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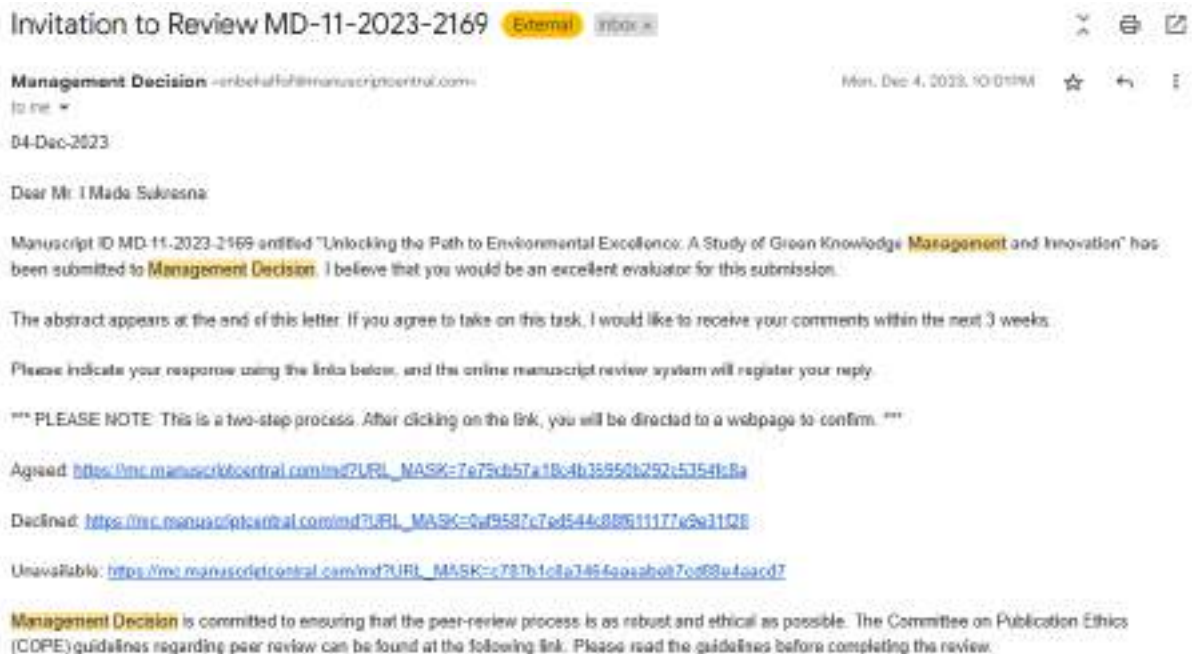
SJR 2023: 1,14

Judul Artikel: Unlocking the Path to Environmental Excellence: A Study of Green Knowledge Management and Innovation

Bulan dan Tahun: Desember 2023

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### 1. Tawaran awal untuk menilai (04-12-2023)





### 3. Konfirmasi atas persetujuan menilai (05-12-2023)

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Yours sincerely,  
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3



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3



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 Special Characters

The manuscript requires major revision since MD is a top-ranked journal. Thank you for the opportunity to review.

### **\* Comments to the Author**

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See attached file



**Unlocking the Path to Environmental Excellence: A Study of  
Green Knowledge Management and Innovation**

Journal:	<i>Management Decision</i>
Manuscript ID	MD-11-2023-2169
Manuscript Type:	Original Article
Keywords:	Green Knowledge Management, Green Innovation, Environmental Performance, Green Knowledge Sharing, Environmental Knowledge

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**ABSTRACT:**

This paper investigates the role of green knowledge management (GKM) on environmental performance (EP) through mediated moderation of green innovation (GI), green knowledge sharing (GKS), and environmental knowledge (EK).

The survey method was employed by the researchers to gather data from a sample of 466 manufacturing SMEs. Data collection occurred between November 2022 and May 2023. PLS-SEM was employed by the researchers to analyze the facts and evaluate the hypotheses, in the view of the resource-based view theory (RBV), the results indicate significant and a positive relationship between GKM -> GI, GKM -> GKS, GKS ->EP, GI->EP, and GI ->EP.

EK indicates a positively significance between GKS and EP. This study provides valuable insights for manufacturing SMEs suggesting that they should utilize GKM for GI, and GKS implementations to enhance EP, financial, and social performance and that the GKM and GI, GKS are the valuable resources under RBV to enrich the sustainable performance for SMEs.

CUST\_RESEARCH\_LIMITATIONS/IMPLICATIONS\_\_(LIMIT\_100\_WORDS) :No data available.

CUST\_PRACTICAL\_IMPLICATIONS\_\_(LIMIT\_100\_WORDS) :No data available.

CUST\_SOCIAL\_IMPLICATIONS\_(LIMIT\_100\_WORDS) :No data available.

The current research findings hold particular relevance for managers of small medium enterprises manufacturing firms, and indicates the green knowledge management (GKM) can be a valuable tool for smaller enterprises in order to achieved the sustainability objectives as comparable larger corporations. First time, survey method was employed by the researchers to gather data from a sample of 466 manufacturing small medium enterprises (SMEs).



# Unlocking the Path to Environmental Excellence: A Study of Green Knowledge Management and Innovation






## Abstract

This paper investigates the role of green knowledge management (GKM) on environmental performance (EP) through mediated moderation of green innovation (GI), green knowledge sharing (GKS), and environmental knowledge (EK). A survey-based approach was employed to gather data from the 466 manufacturing small and medium enterprises (SMEs). Data collection is carried out from November 2022 to May 2023. The partial least squares-structural equation modeling (PLS-SEM) was employed in order to analyze the facts and evaluate the hypotheses by resource-based view theory (RBV). The outcomes represent the positive significance relationship between the GKM -> GI, GKM -> GKS, GKS -> EP, GI->EP, and GI ->EP, respectively. Furthermore, EK indicates a positive significance between GKS and EP. This study provides valuable insights for manufacturing SMEs and suggesting that they should utilize GKM for GI, and GKS implementations to enhance Environmental Performance (EP). The GKM and GI, GKS are the valuable resources achieved by RBV to enrich the sustainable performance for small and medium enterprises (SMEs).

**Keywords:** Green Knowledge Management, Green Innovation, Environmental Performance, Green Knowledge Sharing, Environmental Knowledge.

# Summary of Comments on

## Page: 3

	Number: 1	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:19:14 pm
Since this research particularly emphasizes the role of green knowledge management, not the innovation, hence a better title is: "Unlocking the Path to Environmental Performance: The Role of Green Knowledge Management within Small-Medium Enterprises"				
	Number: 2	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:15:52 pm
Please start with the research gap(s) this research aims to fill. Also, do not use abbreviation in abstract. Write them as they are.				
	Number: 3	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:19:25 pm
in Pakistan				
	Number: 4	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:10:31 pm
No need to write it down here. It is better to place it in the research method section.				
	Number: 5	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:12:29 pm
Write it down in a different way. It is better not to use sign -> in abstract.				

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# 1. Introduction

In the modern age, protecting the environment and protecting human life is more important than ever (Khanal et al., 2023). Firms' efforts are being made to implement environmental management measures, which involve foremost processes that have positive impact on global or local economies (Kim et al., 2022). Climate change and global warming are the worst contests being faced by society (Babu & Yadav, 2023). This is mainly because of business activities for example the exploitation of fossil fuels, power generation, natural resources, and hazardous waste on an enormous level (W. Zhang et al., 2023). Therefore, currently, many companies are putting environmental goals on their products and participating in Green knowledge management activities, including internal organization activities, eco-design, collaboration promotion, recycling, and remanufacturing to attain environmental sustainability.

SMEs encounter a significant challenge in developing and introducing GKM, primarily reducing the deficiency in competitive and cutting-edge green knowledge and technical competencies (Naqvi et al., 2023; Wu, 2013). To the best of the scholar's knowledge, there is a deficiency of studies examining the collective impact of GKM, GI, and GKS on EP within the context of SMEs operating in Pakistan. Notably, no prior research has investigated the synergistic effect of these factors while considering the influence of EK as an intervention mechanism aimed at addressing environmental concerns and enhancing GKM, particularly within the SMEs manufacturing sector. This study seeks to fill this hole by applying the RBV theory to inspect the interplay of these complex combinations of endogenous and exogenous variables. Further, GKM is an emerging and popular concept among suppliers and manufacturing organizations to attain green and economic performance while attaining sustainable development of business.

GKM is interconnected in the manufacturing process objective of attaining sustainable practices using and sharing knowledge, and ideas generating and developing modern manufacturing which ultimately leads to a better economy (S.-L. Chen et al., 2023). Furthermore, GKS is a critical factor in applying green practices and empowering to turn knowledge into actions (Aboramadan et al., 2022). Dissemination of green knowledge and environmentally conscious information inside and outside of the organizations fosters to promotion of environmental sustainability and urges innovative thinking. Green Knowledge organizations quickly adjust the dynamics of environmental rules and market needs (Shahzad, Qu, Zafar, et al., 2020). Likewise, the attainment of green innovation requires organizations to participate in the sharing and acquiring of innovative green information that deviates from their conventional knowledge base. Recent research examines that GKM practices, including eco-friendly sourcing (Abbas & Khan, 2023) and efficient supply chain processes, facilitate knowledge creation and dissemination within organizations, which in turn promotes green innovation endeavors (Zameer & Yasmeen, 2022). Although, empirical research indicates

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	Number: 1	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 7:57:34 pm
Explain further the current challenges of SMEs in general, especially in Pakistan.				
	Number: 2	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:03:18 pm
Create a wider research gap, not just in restricted locally in Pakistan. It could be started from filling the gap(s) in RBV's extension, particularly within green management studies.				
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This is too strong word. I suggest to change into "a limited research".				
	Number: 4	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 7:58:57 pm
Explain further the relevance of GKM's role in SMEs				

that companies that implement GKM practices demonstrate greater levels of green innovation in comparison to those that prioritize only one of these dimensions (Xu et al., 2023).




