60.99
	Male	254	39.01
Age group	17-30	274	42.09
	31-40	247	37.94
	41-50	77	11.83
	>50	53	8.14
Educational level	Intermediate	4	0.61
	College	14	2.15
	University	587	90.17
	Postgraduate	46	7.07

Table 2: Measurement instrument

Variable	Coding	Description	Cronbach's Alpha (α)	Source
Enterprise innovation decision-making towards green and sustainable development (EID)				
Customer expectation responses (CER)	CER1	Products/services are superior in terms of green and sustainable development.	0.863	Olson and Dover (1979), Sheth and Mittal (1996) & Zeithaml et al. (1993)
	CER2	Products/services are freely accessible in terms of green and sustainable development.		
	CER3	Customers' safety is ensured by products/services that are environmentally friendly and sustainable.		
	CER4	Products/services satisfy client expectations for green and sustainable practices.		
	CER5	In the framework of sustainability and going green, products and services are simple to utilize.		
Competitive pressure responses (CPR)	CPR1	Competitors' actions have a significant impact on a company's impression of green and sustainable innovation.	0.901	Shahzad et al. (2022) & Shahzad et al. (2023)
	CPR2	Our enterprise is facing pressure from rivals in the innovation sector.		
	CPR3	Our enterprise is under pressure to reinvent products in response to market innovation.		
	CPR4	Our enterprise is under pressure to innovate its pricing policies because of market price variations in terms of green and sustainable development.		
	CPR5	Our enterprise is under pressure to innovate its promotion efforts due to the innovation of our competitors' promotion tactics in terms of green and sustainable development.		

Variable	Coding	Description	Cronbach's Alpha (α)	Source
	CPR6	Our enterprise is under pressure to innovate in its distribution activities as a result of our competitors' innovative green and sustainable distribution methods.		
	CPR7	Our enterprise is under pressure to innovate its organisation in response to its competitors' organisational innovation in terms of green and sustainable development.		
	CPR8	Our enterprise is under pressure to innovate its processes in response to competitors' green and sustainability-related process advances.		
Innovation awareness				
Marketing innovation perception (MIP)	MIP1	Our enterprise may remember occurrences connected to recent product innovations.	0.876	Cruz-Ros et al. (2017), Purchase and Volery (2020) & TRAN et al. (2024)
	MIP2	Our enterprise recognises the need to innovate products to meet client expectations in terms of green and sustainable development.		
	MIP3	Our enterprise understands that product innovation boosts competitiveness.		
	MIP4	Our enterprise understands that reasonable product costs improve competitiveness.		
	MIP5	Our enterprise recognises pricing changes among products in the same category.		
	MIP6	Our enterprise recognizes the innovation of promotion and distribution initiatives that satisfy customer expectations.		
	MIP7	Our enterprise recognises the innovation of promotional and distribution efforts that improve competitiveness.		
Process innovation perception (PIP)	PIP1	Our enterprise recognises innovation in procedures that satisfy client expectations in terms of green and sustainable development.	0.852	Davenport (1993), Blaug (1963) & Varbanov and Seferlis (2014)
	PIP2	Our enterprise recognises that innovation in workplace procedures can increase competitiveness.		
	PIP3	Our enterprise understands that technical process innovation contributes to higher customer expectations.		
	PIP4	Our enterprise understands that technological process innovation enhances competitiveness.		
	PIP5	Our enterprise understands that process innovation is critical in terms of green and sustainable development.		
Organizational innovation perception (OIP)	OIP1	Our enterprise is constantly trying out new ideas in terms of green and sustainable development.	0.875	Wongtada and Rice (2008), Koo Moon and Kwon Choi (2014) & Hage (1999)
	OIP2	Our enterprise can quickly react to changes in the external environment.		
	OIP3	Our enterprise often introduces new products/services to customers.		
	OIP4	Our enterprise seeks out new technologies, methods, approaches, and ideas in terms of green and sustainable development.		
	OIP5	Our enterprise develops appropriate plans and timeframes for the implementation of creative ideas.		
	OIP6	Our enterprise understands that organisational innovation contributes to better meeting customer expectations in terms of green and sustainable development.		
	OIP7	Our enterprise understands that organisational innovation enhances competitiveness in terms of green and sustainable development.		