In addition, green innovation necessitates interdisciplinary collaboration and knowledge exchange, as cross-functional teams collaborate to develop sustainable solutions (Shehzad et al., 2023). The collaborative approach improves innovation and environmental performance by incorporating diverse perspectives and expertise to address complex environmental issues (Idrees et al., 2023). On the other hand, environmental knowledge works as a catalyst for innovation (Einhorn et al., 2023). Organizations proficient in sustainability can recognize prospects for developing environmentally friendly products, optimizing processes, and reducing trash. Prior research found that positive relationship between environmental knowledge and the promotion of innovation (Polas et al., 2021). Particularly in the context of developing environmentally sustainable solutions. Although considerable research is available on GKM, GI, and environmental performance (Daddi et al., 2021; Laari et al., 2018; C. Y. Wong et al., 2020). However, there is scarce research available that fully examines the relationship. Therefore, an extensive model to improve firm environmental performance using the relationship of GKM with environmental performance was proposed by this study.

<sup>1</sup>Existing Studies have endeavors have independently explored the connections between GKM, GKS, GI, EP (Sahoo et al., 2023; Shahzad, Qu, Zafar, et al., 2020; Shahzad et al., 2021; S. Wang et al., 2022), (S. K. Singh et al., 2020, 2020) and the moderation role of Ek. In order to fill this void in research, the current study endeavors to construct a conceptual structure that elucidates the connection between GKM with a specific emphasis on the mediating influence on EP. Additionally, it examines the moderating effect of Sustainability Practices EK in enhancing environmental outcomes.

## 2. Literature Review and <sup>2</sup>Theoretical

### 2.1 RBV (Resource-Based View)

The foundation of the RBV (Resource-Based View) has been useful in analyzing the business strategies of organizations by considering their internal capabilities and resources (Goh & Loosemore, 2017). The Resource-Based view is a appropriate theoretical framework for this study as it acknowledges that each firm holds distinct tangible and intangible resources that interact in distinct methods to create a modest improvement (Lisi et al., 2020; J. Zhang et al., 2020) (Potluri & Phani, 2020). RBV theory emphasizes the importance of resources, specifically GKM, in attaining competitive improvement and performance (Gunasekaran et al., 2017). Additionally, GKS and <sup>3</sup>GI play a role in transforming these resources into tangible outcomes. This study asserts that organizations can boost their competitive advantage and increase

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-  Number: 2      Author: I Made Sukresna      Subject: Comment on Text      Date: 20/12/2023 7:43:52 pm  
Change into "Hypotheses Development"
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-  Number: 3      Author: I Made Sukresna      Subject: Comment on Text      Date: 20/12/2023 7:52:47 pm  
GI is grounded in RBV as well, according to Shehzad et al. (2024). Knowledge management enablers and knowledge management processes: a direct and configurational approach to stimulate green innovation. European Journal of Innovation Management, 27(1), 123-152. Please explain further the role of GKM and GI in contributing to RBV.

the performance of their sustainable supply chain by establishing environmental friendly practices (Huo et al., 2014).

2.2 **Green Knowledge Management and Environmental Performance**

Manufacturing organizations may have different objectives for adopting GKM and green technology (Sahoo et al., 2023). GKM is an emerging concept in the manufacturing arena, and researchers are currently developing this concept (J. Zhang et al., 2020). This concept serves to mitigate the negative impacts of industrial processes on the environment. (Pekovic & Bouziri, 2021) (Riva et al., 2021). The integration of environment-related knowledge is facilitated by this engagement, leading to the elimination of unnecessary processes in manufacturing, and decreased release of hazardous waste (Ramy et al., 2022) Benabdellah et al.(2021).

GKM is important for integrating organization-specific knowledge and abilities into the procedure of creating and executing strategies (Benzidia et al., 2021). Additionally, adding the interest of different shareholders, effective GKM-able organizations to improve green products and processes (Duke et al., 2023) . On the other hand, EP serves as valuable feedback for GKM activities. Organizations that adopt sustainable practices and assess their environmental impact generate valuable data and insights that can inform knowledge management strategies (Munawar et al., 2022). The feedback loop facilitates the ongoing enhancement of organizations' environmental knowledge, refinement of sustainability initiatives, and adaptation to emerging environmental challenges Lastly, GKM and EP are closely intertwined in the context of sustainability and business operations(Riva et al., 2021). Hence, we proposed the below hypothesis:


*H1: GKM has a significant association with EP*

2.3 **Green Knowledge Management and Green Innovation**


Green knowledge management and green innovation are closely intertwined (H. T. Pham et al., 2023).GI can help reduce or remove the negative impact of organizational operations on the natural environment. Several Sustainable Development Goals (SDGs) include objectives such as decreasing resource consumption, managing waste, promoting recycling, and reducing pollution. It also, suggests that GI technology can enhance existing produce or develop novel ones through the application of environmental science and technology (van den Berg & Kaur, 2022). Moreover, it holds the potential to lessen the environmental impact of an organization’s activities. Lv et al.(2021) demonstrate that GI encompasses product or process innovation .This includes technological innovations that focus on energy conservation, waste recycling, corporate environmental management, pollution prevention, and green product designs



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 Number: 1	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 7:41:21 pm
Define this GKM			

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 Number: 2	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 7:42:34 pm
Define this GI			

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(Rehman et al., 2021). The core objective of GI includes technological progress, recycling, environmental pollution reduction, ecological management, and eco-product design (Shahzad, Qu, Ur Rehman, et al., 2020).

Knowledge management is crucial for the innovation development as it helps as a foundation for research and analysis (Qu & Liu, 2022). The environmental performance of the organization is boosted by green knowledge. Moreover, organizations must adopt and comply with environmental practices to attain a competitive edge in the market (H. T. Pham et al., 2023). According to Marco-Lajara et al.(2023) GKM and GI are considered basic pillars for organizations to address environmental challenges and attain sustainability. Organizations that efficiently manage their knowledge assets about sustainable practices, technologies, and processes foster an environment conducive to innovation (Shamsuzzoha et al., 2023). Likewise, the research found that organizations having a better green knowledge management GKM have extra potential to adopt innovation and attain sustainability and organization development goals (Khan et al., 2022). Therefore, we proposed the below hypothesis:

*H2: GKM has a significant impact on GI*

## **2.2 Green Knowledge Management and Green Knowledge Sharing**

The fundamental elements of economic development and competitiveness have historically been acknowledged as knowledge, entrepreneurship, and innovation (Yu et al., 2022). Recent research studies have specifically highlighted the substantial influence the combination of these elements has on the economy (Piñeiro-Chousa et al., 2020). Also, according to the UNDP (United Nations Development Programed), the environmental society and its interrelationships are fundamental components that play a crucial role in many contexts (Chaithanapat et al., 2022). For instance, the acquisition of information enables both people and organizations to enhance their capacity and capability. Moreover, in return, this helps to improve the quality of innovation and increases their performance. Lehmann et al.(2022) the notion that, due to advancements in environmental knowledge, stakeholders have exerted more influence on the business sector concerning safeguarding non-human ecosystems and incorporating environmental considerations into their practices and societal interactions (Wang et al., 2022). Additionally, the inclination of individuals towards green learning contributes to the development of firms' eco-knowledge. This, in turn, leads to the emergence of novel ideas, perspectives, and solutions, ultimately driving the creation of new products, technologies, and services (Abbas & Sağsan, 2019). To optimize the benefits of GKM, a firm should implement it as a comprehensive system that engages all stakeholders. This approach enables informed decision-making regarding what should be eliminated, maintained, and enhanced the EP (Magyari et al., 2022). In contrast, the act of GKS serves to strengthen and enhance the practice of GKM. Organizations foster a culture of continuous learning by facilitating active knowledge sharing among

employees and stakeholders, enabling the exchange of insights and experiences about sustainability (Huang et al., 2022). The collaborative environment promotes innovation and facilitates the creation of novel environmentally friendly practices and solutions in organizations (Huang et al., 2022). Therefore, we proposed the below hypothesis:

*H3: GKM has a significant impact on the GKS*

**2.3 Green Knowledge Sharing and Environmental Performance**

Earlier studies have shown that deriving enjoyment from assisting others and disseminating information fosters an atmosphere and culture conducive to cultivating and inspiring innovations and environmental performance (Berchicci et al., 2019). However, it is essential to note that knowledge may also possess a collective nature when the individual knowledge held by many individuals is collected, amalgamated (Khan et al., 2022), and afterward shared among the members of an organization (Martínez-Martínez et al., 2019). GKS is different from conventional innovation in organizations that comply with both environmental regulations and green expectations of the production site and the final market. Moreover, the interconnection between GKS and EP is interlinked and has an important effect on the sustainable development and practice of the organizations (Chung, 2020). Lapologang & Zhao.(2023) explore that to effectively and efficiently meet the demands of many stakeholders and adapt to environmental changes within organizations relevant to the environment, organizations rely on a knowledgeable workforce and managers. Jiang et al.(2020) demonstrate that competency to have detailed, accurate, and beforehand knowledge about environmental issues and serve as an essential functional tool to boost the performance of the organizations to make the organization more environmentally sustainable (T. Pham & Pham, 2021). Moreover, employees with environmental knowledge are a key resource for the organization to develop and adopt the implementation of green marketing and green (Sahoo et al., 2023). In addition, green knowledge empowers organizational managers to think critically and out of the box to fix problems using different ways that are more environmentally oriented. Therefore, we hypothesize the following hypothesis

*H4: GKS has a significant influence on the EP*

**2.4 Green Innovation and Environmental Performance**

Prior studies elaborate that GI plays an essential part in organizational success and enhances EP (Kraus et al., 2020).Currently, the rapid advancement in industrialization has created extensive global warming and ecological problems. Therefore, due to these problems, governments and organizations have started to deal with critical environmental issues to ensure ecological and socioeconomic safety (Rehman et al., 2021).As a result, the strategic significance of GI lies in its aim to convert business procedures into environmentally

sustainable procedures. The following factors inspire businesses to get green labels (He et al., 2023). Firstly, it starts with the entrepreneur's desire to address environmental issues using eco-friendly practices. Second, addressing and reacting to consumer environmental awareness of customer-driven company ideology. Lastly, Proactive behavior aligns with market dynamics and governmental regulations to promote business sustainability in response to eco-system considerations (Makhloufi et al., 2022).

GI refers to the capacity of businesses to incorporate environmentally friendly products and processes, leading to the development of eco-friendly products while reducing energy consumption and maintenance a clean working environment (Hameed et al., 2023). Moreover, GI enhances an organization's capabilities of responsiveness, adaptability, societal and legislation capacity, and customer preferences, which ultimately emphasizes environmental concerns (Wang et al., 2022). Xie et al.(2022) claim that GI urges a competitive advantage in the market. Consumers' environmental awareness is growing, leading them to prefer products and services that are in line with their sustainability principles. Companies that involve in green innovation tend to attract further customers and achieve higher (Lapologang & Zhao, 2023). Furthermore, organizations can achieve long-term cost reduction and enhanced efficiency by adopting green innovation, which involves minimizing resource waste (Singh et al., 2023). Therefore, we hypothesize the following hypothesis:

*H5: GI has a significant effect on the EP*

## **2.5 Environmental Knowledge as a Moderator**

Environmental knowledge (EK) is a broad understanding of factual information, conceptual frameworks, and interrelationships related to the natural environment and ecosystems (Durmaz & Fidanoğlu, 2023). This is related to individuals understanding of the manufacturing process, the ecological consequences of goods, and the need for shared accountability and long-term growth (Munawar et al., 2022). Additionally, Consumer green purchasing behavior needs collective responsiveness and friendly approaches toward environmentally friendly products and there is a strong association between environmental knowledge and green consumer behavior (Abd-Mutalib et al., 2023). EK is crucial for effectively tackling the intricate issues of sustainability, resource preservation, and environmental safeguarding (Zameer & Yasmeen, 2022). It includes a wide array of knowledge and perspectives about the natural environment, ecological systems, climate change, and sustainable practices. Also, Understanding the significance of EK is essential for promoting responsible decision-making, both at the organizational and individual levels (Fawehinmi et al., 2020).

Table 1: Literature of Hypothesis variable

References	Focus (IV & DV)	Focus (Mediator & Moderator)	Method	Sample	Application area /research setting
(Y.-S. Chen, 2008)	_____	GI(Med)	PLS-SEM	2006 Business Directory	Taiwan
(Asiaei et al., 2023)	EP(DV)	GI(Med)	PLS-SEM	105 Iranian companies	Iran
(Yasin et al., 2023)	_____	KS(Med)	SPSS	365 Auto Mobile Companies	Pakistan
(Munawar et al., 2022)	_____	EK(Med)	PLS-SEM	209 hotel Industry	Pakistan
(S. Singh et al., 2019)	_____	GKS(Med)	PLS-SEM	300 volunteers	UAE
(Allameh, 2018)	GI(DV)	GKS(Med)	PLS-SEM	156 hotels	Iran
(Fait et al., 2023)	—	GKS(Med)	PLS-SEM	300 volunteer employee	Pakistan
(Yasin et al., 2023)	—	GKs(Med)	PLS-SEM	700 Automobile manufacturing industry	Pakistan
(S. Wang et al., 2022)	GKM(IV)	_____	PLS-SEM	151 companies of	turkey
(J. Wang, 2022)	GKM(IV)	GI(Med)	PLS-SEM	391 manufacturing firms	Pakistan

GKS is an aspect of EK (Y. Xie et al., 2023).GKS refers to the exchange of information, best practices, and innovations regarding environmentally sustainable practices among organizations (Bárcena-Ruiz et al., 2023).The process involves spreading information on renewable energy technologies, waste reduction strategies, eco-friendly product design, and related topics. Sharing green knowledge is crucial for advancing environmental awareness in the business belonging (S. K. S. Wong, 2013).Moreover, having EK is crucial for fostering responsible environmental conservation at both individual and organizational levels (Riva et al., 2021). On the other hand, Green innovation (GI) involves the development and implementation of new solutions that minimize harm to the environment in comparison to current practices (Huang et al., 2022).This innovation encompasses diverse manifestations, including the advancement of renewable energy sources, the optimization of eco-efficient manufacturing processes, and the production of sustainable materials (Khan et al., 2022).EK is crucial for identifying areas requiring innovation and informing the development of environmentally friendly solutions (Huang et al., 2022) (Zameer & Yasmeen, 2022). EK provides the basis and inspiration for green innovation, which in turn generates tangible, environmentally friendly solutions that directly impact environmental performance. By promoting environmental education and supporting eco-friendly innovation, businesses, and organizations can

effectively enhance their environmental practices, minimize their ecological footprint, and actively contribute to the advancement of sustainability (Idrees et al., 2023). Therefore, we proposed the following hypotheses:

*H6: EK plays a moderation role between GKS and EP*

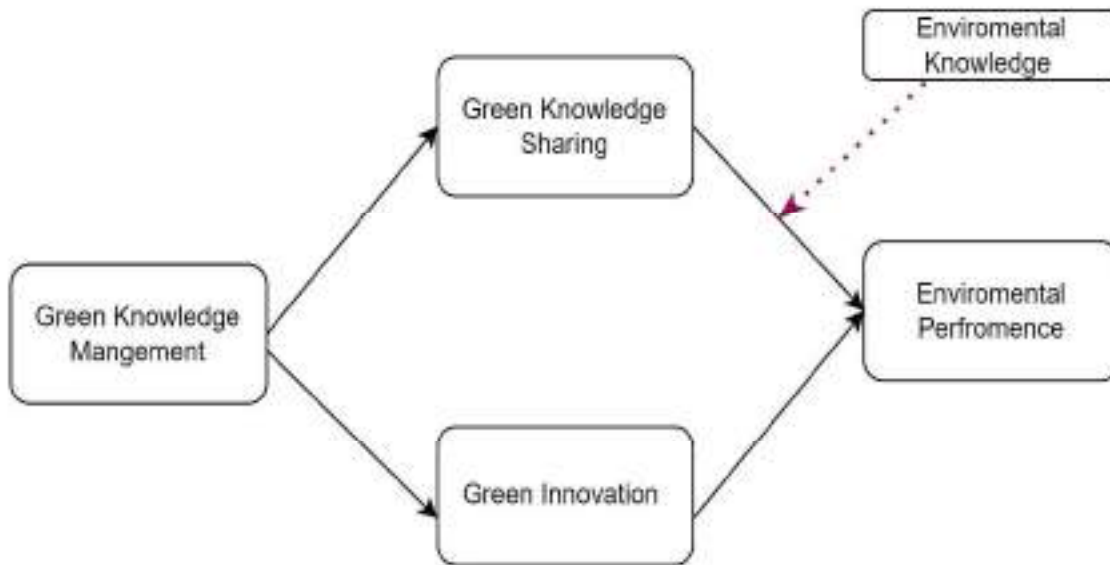



Figure 1: Conceptual Model

### 3. Methodology

#### 3.1 Sample and Data


This study has been conducted employing a stratified random sampling methodology. To study the hypotheses, we put twelve, we opted for a heterogeneous array of industries, encompassing surgical instrument manufacturers, sports equipment manufacturers, textile manufacturers, and sugar producers, to serve as data collection sources. For our survey-based approach, we assembled listed manufacturing SMEs by accessing <sup>1</sup>data from the chamber of commerce and the industry (Awan et al., 2021). In 1st phase, scholars selected the <sup>2</sup>SMEs which are following the green practices from last 5 years and are operating in Pakistan. Then in second phase, scholars distributed 1058 questionnaires to the managers who were solicited for participation and they were contacted through email and various social media platforms. The response rate was 60.91% in which out of 1058 responses, we received back 645 responses. Furthermore, we excluded 179 questionnaires due to improper and missing responses and retained 466 responses for further analysis. Table 2 provides comprehensive insights into SMEs, delineates the research population, and furnishes detailed profiles of the survey respondents.