3.2. Procedures to Analyze

After conducting a systematic review to figure out the research gaps in this area, the authors built up the initial scales to measure innovation awareness and decision-making towards green and sustainable development. To consolidate the reliability of the scale, the Cronbach's Alpha index must be above 0.6 (Hair Jr et al., 2021). Moreover, the Correlation item total must be greater than 0.4 to indicate a satisfactory correlation (DeVellis & Thorpe, 2021; Hair et al., 2014; Shamshiri et al., 2013). As a result, all indicators were satisfactory (Table 2). On the other hand, to limit the biases of methods, the VIF check was recommended by Hair

Jr et al. (2021) and all values should be smaller than 3.3. After checking, all VIF indexes were smaller than 3.3.

In the next step, to evaluate the research results of an exploratory study, the author conducts a measurement model and structure assessment according to the guidelines of Hair Jr et al. (2021). Criteria for evaluating measurement models include convergent validity (loading index ≥ 0.6 and AVE ≥ 0.5), validity and reliability (α ≥ 0.6 and CR ≥ 0.6), and discriminant validity (HTMT index < 0.9). In terms of evaluating structural models, partial least squares structural equation modelling (PLS-SEM) was recommended by Hair Jr et al. (2021).

4. Research Findings

4.1. Measurement Model

According to the findings of evaluating the measurement model, all criteria related to convergent validity, validity and reliability, and discriminant validity were satisfied (Table 3). The minimum factor loading and AVE are 0.698 and 0.573, respectively. Similarly, the minimum α and CR are 0.852 and 0.894, respectively. Besides, all HTMT indexes are smaller than 0.9.

Table 3: Assessment of the measurement model

Variables	Items	Loading	α	CR	AVE	Heterotrait-monotrait ratio results				
Customer expectation responses	CER1	0.796	0.863	0.901	0.645					
	CER2	0.815								
	CER3	0.805								
	CER4	0.815								
	CER5	0.786								
Competitive pressure responses	CPR1	0.705	0.901	0.920	0.591	**0.432**				
	CPR2	0.769								
	CPR3	0.778								
	CPR4	0.721								
	CPR5	0.769								
	CPR6	0.800								
	CPR7	0.810								
	CPR8	0.791								
Marketing innovation perception	MIP1	0.698	0.877	0.905	0.576	**0.664**	**0.635**			
	MIP2	0.768								
	MIP3	0.779								
	MIP4	0.758								
	MIP5	0.758								
	MIP6	0.781								
	MIP7	0.767								
Organizational innovation perception	OIP1	0.750	0.876	0.904	0.573	**0.622**	**0.564**	**0.805**		
	OIP2	0.775								
	OIP3	0.742								
	OIP4	0.786								
	OIP5	0.750								
	OIP6	0.755								
	OIP7	0.740								
Process innovation perception	PIP1	0.816	0.852	0.894	0.628	**0.606**	**0.585**	**0.872**	**0.829**	
	PIP2	0.789								
	PIP3	0.784								
	PIP4	0.796								
	PIP5	0.775								

4.2. Structural Model

According to the findings in Table 4 and Figure 2, all associations were significant with a level of 1%. Not beyond initial expectations, the hypotheses were all accepted (H1 → H6). This means that for a second-order variable like EID, the two components CER and CPR are both very suitable in this study. Based on these findings, it can be concluded that pre-decision awareness of innovation to meet customer expectations and competitive pressures positively influences firms' innovation decisions. Specifically, MIP, PIP, and OIP are positively correlated with EID (β = 0.415, 0.140, and 0.234, respectively).

Regarding the interplays of innovation awareness, MIP and PIP are positively correlated with OIP (β = 0.385, and 0.426, respectively). Notably, MIP is significantly

positively correlated with PIP (β = 0.755). As a result, the mediating role of PIP and OIP is significant in shaping corporate innovation decisions towards green and sustainable development to meet customer expectations and competitive pressures ($p < 0.01$).

Table 4: Direct and indirect associations of the structural model

Hypotheses	Path relationships	Estimate (β)	STD	T -value	P value	Results
H1	MIP → EID	0.415	0.053	7.784	0.000	Confirmed
H2	PIP → EID	0.140	0.048	2.915	0.004	Confirmed
H3	OIP → EID	0.234	0.064	3.683	0.000	Confirmed
H4	MIP → PIP	0.755	0.030	25.473	0.000	Confirmed
H5	MIP → OIP	0.385	0.052	7.370	0.000	Confirmed
H6	PIP → OIP	0.426	0.055	7.792	0.000	Confirmed
Indirect effects	PIP → OIP → EID	0.100	0.032	3.088	0.002	Confirmed
	MIP → PIP → EID	0.105	0.037	2.887	0.004	Confirmed
	MIP → PIP → OIP → EID	0.075	0.025	3.047	0.002	Confirmed
	MIP → OIP → EID	0.090	0.030	2.966	0.003	Confirmed
	MIP → PIP → EID	0.322	0.045	7.198	0.000	Confirmed