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How many SMEs are included in the current database (sampling frame)?

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Describe the criterion of SMEs in Pakistan from the authorized institution(s). Do not forget to write the source(s)



Table 2: Demographic table

Population Statistics (N =466)			
Properties	Distribution	N	Percent
Job Title			
	Director	32	7%
	Operations Manager	71	15%
	Manager	104	22%
	Branch Manager	162	35%
	Operations Supervisor	97	21%
Education			
	Technical	83	18%
	Graduation	128	27%
	Master	178	38%
	Above Master	77	17%
Gender			
	Male	356	76%
	Female	110	24%
Industry			
	Textile	47	10%
	Cola and Petroleum	40	9%
	Automobile	56	12%
	fertilizers	41	9%
	Wood and Paper	23	5%
	Food and Beverage	36	8%
	Pharmaceutical	47	10%
	Surgical Instruments	32	7%
	Engineering Products	45	10%
	Chemical Products	33	7%
	Sports Good	40	7%
	Misc. Manufacturing	26	6%

3.2 Measurement Items

All hypotheses employed in this study were derived from established literature and assessed using a five-point Likert scale, which ranged from "strongly disagree" to "strongly agree. For GKM five items were adapted (Shehzad et al., 2023). Sample items included “Employees and partners at our organization have easy access to information on best-in-class environmentally friendly practices”. For GKS items were adapted (Chennamaneni, 2006; Lin & Chen, 2017). Sample items included “I shared factual knowledge (know-what) from work with my co-workers”.GI six items included (Yousaf, 2021) sample items included

“The company uses the fewest amount of materials comprise the product for conducting the product development or design”. EP four items included (Momayez et al., 2023) sample items included “Over the last three years, the frequency of environmental accidents has reduced in our industry”. Ek four items included (Munawar et al., 2022) sample items included “In my organization, sharing knowledge and awareness about environmental issues and solutions with colleagues is a routine matter”.

## 4. <sup>1</sup>Data Analysis and Results

### 4.1 Analytical Tools and Techniques

The collected data were analyzed using Smart-PLS which was chosen for its variance-based PLS-SEM methodology, and selected for various methodological considerations. <sup>2</sup>This quality renders it suitable for exploratory, survey-based analyses (Hair et al., 2012). Moreover, PLS-SEM exhibits greater robustness, even when applied to smaller, non-normally distributed samples, and it is well-suited for reflective models.

### 4.2 Measurement Model

The measurement model's validity was assessed by conducting convergent and discriminant validity tests. Convergent validity was evaluated through the examination of factor loadings (outer loadings), composite reliability, Cronbach's Alpha, and AVE (Hair Jr et al., 2020). Chin et al.(2008) argue that analysis indicates that all item loadings exceeded the threshold of 0.70 (Table 3). The CR values, representing the extent to which the indicators of the construct signify the underlying latent construct, exceeded the critical threshold of 0.7. Moreover, the AVE, which captures the overall variance explained by the latent construct indicators, surpassed the recommended threshold of 0.5 (Hair Jr et al., 2020). Cronbach's Alpha was employed to assess internal consistency, which gauges the reliability through the interrelatedness of the observed item variables. The obtained values exceeded the requisite threshold of 0.70 (Hair et al., 2019). This study observed widely recognized standards to evaluate the reliability of the measurement model, including criteria such as AVE, discriminant validity, and convergent validity. The reliability assessment consistently met the criterion of 0.70 across all constructs (Hair Jr et al., 2020) See Table 3

Table 3: Reliability and validity

Reliability and Validity						
			Alpha	CR	AVE	VIF
EK1	0.758	Environmental Knowledge	0.849	0.898	0.688	1.649
EK2	0.842					
EK3	0.843					
EK4	0.871					
EP1	0.837	Environmental performance	0.885	0.921	0.744	2.567
EP2	0.890					
EP3	0.866					
						2.711

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Since this survey is a self-reported one, please report the results of common method bias test, at least using a harman-factor test and marker-variable test or CLF approach. See the series of publications by Podsakoff et al. and Lindell.

Number: 2      Author: I Made Sukresna      Subject: Comment on Text      Date: 20/12/2023 7:28:44 pm

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I agree this research uses PLS-SEM, but you should change the rationale. Your research does not conform these statements. Your research has large sample (more than 200 samples), so it might be normally distributed. In addition, the type tends to explanatory since the indicators totally adapt previous researches, not developing new indicators. PLS-SEM also well-suited for both reflective and formative indicators (see series of publication of Hair). Therefore, it is better to use another rationale, such as: this research uses continuous moderator, hence PLS-SEM is more suitable than CB-SEM (see Hair et al. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *Int. J. Multivariate Data Analysis*, 1(2), 107-123; Matthews et al. (2018). PLS-SEM: The Holy Grail for Advanced Analysis. *The Marketing Management Journal*, 28(1), 1-13.

EP4	0.857					2.403
GI1	0.769		0.904	0.926	0.675	2.329
GI2	0.839					1.752
GI3	0.852	Green Innovation				2.962
GI4	0.855					3.085
GI5	0.794					2.729
GI6	0.819					2.729
GKM1	0.766		0.887	0.917	0.689	2.682
GKM2	0.852	Green knowledge Management				1.762
GKM3	0.863					2.423
GKM4	0.869					2.569
GKM5	0.796					2.590
GKS1	0.815		0.826	0.885	0.657	1.833
GKS2	0.806	Green knowledge sharing				2.021
GKS3	0.816					1.891
GKS4	0.807					2.027

4.3 Discriminant Validity

Discriminant validity is predicted by three different criteria. First is the Heterotrait-Monotrait Ratio, then the Fornell and Larcker criterion, and last is cross loadings. All three criteria are under threshold and successfully evaluated that all constructs in the model are distinct from each other and measure different underlying concepts (Henseler et al., 2015). Hereafter, it supports the discriminant validity established. To further check for the discriminant validity, (Table 4) has highlighted results.

Table 4: Discriminant and Correlations

HTMT Ratio					
	EK	EP	GI	GKM	
EP	0.787				
GI	0.673	0.654			
GKM	0.747	0.667	0.654		
GKS	0.659	0.619	0.622	0.631	
Fornell and Larcker Criterion					
	EK	EP	GI	GKM	GKS
EK	<b>0.830</b>				
EP	0.687	<b>0.863</b>			
GI	0.592	0.591	0.822		
GKM	0.652	0.593	0.592	<b>0.830</b>	
GKS	0.553	0.532	0.540	0.542	<b>0.811</b>

#### 4.4 F Square

F Square is used to measure the proportion of variance explained in the dependent variable or effect size by adding a specific independent variable to the model. Higher F Square values indicate that a larger proportion of variance in the underlying constructs. (Table 5) provides for the endogenous construct, the F Square values for EK and EP (0.192), and the F Square values for GI and GKM is 0.539. The remaining F square values are highlighted in (Table 5). In this study, the inner (VIF) method, as introduced by (Kock, 2015), was utilized to examine the presence of CMB. This involved conducting a comprehensive collinearity test to assess potential issues related to share method variance.

Table 5: Variance Inflation Factor and F square

Variance Inflation Factor (inner VIF)			
	EP	GI	GKS
EK	1.000		
GI	1.000		
GKM	1.000	1.000	1.000
GKS	1.000		
F-Square			
	EP	GI	GKS
EK	0.192		
GI	0.040		
GKM	0.026	0.539	0.415
GKS	0.023		

#### 4.5 R square and Adjusted R square

The model's fitness is estimated by values of R-squared ( $R^2$ ) and adjusted R-squared ( $R^2$  adjusted). They provide information about how well the independent variables explain the variance in the dependent variable. The descriptive power of a model can be enumerated by calculating its  $R^2$  value. Figure 2 and Table 6 highlight that for the GI and EP, the  $R^2$  values are 0.553 and 0.350, respectively. To evaluate the predictive power of the model researchers used  $Q^2$  value technique (Shmueli et al., 2019).  $Q^2$  assists in assessing the extent to which an exogenous construct influences on endogenous construct.  $Q^2$  values of EP and GI, are 0.497 and 0.347, which imply substantial predictive importance of model. All other values can be seen in Table 6.

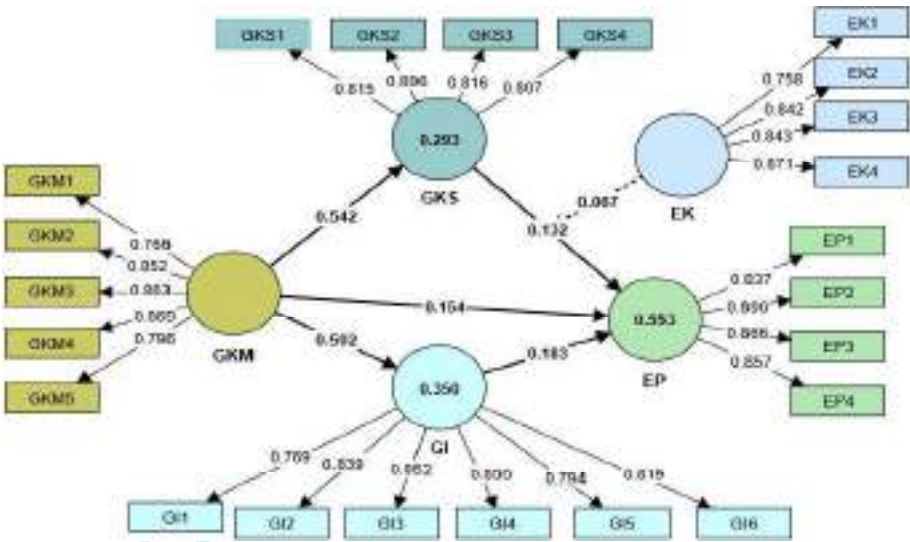


Figure 2:Measurement Model

Table 6: R2 and Q2

R2 and Q2				
	R-square	R-square adjusted	Q2	R2
EP	0.553	0.549	0.497	0.713
GI	0.350	0.349	0.347	0.811
GKS	0.293	0.292	0.288	0.848
SRMR		0.054		0.091
NFI		0.855		0.847

4.6 Overall Model Fit

In SEM, the outer model assesses measurement validity and reliability, while the inner model calculates predictive efficacy (Henseler et al., 2015). Model fit was evaluated using the SRMR and the NFI. The model’s good fit to the data is suggested by the calculated SRMR value of 0.05 and the NFI value of 0.855.

4.7 Direct Path Analysis

Bootstrapping employs a resampling process with replacement to augment the effective sample size, allowing for improved statistical inference and estimation of parameters. In the process of bootstrapping, every observation is repeatedly drawn from the population with replacement, ensuring that all elements within the datasets have an equal opportunity to be selected as samples. This approach helps generate a representative and robust distribution of statistics or parameters. Indeed, during bootstrapping, it is possible for an observation to be chosen multiple times (with replacement), or in some instances, not to be included

in the generated sample. This characteristic of bootstrapping allows for variability in the resampled datasets, which is crucial for statistical analysis and inference. The smallest sample size for bootstrapping typically equals the size of the actual sample. In most cases, researchers create resamples with replacements from their original datasets, maintaining the same sample size to preserve the statistical properties of the data (Wetzels et al., 2009). Bootstrapping with 10,000 sub-samples was employed in the study to enhance the precision of estimates for the relationships defined within the model, as well as to ascertain the significance and robustness of these relationships. This larger number of sub-samples helps to provide more reliable and stable statistical results (Hair et al., 2019). The outcomes of the analysis provided support for all of the direct relationships posited in hypotheses H1 to H5 shown in (Table 7). A positive and direct impact of GKM on EP was proposed by H1 ( $\beta=0.154$ , T-value=3.465P<0.001). Furthermore, A positive and direct impact of GKM on GI was proposed by H2 ( $\beta=0.592$ , T-value=21.042P<0.0000), further results are shown as below. (Table 7).

Table 7: Direct Path Analysis

Direct Path Analysis							
		Beta	Mean	SD	T-value	P values	Dec
H1	GKM -> EP	0.154	0.153	0.044	3.465	0.001	Acc
H2	GKM -> GI	0.592	0.593	0.028	21.042	0.000	Acc
H3	GKM -> GKS	0.542	0.542	0.033	16.220	0.000	Acc
H4	GKS -> EP	0.132	0.131	0.040	3.323	0.001	Acc
H5	GI -> EP	0.183	0.185	0.043	4.256	0.000	Acc

#### 4.8 Mediation and Moderation Analysis

The use of PLS-SEM methodology to investigate mediation effects has been a recurring topic of discussion and debate among researchers over time. Baron & Kenny, (1986) introduced The mediation analysis approach which has seen widespread adoption in recent research educations. The procedure's findings indicated the existence of both direct and indirect effects, where the indirect effects played a fractional mediating role in the connection between GKM and EP. These outcomes provided support for the hypothesized mediating roles of business development and dynamic process capabilities results are shown in (Table 7). Tests also made on moderating effects. A positive and significant impact of moderating effect on GI and EP was proposed, thereby supporting H5 ( $\beta= 0.067$ , T-value=2.841, P=0.0000), see (Table 7)

Total indirect effects						
	Beta	Mean	SD	T-value	P values	Dec
GKM -> EP	0.180	0.181	0.030	5.941	0.000	Acc



Specific indirect effects						
	Beta	Mean	SD	T-value	P values	Dec
GKM -> GKS -> EP	0.071	0.071	0.022	3.228	0.001	Acc
GKM -> GI -> EP	0.109	0.110	0.026	4.119	0.000	Acc

Moderation						
	Beta	Mean	SD	T-value	P values	Dec
H6 EK x GKS -> EP	0.067	0.067	0.024	2.841	0.005	Acc

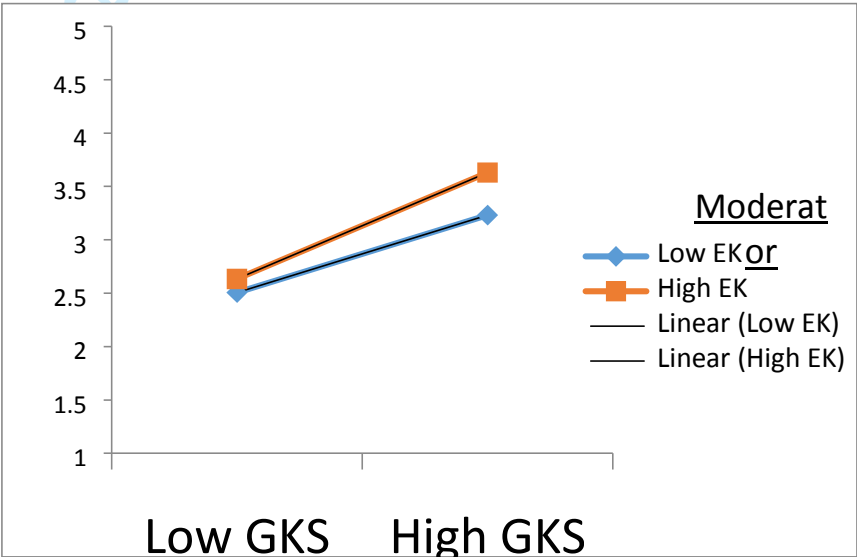


Figure 3: EKx GKS-> EP

5. Discussions and findings

Support for the direct relationship proposed in hypothesis H1 through H6 is provided by aforementioned results. Each variable within the conceptual model was individually examined, and the computed empirical values exceeded the predefined threshold. The results show that GKM helps to improve EP in SMEs manufacturing firms. GKM is vigorous in bolstering an EP. Research studies have additionally showcased the pivotal role of GKS and GI as a mediator in the connection between GKM and EP. Therefore, the EK is moderate between GKS and EP. Our research findings valuable managerial insights for Pakistani manufacturing SMEs (Adomako & Tran, 2022). RBV are very effective to enhance EP when integrated with GI and GKM. Furthermore, we have elaborated the discussion part in more detail below.



Number: 1

Author: I Made Sukresna

Subject: Highlight

Date: 19/12/2023 9:44:50 pm

Do not write it in a table form. Instead, write it in paragraphs.

References	Research Objectives	Key findings	Similarities and dissimilarities with our research findings
(Shahzad, Qu, Zafar, et al., 2020)	The significance of knowledge management within the context of corporate sustainability performance, incorporating elements of green innovation and organizational agility, is sought to be analyzed by this paper, guided by the framework of the Resource-Based View theory	Furthermore, it is observed that organizational agility exerts a favorable influence on both green innovation and corporate sustainable performance, albeit without a moderating effect on the relationships between them. This study elucidates that organizations that commit to innovative technologies and the adoption of environmentally-friendly strategies not only prove proficient in achieving sustainable performance but also underscore the significance of softer elements, namely knowledge management and organizational agility, within the contemporary knowledge-based economy.	The relationship between GKM on EP with the mediation of GI and GKS and the moderation role of EK is aimed to be examined by this paper. Our study is similar to previous research in theory, and GKM is found to positively influence GI.
(Shahzad et al., 2021)	We have formulated a comprehensive multidimensional framework rooted in the RBV. This framework serves as the underpinning structure for delineating the process by which GKM is harnessed to facilitate GI within the context of sustainable development practices.	It is demonstrated by our outcomes that endowing in and implementing the modern technologies and sustainable practices is not only valuable for long-term achievement but also that soft concerns for example managing organizational knowledge are vibrant in the present knowledge-based economy	Our results are similar with previous research GKM has positively significant impact on GI and GI in our framework use as a mediation. We have formulated a comprehensive multidimensional framework rooted in the RBV.
(Sahoo et al., 2023)	This study delves into an examination of the roles played by the achievement of green knowledge in the augmentation of both GKM and GI endeavors, with the ultimate objective of enhancing EP.	The findings of this study reveal that resource commitment exerts a moderating influence on the interaction between green knowledge acquisition, GKM, and GI. These results offer valuable practical insights that empower managers to prioritize the planning, allocation, and budgeting of resources toward the implementation of effective green practices, thereby facilitating improvements in EP.	Our findings show that GKM helps the organization to improve the EP. Furthermore, the study reveals that GI and GKS indicates a partial mediating role in the connection between GKM and EP. Additionally, it is noted that the presence of a EK amplifies the connection between GKS and EP.