Note: MIP: Marketing innovation perception; PIP: Process innovation perception; OIP: Organizational innovation perception; EID: Enterprise innovation decision-making.
STD = standard deviation; $R^2_{EID} = 0.505$, $R^2_{OIP} = 0.579$, $R^2_{PIP} = 0.569$

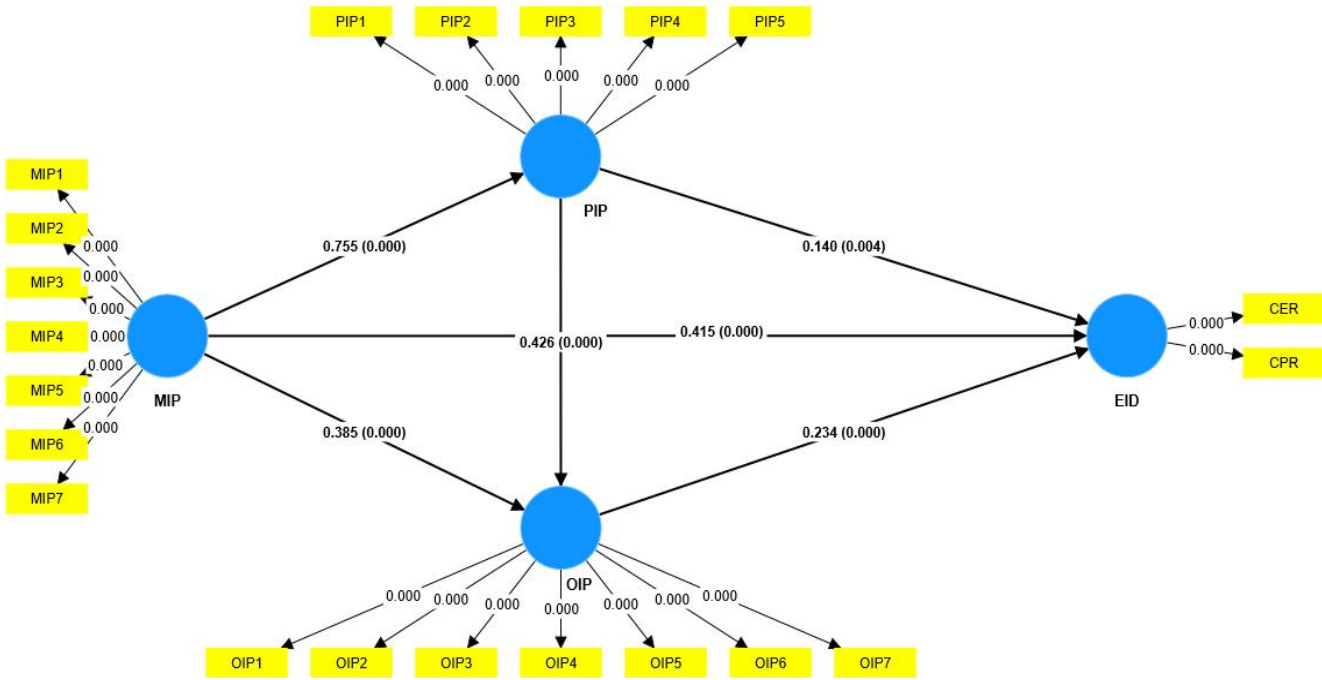

Figure 2: The results of coefficient paths

5. Discussion

Stem from the practical issues and research gaps presented in the introduction, this study has proposed a comprehensive research model to describe the mechanism of innovation decision-making of enterprises in the field of distribution, logistics and trade towards green and sustainable development in the current context. This study has highlighted the mediating role of pre-innovation awareness leading to business innovation decisions, especially business innovation towards green and sustainable development to meet customer expectations and

competitive pressure. To clarify this, this section focuses on discussing two core content: (1) the interactions between the elements in innovation perception; and (2) the correlation between pre-innovation perception and the enterprise's innovation decision.