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Number: 1      Author: I Made Sukresna      Subject: Comment on Text      Date: 20/12/2023 3:58:08 pm

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Similarity analyses is not enough. The discussion section should contain and follow the order of:

1. State the most contributed finding of the study. In this current research, the relationships of GKM -> GI -> EP deliver the largest influence. Hence, explain why this path delivers greater loading than the path of GKM -> GKS -> EP.
2. Explain why EK moderate the relationship of GKS -> EP. Also, in the current research, it is unclear how you can explain the role of low EK and high EK in moderating such relationship. Please explain

<b>(Rubel et al., 2021)</b>	The aim of this study is to investigate the impact of GKM on green service behaviors, with a specific focus on the mediating role of GKS as perceived by bank employees.	The results of the analysis reveal a noteworthy and positive direct impact of GKM on both green extra-role and in-role service behaviors, as well as on GKS. Furthermore, a substantial mediating part in the connection between GKM and green service behaviors is established for GKS..	The purpose of this study is to explore the effect of GKM on EP, with a specific focus on the mediating role of GKS and GI as perceived manufacturing SMEs.
<b>(Abbas &amp; Khan, 2023)</b>	The goal of this study is to investigate whether the implementation of GKM enhances organizational GI capabilities, ultimately contributing to improved green performance.	The research findings indicate the GKM serves as a substantial and positive predictor of both organizational GI and green performance, augmenting their respective capabilities. Furthermore, the study reveals that GI plays a partial mediating role in the relationship between GKM and corporate green performance. Additionally, it is noted that the presence of a green culture amplifies the connection between GKM and organizational GI.	These results offer valuable practical insights that empower managers to prioritize the planning, allocation, and budgeting of resources toward the implementation of effective green practices, thereby facilitating improvements in EP.
<b>(S. Ahmed et al., 2019)</b>	The interrelationship and impact of green knowledge sharing, green information systems, and adaptive information sharing behavior on organizational EP are explored by this study.	Hence, the study discerns that the adoption of GKS contributes to the creation of a green system, which in turn exerts a substantial influence on EP.	GKM directly positively impact on EP and to the adoption of GKS as mediation partially mediated between GKM and EP.
<b>(R. R. Ahmed et al., 2023)</b>	The impact of GI on EP is sought to be investigated by this research, ultimately contributing to overall organizational performance..	The research outcomes demonstrate that green innovation exerts a significant influence on both environmental and organizational performance. The research findings provide substantial contributions and emphasize the importance of practitioners and policymakers institutionalizing GI practices within their organizations as a means to enhance EP.	Our research outcomes GI exerts a significant Influence on EP. Overall, all hypotheses are supported by the findings, both in terms of indirect and direct effects, and various practical and theoretical implications are offered.
<b>(S. K. Singh et al., 2020)</b>	Utilizing the RBV and the ability-motivation-opportunity theory as frameworks, this study investigated the interactions among green human resource management, green transformational leadership, GI, and EP.	A firm's EP is affected by Green HRM, indirectly through GI. Overall, all hypotheses are supported by the findings, both in terms of indirect and direct effects, and various practical and theoretical implications are offered.	The research findings indicate the GKM serves as a substantial and positive predictor of EP through GI, augmenting their respective capabilities. Furthermore, the study reveals that GI plays a partial mediating part in the relationship between GKM and EP.

Additionally, it is noted that the presence of a green culture amplifies the connection between GKM and EP.

(Munawar et al., 2022)	To explore the relationship of green human resource management and GI within the hotel industry is the main objective of this study, with a specific focus on the mediation role of green human capital and EK, in addition to the moderating influence of managerial environmental concerns.	This research makes a valuable involvement to the current body of knowledge by empirically examining the relationships proposed in the context of environmental protection from a human capital theory perspective	Our findings reveals that Ek is positively significant moderate between GKS and EP.
(Song et al., 2020)	The indirect research stream of organizational learning theory is employed by our study to construct a moderated mediation model. In this model, absorptive capacity is acted upon as a mediator, elucidating the interactive impacts of green knowledge sharing and shareholder pressure on green innovation.	The outcomes of our study, derived from multiple regression and bootstrapping analyses, demonstrate that the relationship between GKS and GI is completely mediated by absorptive capacity. Furthermore, this mediation effect is positively moderated by stakeholder pressure	Exploring this research of RBV theory, our study conceptual model. In this study GKS and GI as a mediator and EK as a moderator in it .The outcomes of our study PLS-SEM bootstrapping analysis.

## 6. Conclusion

The core objective of this study was to discover the interconnection between GKM, EP with a particular focus on examining the mediating influence of GKS and GI and the moderating influence of EK. According to the study's results, it becomes evident that GKM plays a noteworthy and affirmative role in enhancing the EP initiatives and sustainable performance endeavors of the SMEs manufacturing firms. This outcome aligns with the study's primary objective. Hence, it is imperative for policymakers to launch a solid connection between GKM initiatives and the broader business policies, as this linkage can expedite both business performance and environmental sustainability. Additionally, the findings underscore the pivotal importance of fostering a EK within organizations as a critical factor in shaping their activities and outcomes and the strong relationship between GKM and GI and GKS. Finally the EK plays a significant

Place this section after the research limitations section.







role between GKS and EP. Furthermore, the RBV was utilized as the theoretical framework to provide insight into how these variables can contribute to the accomplishment of environmental sustainability.

6.1 Research Implications and limitations

The current research findings hold particular relevance for managers of SMEs manufacturing firms, as they indicate that GKM can be a valuable tool in helping these smaller enterprises attain sustainability objectives comparable to those achieved by larger corporations. Substantial benefits can be reaped by manufacturing from the effective implementation of GKM. A series of preparatory actions should be undertaken by policymakers to facilitate the successful implementation of GKM, as recommended by the study. Additionally, the organization of practical training and educational sessions for employee development is essential for organizations aspiring to become sustainable entities that not only generate more substantial revenue but also minimize the environmental effect of their operations. The present research also underscores the significance of EP as a crucial factor in assisting organizations through the effective execution of GKM. Nevertheless, in this context, it is imperative for top management to actively endorse an environmentally-friendly Knowledge within the organization. This EK promotion serves the purpose of enhancing individual capabilities to innovate in a sustainable and eco-friendly manner, aligning with the organization's Sustainable Development goals.

Theoretically, a noteworthy involvement to the limited existing body of RBV concerning the intricate relationship between GKM, GKS, GI, and EP is made by this research. The significance of a steady convergence among GKM and green theory as a pivotal resource in facilitating the realization of EP is emphasized by the study's recommendation. Drawing from the tenets of GKM, it underscores that GKM, being a dynamic capability, can emerge as a critical element contributing to a company's competitive advantage and its performance in the realm of sustainability and environmental responsibility. The study accentuates the significance of EP in serving as a bridge between GKM, a relationship that has received limited in-depth scrutiny in previous research. As demonstrated in this study, the effective implementation of the GKM system is instrumental in fostering EP.

While this study has yielded valuable theoretical and practical insights, it is important to acknowledge that the complexity of the research problem has led to certain limitations that necessitate further exploration in subsequent studies. The findings of this paper have some limitations that can impact the generalizability of the findings to the broader population of organizations in the country, as this study has been conducted in the specific context of Pakistan. Furthermore, scholars may not consider the specific contextual factors that are unique to Pakistan, such as cultural, regulatory, or market conditions. These factors may influence the relationships between GKM, GKS, GI, EK, and EP differently in Pakistan compared to other countries.

	Number: 1	Author: I Made Sukresna	Subject: Comment on Text	Date: 21/12/2023 12:13:34 pm
I cannot find the mentioned actions. Please describe them in the context of SMEs in Pakistan.				
	Number: 2	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 4:03:23 pm
Place the theoretical contributions in the first paragraph of the research implications section				
	Number: 3	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:22:26 pm
Explain further the contribution of GKM within SMEs in extending the RBV study.				
	Number: 4	Author: I Made Sukresna	Subject: Comment on Text	Date: 20/12/2023 8:24:33 pm
This sentence is confusing, as EP is the final dependent variable. It is better to delete this sentence, or write it in other way that is in line with the findings of this current research.				

Long-term studies examining the relationships between GKM, GKS, GI, EK, and FP over time would provide stronger indications of causality. Researchers may use mixed-methods research approaches, combining quantitative and qualitative methods, which would provide a more holistic view of the topic. Researchers may use this study with different sectors or different regions by doing a comparative analysis in the future. This will add to the collection of knowledge and guide environmentally friendly practices and policies in the nation. Third, a different side of the research-based view (RBV) theory in the context of GKS and GI is illuminated by this study. A capital-based view or conservation of resources theory can be considered by future studies to investigate the similar conceptual model in diverse study settings. Casual relationships, as well as the mediating role of GI with GI dimensions and EP, can also be investigated by research.

### **Acknowledgements**

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### **Ethical approval**

Neither the entire paper nor any part of its content has been published or submitted/accepted elsewhere.

### **Consent to participate**

Not applicable.

### **Consent for publication**

All authors have seen the manuscript and agreed with submission to this journal.

### **Data availability**

Not applicable.

### **Competing interests**

The authors declare no competing interests.

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Management Decision

## LAMPIRAN SYARAT TAMBAHAN: REVIEWER JURNAL BEREPUTASI TERINDEKS SCOPUS

**B. Nama Jurnal: International Journal of Services, Technology and Management**

**Penerbit: Inderscience Enterprises Ltd.**

**Terindeks: Scopus Q4**

**SJR 2023: 0,16**

**Judul Artikel: Cracking the code of Customer Behaviour: An Integrated PLS-SEM ANN  
framework for anticipating buying intentions in online food delivery**

**Waktu: 29 Desember 2023 - 2024**

No.	Butir	Tanggal	Halaman
1	Tawaran awal untuk menilai	29 Desember 2023	1
2	Konfirmasi atas persetujuan menilai	11 Januari 2024	2
3	Pengumpulan hasil penilaian 1	7 Februari 2024	3
4	Permintaan menilai revisi 1	4 Maret 2024	40
5	Pengumpulan hasil penilaian atas revisi 1	19 April 2024	42
6	Permintaan menilai revisi 2	24 April 2024	73
7	Pengumpulan hasil penilaian atas revisi 2	27 April 2024	75

### 1. Tawaran awal untuk menilai (29-12-2023)



This study employs the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model to investigate the factors influencing user behaviour towards online food delivery systems, emphasizing trust's moderating influence. Utilizing Artificial Neural Network (ANN) and SmartPLS, the research examines data collected from 250 users of online food delivery systems. The study reveals that facilitating conditions significantly impact users' intention behaviour, followed by performance expectancy, effort expectancy, and social influence. Remarkably, these findings remain consistent across both analytical methods. Consequently, the study underscores the significance of providing easy and convenient access to services within online food delivery systems to enhance user adoption and retention. Furthermore, the research identifies trust as a significant moderator in the relationship between effort expectancy and intention behaviour. The implications of these findings are invaluable for online food delivery companies, as they offer insights to improve their services and attract a more extensive customer base.

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Title: "Cracking the code of Customer Behaviour: An Integrated PLS-SEM ANN framework for anticipating buying intentions in online food delivery."  
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We are most grateful for your valuable time and assistance during the peer-review process of this paper and appreciate your contribution to maintaining the quality of Inderscience Publishers journals.

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#### Submission details

Title: THE ROLE OF TRUST ON ENHANCING BUYING INTENTIONS IN ONLINE FOOD DELIVERY: FINDINGS FROM A DEVELOPING COUNTRY

Journal: Int. J. of Services Technology and Management

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#### Evaluation Form: Round 1

Submitted: 07 Feb 2024

#### MANUSCRIPT FEATURES

#### Reviewer Replies

Likelihood of passing the test of time

Acceptable

Completeness of the work

Marginal

Acknowledgement of the work of others by references

Good

Organisation of the manuscript

Acceptable

Clarity in writing tables graphs and illustrations

Good

Subject relevance

Good

Professional/industrial relevance

Good

Originality of the work

Marginal

#### QUALITY AND RIGOUR

Is the article too long?

No

Is the manuscript free of commercialism?

Yes

Are you aware of prior publication or presentation of this work?

Yes

Have you checked the equations and/or statistics? (if applicable)

No

#### RECOMMENDATION

Acceptable with major revisions



#### COMMENTS

Changes which must be made before publication:-

Please read the attached manuscript.

Consider deleting the 'ANN' technique.

The table must adhere to the journal format.

The title of the figures must be located above the figure.

Suggestions which would improve the quality of the article but are not essential for publication:-

None.

Confidential comments only for the editor:-

Please see the attached manuscript.

# **CRACKING THE CODE OF CUSTOMER BEHAVIOUR: AN INTEGRATED PLS-SEM ANN FRAMEWORK FOR ANTICIPATING BUYING INTENTIONS IN ONLINE FOOD DELIVERY**

## **Abstract**

This study employs the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model to investigate the factors influencing user behaviour towards online food delivery systems, emphasizing trust's moderating influence. Utilizing Artificial Neural Network (ANN) and SmartPLS, the research examines data collected from 250 users of online food delivery systems. The study reveals that facilitating conditions significantly impact users' intention behaviour, followed by performance expectancy, effort expectancy, and social influence. Remarkably, these findings remain consistent across both analytical methods. Consequently, the study underscores the significance of providing easy and convenient access to services within online food delivery systems to enhance user adoption and retention. Furthermore, the research identifies trust as a significant moderator in the relationship between effort expectancy and intention behaviour. The implications of these findings are invaluable for online food delivery companies, as they offer insights to improve their services and attract a more extensive customer base.

**Keyword:** *ANN, Online Food Delivery System, UTAUT, SmartPLS, Trust*








# Summary of Comments on 2023\_IJSTM-161670 - reviewed 1.pdf

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Page: 1

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## 1. Introduction:

Users of an Online Food Delivery System (OFDS) may look through menus and make orders from nearby eateries, all from the convenience of their computer or smartphone. (Ray et al., 2019). The food orders are then prepared by the restaurant and delivered to the customer's location by a delivery person (Raza et al., 2023). Many OFDS also offer the option for customers to pick up their orders at the restaurant (Hong et al., 2023).

OFDS can be convenient for customers, as they can order food from their favourite restaurants without leaving their homes or office (Lau & Ng, 2019). They also offer a suitable option for people who may not have transportation access or prefer not to drive (Visser et al., 2014). Additionally, the items delivered via OFDS are one-of-a-kind: extremely perishable and diverse (Kotler et al., 2016).

Many different OFDS operate in various countries, including Grubhub, UberEats, & DoorDash in the United States; Deliveroo in the U.K.; and Swiggy and Zomato in India (McCain et al., 2022). These companies typically charge a fee for their services, which may be paid by the customer or the restaurant (Prasetyo et al., 2021).




India's online food delivery market has grown remarkably in the past few years. As per statistics provided by the Indian Brand Equity Foundation, the market value of online food delivery services in India reached around \$3.9 billion in 2020 and is projected to exhibit a compound annual growth rate of 22% from 2020 to 2025.

Since the 1890s, India has had a rich history of food delivery services, including early examples such as the Mumbai dabbawallas (Baindur & Macário, 2013). The growth of online food delivery services (OFDS) in India can be attributed to several factors, with one of the primary drivers being the surge in popularity of e-commerce and internet growth in the country. As per the World Bank, the proportion of India's population with internet access rose from 15% in 2013 to 55% in 2020, representing a substantial increase in internet users. This trend is expected to continue, leading to a surge in demand for online services like OFDS as more individuals in India gain internet access and become comfortable with online platforms.

In addition, OFDS offers a convenient option for customers who may not have the time or desire to go out to a restaurant or who may not have access to transportation. The growth of OFDS has also been facilitated by the expansion of internet infrastructure and the increasing availability and affordability of internet-enabled devices such as smartphones.

India's online food delivery market has witnessed substantial expansion in recent times and is poised to continue growing in the foreseeable future. Nevertheless, online food delivery services (OFDS) may expose restaurant owners and customers to potential risks concerning the maintenance of appropriate temperatures during delivery, the hygiene of delivery drivers, and the possibility of food tampering. Temperature control is an essential factor in safely handling and delivering food. If food is not kept at the appropriate temperature during delivery, eating can become unsafe. OFDS faces challenges in maintaining the proper food temperature during delivery, especially if the delivery takes a long time.

Delivery drivers' hygiene is also a concern for OFDS, as poor hygiene practices can lead to food contamination. OFDS can implement measures such as providing drivers with hand

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sanitizer and requiring them to wear masks to help reduce the risk of contamination (Kim et al., 2008).

Food tampering is another risk associated with OFDS. While the risk of food tampering is low, it is still a concern for restaurant owners and customers. OFDS can implement measures such as using tamper-evident packaging and training drivers on food handling procedures to help reduce the risk of tampering (Ray et al., 2019). Thus, trust is crucial in the food delivery system as it encourages customer loyalty, contentment, and preservation (Assaker et al., 2020; Sinha et al., 2021) and helps build a positive reputation for the food delivery service (Munikrishnan et al., 2023). Building customer trust requires high-quality food, timely delivery, good customer service, data security, and transparency (Aslam et al., 2020; Ratasuk & Gajesanand, 2023).

## 2. Literature Review

UTAUT2 is a theory that attempts to explain and foretell how people would adopt and utilize technological systems. The theory expands on the work of Venkatesh et al. (2003), who created the UTAUT framework and identified four primary constructs—performance expectancy, effort expectancy, social influence, and facilitating condition—that affect technology acceptance and usage. Hedonic motivation (i.e., the pleasure one derives from utilizing the technology) and habit formation are two constructs that build UTAUT2 on the original concept (i.e., the automatic and unconscious use of the technology). In addition, it stresses the significance of human variables (such as age, gender, and experience) and contextual elements (such as culture and task characteristics) in determining technology adoption and usage (Murarka et al., 2020).

Performance expectancy is the extent to which a person perceives that utilizing a particular technology will assist them in accomplishing their objectives (Yapp et al., 2018). It is a significant factor in determining a person's intention to use technology and is considered a crucial indicator of technology acceptance and adoption (Gunden et al., 2020a).





The term “performance expectation” describes a person's confidence that using a particular technology would improve performance and facilitate attaining set objectives. Efficiency, communication, decision-making, and convenience are some possible upsides. Individuals are more likely to accept and use new technologies if they are confident that such technologies will improve their performance (Hong et al., 2023).