In terms of the interplays of the elements in innovation perception, the link between MIP, PIP, and OIP is a significant finding in this study. Most previous studies have assumed that product innovation is a part of corporate innovation (Beneito et al., 2015; Le & Govindan, 2024; Zailani et al., 2015); however, this is not sufficient since product innovation is only a part of marketing innovation perception which includes product, price, distribution and promotion. This innovation must be consistent with its perception of products, prices, distribution and promotional activities. In other words, it is the innovative perception of marketing that has made a significant positive impact on process and organisational innovation perceptions ($\beta_{MIP \rightarrow PIP} = 0.755$; $\beta_{MIP \rightarrow OIP} = 0.385$, $p < 0.01$). This cognitive shift is the bridge from marketing to process and organizational innovation and cannot be discontinued at any stage (such as PIP and OIP, $\beta_{PIP \rightarrow OIP} = 0.426$, $p < 0.01$). Compared to previous research, such as Kahn (2018), innovation can be divided into outcome, process, or mindset; this study reaffirms the connection between them. The interaction of elements in innovation perception is like mindset, and the process of converting perception into action as a process, and finally the decision to innovate the enterprise to meet the competitive requirements and customer expectations is the outcome of the innovation perception process.

The correlation between pre-innovation awareness and firms' innovation decisions is another highlight of this study. As mentioned, this study approaches innovation decisions from the firm's perspective, in other words, these approaches delve into the alignment of employees' perceptions of firm innovation in the context of green and sustainable development. The research results show that all three components of innovation awareness have a positive impact on business innovation decisions to meet customer expectations and competitive pressures ($\beta_{MIP \rightarrow EID} = 0.415$, $\beta_{PIP \rightarrow EID} = 0.140$, and $\beta_{OIP \rightarrow EID} = 0.234$, $p < 0.01$) and are consistent with the research results of Lopez-Fernandez et al. (2016) when considering the link between managers' perception and innovation decision. Returning to previous studies on this topic, according to El-Kassar and Singh (2019), green products and processes have a positive impact on the decision to innovate a business to increase competitive advantage; thus, this study is unique in that it takes into account both marketing and organizational aspects when deciding to innovate a business to meet competitive requirements and customer expectations. Compared with Chiou et al. (2011), this study presents a uniqueness in examining the impact of cognitive innovation on marketing, process, and organizational innovation on the decision to innovate a business to meet customer expectations and competitive pressure instead of the three intermediate factors that directly impact the competitive advantage of the business, which are product innovation, process innovation, and managerial innovation.

Following the above findings, this study contributes to both practical and theoretical aspects. Theoretically, this study offers a new approach according to behavioural epistemology, in which the mediating role of cognition is inseparable from the decision-making process. The consideration of aspects of marketing innovation perception such as product/service, price, distribution and promotion, contributes to the completion of previous studies which mainly focus on product/service innovation while meeting customer expectations and competitive pressures requires more than that in the current context. In addition, the study approaches the decision to innovate businesses towards green and sustainable development with a second-order structure in the dependent variable, which allows the research results to be expressed more comprehensively and answer the question of what is the purpose of business innovation.

In practice, the study clearly shows the mechanism of business innovation decision formation in the current context of distribution enterprises, affirming the role of distribution businesses in understanding marketing, process and organization to meet customer expectations and competitive pressure better. On the other hand, synchronization in employees' innovation awareness helps businesses in the distribution, logistics and trading sectors achieve common goals through their employees. An illustrative example is that the world's greening trend and increasing awareness of environmental protection require customers to have high demands on products and services (Lavanya & Jeyakumar, 2019); therefore, enterprises themselves have to transform to meet their customers. Scales associated with the "recognize" and "understand" levels of awareness allow for a comprehensive picture of the employee's current awareness. It shows that implementing or applying green and sustainable business innovation decisions at businesses in the distribution sector (such as logistics, trading, supply chain, etc.) does not require a high level of thinking, which is largely at the level of recognition, understanding, and application. In alignment with this, some practical implications are given as follows:

- Increase engagement and information-sharing activities on the role of green and sustainable innovation for employees to meet customer expectations.
- Strengthen training and orientation activities for employees related to product distribution, promotion and product/service improvement activities to meet customer requirements and competitiveness in the same segment.

- Continuously improve work processes, and promote new individuals and methods in work and activities related to green supply chain, green trade and green logistics.
- Focus on and create the best conditions to implement good ideas to meet customer requirements and business competitiveness in the context of green and sustainability.

6. Conclusion, limitation and future direction

The study has successfully modelled the decision-making process of green and sustainable business innovation from the perspective of businesses. This is the first study to examine the correlation between pre-innovation perceptions of aspects such as marketing, processes and organization leading to business innovation decisions of enterprises in the distribution, logistics, and trading sectors. The study reaffirms the appropriate approach related to the current trend in the distribution enterprises in terms of decision-making while previous behavioural theories have many limitations. Research has shown that marketing innovation awareness leads to major changes in perceptions of innovation processes, organisations, and decisions, and this has significant practical implications for policymakers and enterprises in the current environment. In addition, with the participation of the construction of the second-order dependent variable, this study points out the important role of innovation such as what to innovate for and why to innovate. This study is a typical study in Vietnam but it can be applied in some emerging countries to examine the level of awareness of enterprises towards green and sustainable development today in many areas such as logistics and distribution.

Aside from the theoretical and practical contributions, this study has some drawbacks. This is a cross-sectional study and its appropriateness for application should be reconsidered at some point in the future. The study did not address external factors that influence cognition (such as emotions and social influences), which is also a noteworthy future research direction. Finally, research needs to be conducted in more areas to assess its generalizability.

References

Atalay, M., Anafarta, N., & Sarvan, F. (2013). The relationship between innovation and firm performance: An empirical evidence from Turkish automotive supplier industry. *Procedia-social and behavioral sciences*, *75*, 226-235. https://doi.org/10.1016/j.sbspro.2013.04.026

Audretsch, D. B., Coad, A., & Segarra, A. (2014). Firm growth and innovation. *Small business economics*, *43*, 743-749. https://doi.org/10.1007/s11187-014-9560-x

Ayinaddis, S. G. (2023). The relationship between service innovation, customer satisfaction, and loyalty intention in emerging economies: An evidence from ethio telecom. *Journal of the Knowledge Economy*, *14*(4), 4045-4063. https://doi.org/10.1007/s13132-022-01025-7

Beneito, P., Coscollá-Girona, P., Rochina-Barrachina, M. E., & Sanchis, A. (2015). Competitive pressure and innovation at the firm level. *The Journal of industrial economics*, *63*(3), 422-457. https://doi.org/10.1111/joie.12079

Blaug, M. (1963). A survey of the theory of process-innovations. *Economica*, *30*(117), 13-32. https://doi.org/10.2307/2601709

Boone, J. (2000). Competitive pressure: the effects on investments in product and process innovation. *The RAND Journal of Economics*, 549-569. https://doi.org/10.2307/2601000

Brouwer, M. (1991). *Schumpeterian Puzzles: Technological competition and economic evolution*. University of Michigan Press.

Chesbrough, H. (2006). *Open business models: How to thrive in the new innovation landscape*. Harvard Business Press.

Chiou, T.-Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation research part E: logistics and transportation review*, *47*(6), 822-836. https://doi.org/10.1016/j.tre.2011.05.016

Coskun, S., Basligil, H., & Baracli, H. (2008). A weakness determination and analysis model for business process improvement. *Business Process Management Journal*, *14*(2), 243-261. https://doi.org/10.1108/14637150810864961

Cruz-Ros, S., Garzon, D., & Mas-Tur, A. (2017). Entrepreneurial competencies and motivations to enhance marketing innovation in Europe. *Psychology & Marketing*, *34*(11), 1031-1038. https://doi.org/10.1002/mar.21042

Davenport, T. H. (1993). *Process innovation: reengineering work through information technology*. Harvard Business Press.

de Medeiros, J. F., & Ribeiro, J. L. D. (2017). Environmentally sustainable innovation: Expected attributes in the purchase of green products. *Journal of Cleaner Production*, *142*, 240-248. https://doi.org/10.1016/j.jclepro.2016.07.191

DeVellis, R. F., & Thorpe, C. T. (2021). *Scale Development: Theory and applications*. Sage Publications.

Dey, P. K., Chowdhury, S., Rodríguez-Espíndola, O., Parkes, G., Tuyet, N. T. A., Long, D. D., Ha, T. P., & Budhwar, P. (2022). Impact of organisational factors on the circular economy practices and sustainable performance of small and medium sized enterprises in Vietnam. In *Supply Chain Sustainability in Small and Medium Sized Enterprises* (pp. 46-80). Routledge.

Drucker, P., & Maciariello, J. (2014). *Innovation and entrepreneurship*. Routledge. https://doi.org/10.4324/9781315747453

Drucker, P. F. (1998). The discipline of innovation. *Harvard business review*, *76*(6), 149-157.

Du, J., Love, J. H., & Roper, S. (2007). The innovation decision: An economic analysis. *Technovation*, *27*(12), 766-773. https://doi.org/10.1016/j.technovation.2007.05.008

El-Kassar, A.-N., & Singh, S. K. (2019). Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices.

Technological forecasting and social change, *144*, 483-498. https://doi.org/10.1016/j.techfore.2017.12.016

Fang, S., & Zhang, L. (2021). Adoption of green innovations in project-based firms: An integrating view of cognitive and emotional framing. *Journal of Environmental Management*, *279*, 111612. https://doi.org/10.1016/j.jenvman.2020.111612

Geng, L., Shi, X., Zu, L., Chai, M., & Xing, J. (2021). Importance calculation of customer requirements for incremental product innovation. *Frontiers in Psychology*, *12*, 633472. https://doi.org/10.3389/fpsyg.2021.633472

Greenland, S. J., Nguyen, N., & Strong, C. (2023). Irresponsible marketing and the need to support pro-sustainable production and consumption. *Journal of Strategic Marketing*, 1-5. https://doi.org/10.1080/0965254X.2023.2230487

Hage, J. T. (1999). Organizational innovation and organizational change. *Annual review of sociology*, *25*(1), 597-622. https://doi.org/10.1146/annurev.soc.25.1.597

Hair, J. F., Gabriel, M., & Patel, V. (2014). AMOS covariance-based structural equation modeling (CB-SEM): Guidelines on its application as a marketing research tool. *Brazilian Journal of Marketing*, *13*(2). https://doi.org/10.5585/remark.v13i2.2718

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer Nature. https://doi.org/10.1007/978-3-030-80519-7

Han, M. S., & Chen, W. (2021). Determinants of eco-innovation adoption of small and medium enterprises: An empirical analysis in Myanmar. *Technological forecasting and social change*, *173*, 121146. https://doi.org/10.1016/j.techfore.2021.121146

Hoang Tien, N., Minh, H. T. T., Minh Duc, L. D., Mai, N. P., & Thuc, T. D. (2020). Social entrepreneurship and corporate sustainable development. Evidence from Vietnam. *Cogent Business & Management*, *7*(1), 1816417. https://doi.org/10.1080/23311975.2020.1816417

Jun, W., Ali, W., Bhutto, M. Y., Hussain, H., & Khan, N. A. (2021). Examining the determinants of green innovation adoption in SMEs: A PLS-SEM approach. *European Journal of innovation management*, *24*(1), 67-87. https://doi.org/10.1108/EJIM-05-2019-0113

Kahn, K. B. (2018). Understanding innovation. *Business Horizons*, *61*(3), 453-460. https://doi.org/10.1016/j.bushor.2018.01.011

Kalkan, A., Bozkurt, Ö. Ç., & Arman, M. (2014). The impacts of intellectual capital, innovation and organizational strategy on firm performance. *Procedia-social and behavioral sciences*, *150*, 700-707. https://doi.org/10.1016/j.sbspro.2014.09.025

Khalilzadeh, J., Kozak, M., & Del Chiappa, G. (2024). Tourism motivation: A complex adaptive system. *Journal of Destination Marketing & Management*, *31*, 100861. https://doi.org/10.1016/j.jdmm.2024.100861

Koo Moon, H., & Kwon Choi, B. (2014). How an organization's ethical climate contributes to customer satisfaction and financial performance: Perceived organizational innovation perspective. *European Journal of innovation management*, *17*(1), 85-106. https://doi.org/10.1108/EJIM-03-2013-0020

Lavanya, V., & Jeyakumar, S. (2019). GREEN TOURISM PRACTICE: NEED OF THE HOUR. *Service Sectors in India: Issues Challenges and Opportunities, ABS BOOKS, New Delhi*, 268-276.

Le, T. T., & Govindan, K. (2024). Boosting green innovation on corporate performance: Managerial environmental concern's moderating role. *Business Strategy and the Environment*. https://doi.org/10.1002/bse.3795

Le, T. T., Tran, P. Q., Lam, N. P., Tra, M. N. L., & Uyen, P. H. P. (2024). Corporate social responsibility, green innovation, environment strategy and corporate sustainable development. *Operations Management Research*, *17*(1), 114-134. https://doi.org/10.1007/s12063-023-00411-x

Le, T. T., Vo, X. V., & Venkatesh, V. (2022). Role of green innovation and supply chain management in driving sustainable corporate performance. *Journal of Cleaner Production*, *374*, 133875. https://doi.org/10.1016/j.jclepro.2022.133875

Lee, R., Lee, J.-H., & Garrett, T. C. (2019). Synergy effects of innovation on firm performance. *Journal of business research*, *99*, 507-515. https://doi.org/10.1016/j.jbusres.2017.08.032

Li, Q., & Qamruzzaman, M. (2023). Innovation-led environmental sustainability in Vietnam—towards a green future. *Sustainability*, *15*(16), 12109.

Liu, S., & Yan, M.-R. (2018). Corporate sustainability and green innovation in an emerging economy—An empirical study in China. *Sustainability*, *10*(11), 3998. https://doi.org/10.3390/su10113998

Lopez-Fernandez, M. C., Serrano-Bedia, A. M., & Gómez-López, R. (2016). Determinants of innovation decision in small and medium-sized family enterprises. *Journal of Small Business and Enterprise Development*, *23*(2), 408-427. https://doi.org/10.1108/JSBED-02-2015-0028

Mahmoud, M. A., Hinson, R. E., & Anim, P. A. (2018). Service innovation and customer satisfaction: the role of customer value creation. *European Journal of Innovation Management*, *21*(3), 402-422. https://doi.org/10.1108/EJIM-09-2017-0117

Manual, O. (2005). *Proposed guidelines for collecting and interpreting technological innovation data*. https://doi.org/10.1787/9789264192263-en

McFarthing, K. G. (2013). The evolution of partnering in open innovation: from transactions to communities. In *Open innovation in the food and beverage industry* (pp. 235-253). Elsevier. https://doi.org/10.1533/9780857097248.3.235

Mehrabian, A. (1974). An approach to environmental psychology. *Massachusetts Institute of Technology*.

Ngo, O. T. L., & Ngo, T. Q. (2023). Sustainable development in Vietnamese exporters: assessing the influence of green innovation, corporate social responsibility, and green hrm: the role of green commitment and green knowledge sharing. *International Journal of Economics and Finance Studies*, *15*(2), 106-130. https://doi.org/10.34109/ijefs. 202315206

Nguyen, T. P., & Dekhili, S. (2019). Sustainable development in Vietnam: An examination of consumers' perceptions of green products. *Business Strategy & Development*, *2*(2), 127-136. https://doi.org/10.1002/bsd2.48

Nguyen, X., & Le, T. (2020). The impact of global green supply chain management practices on performance: The case of Vietnam. *Uncertain Supply Chain Management*, *8*(3), 523-536. https://doi.org/10.5267/j.uscm.2020.3.003

Olson, J. C., & Dover, P. A. (1979). Disconfirmation of consumer expectations through product trial. *Journal of Applied psychology*, *64*(2), 179. https://doi.org/10.1037/0021-9010.64.2.179

Polas, M. R. H., Tabash, M. I., Bhattacharjee, A., & Dávila, G. A. (2023). Knowledge management practices and green innovation in SMES: the role of environmental awareness towards environmental sustainability. *International Journal of Organizational Analysis*, *31*(5), 1601-1622. https://doi.org/10.1108/IJOA-03-2021-2671

Purchase, S., & Volery, T. (2020). Marketing innovation: a systematic review. *Journal of Marketing Management*, *36*(9-10), 763-793. https://doi.org/10.1080/0267257X.2020.1774631

Rousseau, M. B., Mathias, B. D., Madden, L. T., & Crook, T. R. (2016). Innovation, firm performance, and appropriation: A meta-analysis. *International Journal of Innovation Management*, *20*(03), 1650033. https://doi.org/10.1142/S136391961650033X

Rubera, G., & Kirca, A. H. (2012). Firm innovativeness and its performance outcomes: A meta-analytic review and theoretical integration. *Journal of marketing*, *76*(3), 130-147. https://doi.org/10.1509/jm.10.0494

Russell, K., O'Raghallaigh, P., McAvoy, J., & Hayes, J. (2020). A cognitive model of digital transformation and IS decision making. *Journal of Decision Systems*, *29*(sup1), 45-62. https://doi.org/10.1080/12460125.2020.1848388

Sahu, A. K., Padhy, R., & Dhir, A. (2020). Envisioning the future of behavioral decision-making: A systematic literature review of behavioral reasoning theory. *Australasian Marketing Journal*, *28*(4), 145-159. https://doi.org/10.1016/j.ausmj.2020.05.001

Schumpeter, J. A., & Swedberg, R. (2021). *The theory of economic development*. Routledge. https://doi.org/10.4324/9781003146766

Shahzad, A., bin Zakaria, M. S. A., Kotzab, H., Makki, M. A. M., Hussain, A., & Fischer, J. (2023). Adoption of fourth industrial revolution 4.0 among Malaysian small and medium enterprises (SMEs). *Humanities and Social Sciences Communications*, *10*(1), 1-14. https://doi.org/10.1057/s41599-023-02076-0

Shahzad, M., Qu, Y., Rehman, S. U., & Zafar, A. U. (2022). Adoption of green innovation technology to accelerate sustainable development among manufacturing industry. *Journal of Innovation & Knowledge*, *7*(4), 100231. https://doi.org/10.1016/j.jik.2022.100231

Shamshiri, H., Eshraghian, M. R., Ameli, N., & Nafissi, S. (2013). Validation of the Persian version of the 40-item amyotrophic lateral sclerosis assessment questionnaire. *Iranian Journal of Neurology*, *12*(3), 102.

Sheth, J. N., & Mittal, B. (1996). A framework for managing customer expectations. *Journal of Market-Focused Management*, *1*, 137-158. https://doi.org/10.1007/BF00128687

Skordoulis, M., Ntanos, S., Kyriakopoulos, G. L., Arabatzis, G., Galatsidas, S., & Chalikias, M. (2020). Environmental innovation, open innovation dynamics and competitive advantage of medium and large-sized firms. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(4), 195. https://doi.org/10.3390/joitmc6040195

TA, V. L., BUI, H. N., CANH, C. D., DANG, T. D., & DO, A. D. (2020). Green supply chain management practice of FDI companies in Vietnam. *The Journal of Asian Finance, Economics and Business*, *7*(10), 1025-1034. https://doi.org/10.13106/jafeb.2020.vol7.no10.1025

TRAN, T. D., TRUONG, T. D., Van PHAM, T., & PHAM, D. H. (2024). Cognitive Competency, Problem-Solving Skills and Decision-Making: A Case Study of Students' Extracurricular Activities in The Distribution Chains Sector. *Journal of Distribution Science*, *22*(2), 71-82. https://doi.org/10.15722/jds.22.02.202402.71

Tran, T. D., & Van Pham, T. (2024). The Relationship Between Thinking Ability, Emotional Intelligence, and Decision-Making. *Emerging Science Journal*, *8*(2), 644-657. https://doi.org/10.28991/ESJ-2024-08-02-017

Tseng, M.-L., Ha, H. M., Lim, M. K., Wu, K.-J., & Iranmanesh, M. (2022). Sustainable supply chain management in stakeholders: supporting from sustainable supply and process management in the healthcare industry in Vietnam. *International Journal of Logistics Research and Applications*, *25*(4-5), 364-383. https://doi.org/10.1080/13675567.2020.1749577

Tucker, R. B. (2002). *Driving growth through innovation: How leading firms are transforming their futures*. Berrett-Koehler Publishers.

Varbanov, P. S., & Seferlis, P. (2014). Process innovation through Integration approaches at multiple scales: a perspective. *Clean Technologies and Environmental Policy*, *16*, 1229-1234. https://doi.org/10.1007/s10098-014-0837-1

Wasiq, M., Kamal, M., & Ali, N. (2023). Factors influencing green innovation adoption and its impact on the sustainability performance of small-and medium-sized enterprises in Saudi Arabia. *Sustainability*, *15*(3), 2447. https://doi.org/10.3390/su15032447

Wongtada, N., & Rice, G. (2008). Multidimensional latent traits of perceived organizational innovation: Differences between Thai and Egyptian employees. *Asia Pacific Journal of Management*, *25*, 537-562. https://doi.org/10.1007/s10490-008-9085-4

Yi, X., Tanveer, A., Bin, L., & Xue, Y. (2024). Unleashing the Influence of Information Sharing, Technological Openness, and Corporate Innovation on Green Corporate Social Responsibility: A Way Toward Environmental Sustainability. *Energy & Environment*, *35*(1), 395-417. https://doi.org/10.1177/0958305X221129225

Zailani, S., Govindan, K., Iranmanesh, M., Shaharudin, M. R., & Chong, Y. S. (2015). Green innovation adoption in automotive supply chain: the Malaysian case. *Journal of Cleaner Production*, *108*, 1115-1122. https://doi.org/10.1016/j.jclepro.2015.06.039

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1993). The nature and determinants of customer expectations of service. *Journal of the academy of Marketing Science*, *21*, 1-12. https://doi.org/10.1177/0092070393211001

Zhou, B., Li, Y., Huang, S., Guo, S., & Xue, B. (2019). Customer concentration and corporate innovation: Effects of financing constraints and managers' expectation of Chinese listed companies. *Sustainability*, *11*(10), 2859. https://doi.org/10.3390/su11102859