Customers are more inclined to utilize an online meal delivery app if they feel that doing so would help them complete a task more quickly and easily and save time while placing their food orders (Morosan & DeFranco, 2016). On the other hand, if they believe that the app is difficult to use or that the food quality will be lower, they may be less likely to use it and hence it led to our first hypothesis:

*H<sub>1</sub>: The level of performance expectancy among customers of online food delivery services positively and significantly influences their purchase intention.*

The following significant component to purchase intent is Expected effort. In an online meal delivery system, client contentment and loyalty are determined mainly by the speed of delivery. When consumers use technology to place their food orders, they anticipate a streamlined and

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straightforward experience that makes it simple to locate what they're searching for and finish the transaction swiftly (Chua et al., 2017).

The user-friendliness of the application or website used to make the purchase is a factor in estimating the effort required. It includes navigational convenience, the ability to search for particular menu items, and the availability of extensive information about each item, such as its components and nutritional content (Hong et al., 2023). A well-designed and user-friendly interface may make the ordering experience for clients considerably more efficient. Hence, providing for our second hypothesis:

*H<sub>2</sub>: The level of effort expectancy among customers of online food delivery services positively and significantly influences their purchase intention.*

Social influence is the effect of others' beliefs, behaviours, and attitudes on one's thoughts and actions (Fishbein & Ajzen, 1977). In the case of online meal delivery, customers' purchasing choices may be significantly impacted by the level of social influence they are exposed to.

Word-of-mouth recommendations are one way social influence may affect the desire to buy online meal delivery (Gunden et al., 2020b). Customers are more inclined to purchase from a meal delivery service if they hear excellent reviews from friends, family, and other reliable sources (Pitchay et al., 2022). These suggestions may influence consumers' opinions of the service's quality, dependability, and value, hence increasing the likelihood that they will place an order.

Social proof is one way that peer conditioning may affect purchasing intent. Social proof is when individuals turn to others for direction when making judgments (Bao & Zhu, 2022). For instance, if customers discover that a meal delivery service has a significant number of favourable comments or a higher rating on a review website, they may be more inclined to buy from that service because they believe it to be a reliable and popular one (Jun et al., 2022).

Similarly, the popularity of online meal delivery services with many followers on social media platforms may influence the customer's propensity to buy (Ariffin et al., 2021). Hence on the backdrop of previous literature, we propose following hypothesis:

*H<sub>3</sub>: The level of social influence among customers of online food delivery services positively and significantly influences their purchase intention.*

Facilitating conditions are external variables that make it simpler for customers to execute a transaction. In food delivery, these factors might include payment choices, delivery alternatives, and general website or application usability (Zhao & Bacao, 2020).

Payment choices are an essential enabling condition. Customers need the ability to pay for food delivery in an easy and secure manner. It may include credit cards, debit cards, internet banking, mobile wallets, and cash-on delivery alternatives (Pitchay et al., 2022). The greater the number of possible payment methods, the greater the likelihood that a consumer will finish their transaction.

Another crucial criterion is the availability of delivery choices. Customers want a selection of delivery alternatives, such as standard delivery, rapid delivery, and pickup, and the ability to choose a delivery time that is convenient for them (Hooi et al., 2021). More delivery choices increase the likelihood that a consumer will make an order.

Too weak. Add more supporting empirical findings.

The usability of a website or application is also a critical enabling condition. A well-designed and user-friendly website or app may make it much simpler for clients to locate what they need and finish a transaction (Suhartanto et al., 2019). It includes navigational simplicity, product information clarity, and a straightforward checkout procedure. It provides for our next hypothesis:

*H4: Facilitating conditions positively and significantly impact the Purchase Intention of Online Food Delivery Service Customers.*

Trust is faith in the technology and its provider's dependability, integrity, and capability. High levels of trust may promote increased acceptance and use of technology, but low levels might stymie adoption and usage (Hong et al., 2021). Customers who have faith in a delivery service will likely come back and utilize it again. They believe the service would bring their meals on schedule and in excellent shape. The trust may aid in developing a favourable reputation for delivery service (Troise et al., 2021). Customers are more inclined to promote a service when they had a pleasant experience. It may lead to more business and customers. Trust is also essential when safeguarding client information's security (Zhao & Bacao, 2020). Customers who trust a service are more inclined to reveal sensitive information, like credit card numbers, without hesitation. It is critical for avoiding fraud and other security risks. Trust is also essential for ensuring customer items are delivered on time. Customers who trust a service are confident that their meals will be delivered on time (Lau & Ng, 2019). It is critical for preserving client satisfaction since delays or delivery difficulties may cause irritation and discontent (Sinha et al., 2021). Finally, trust helps to guarantee that consumers get high-quality meals. Customers who trust a delivery service have faith that the food will be properly cooked, wrapped, and safe to consume (Siddiqui & Siddiqui, 2021). It is critical for sustaining client satisfaction since food quality concerns may lead to discontent.

*H5: Trust moderates the relationship between Performance Expectancy and Buying Intention.*

*H6: Trust moderates the relationship between Effort Expectancy and Buying Intention.*

*H7: Trust moderates the relationship between Social Influence and Buying Intention.*

*H8: Trust moderates the relationship between Facilitating Condition and Buying Intention.*

Figure 1 shows the theoretical underpinnings of the research.



<INSERT FIG. 1 HERE>

### 3. Data Description

After conducting an exhaustive search of the available research (Assaker et al., 2020; Hong et al., 2023; Jun et al., 2022; Kim et al., 2008; Lau & Ng, 2019; Prasetyo et al., 2021), a self-administered questionnaire was designed for the present study. During the screening process, it was determined whether each participant had placed at least two orders for food delivery through the Internet during the last four months. Some previous studies are based on single order (Jun et al., 2022). However, the focus group formed for the present study opined that a single order may create a bias based on a single experience; hence, a minimum of five orders will provide a better result. As a result, the screening criteria were extended to include at least five online orders.

The survey was widely shared throughout the most well-known and often-used social media networks like Twitter, Facebook, Linked-in, etc., to acquire the necessary responses. The online



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platform was selected for purpose as it ensures that the questionnaire is filled by those respondents who are active online. There were two parts to the questionnaire. In the first part, we asked respondents to fill out some demographic details about themselves, such as their age, gender, marital status, annual family income, level of education, etc. The next part included items about the constructs. A total of 20 items were sourced from previously published works. The respondents were asked to show their preferred response on a 5-point Likert scale for every item. A total of 250 data was received. However, 26 people did not complete the survey in its entirety.

Further, seven respondents did not correctly answer the attention check question and were thus disqualified. After eliminating irrelevant data, 217 responses remained for further examination. Hence, the total number of responses exceeds the minimum threshold of 200 required for performing SEM (Kline, 2015). Therefore, the present investigation validated the adequate sample size.

#### 4. Materials and Methods<sup>1</sup>

An integrated two-stage PLS-SEM ANN approach was applied in the present study as it combines the strengths of two powerful techniques, Partial Least Squares Structural Equation Modeling (PLS-SEM) and Artificial Neural Networks (ANN), to provide more accurate and reliable predictions of customer buying behaviour in OFDS.

The PLS-SEM approach enables the identification of latent variables and their relationships with observed variables, while the ANN approach is highly effective in identifying patterns and relationships between variables. By combining these two techniques, the integrated approach can better capture the complex relationships between customer characteristics, online food delivery service features, and buying behaviour.

Additionally, the two-stage approach involves using PLS-SEM to identify the key factors that influence customer buying behaviour and then using ANN to develop a predictive model based on these factors. This approach can result in a more accurate and robust predictive model than using either technique alone.

Overall, an integrated two-stage PLS-SEM ANN approach can better customer behaviour in online food delivery services, which can help companies improve their marketing strategies, optimize their services, and increase customer satisfaction and loyalty.




#### 5. Results & Discussion<sup>3</sup>

##### 5.1 Measurement Model

PLS algorithm was performed to investigate whether the item loaded into their respective construct or otherwise. The finding suggests that all the item load into their respective construct with values more than 0.7, and there was no case of cross-loading (Vinzi et al., 2010). The same is depicted in *Table 1*.

<INSERT TABLE 1 HERE>

PLS algorithm also provided the value of Cronbach alpha. The value was above the minimum threshold of 0.7, hence providing for the reliability of the items used in the research. Assessing construct reliability permits determining whether a given variable or group of variables reliably

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measures what they claim to measure (Straub et al., 2004). The score for construct reliability was also found to be above the threshold of 0.7, emphasizing internal reliability. The value of Cronbach alpha and Construct reliability is provided in Table 2.

**<INSERT TABLE 2 HERE>**

To measure the discriminant validity Fornell & Larcker, (1981) criteria is applied. Measurement models' discriminant validity is often examined using this criterion, which is a standard statistical test. As per this criteria, a construct's correlation with other constructs must be lower than the square root of the average variance retrieved by the construct. When this prerequisite is met, discriminant validity is established. The finding is shown in Table 3, which highlights the fact that discriminant validity holds good.

**<INSERT TABLE 3 HERE>**

Convergent validity provides how well the scale correlates with existing measures of the same concept. The concept should have a positive correlation with comparable variables and a negative correlation with unrelated ones. The AVE is determined by averaging the squared loadings of all indicators that belong to a specific construct. The statistical threshold for convergent validity is an AVE of  $>0.50$ . Table 4 depicts the AVE value of the constructs. The finding suggests that the value of AVE is above the minimum threshold.

**<INSERT TABLE 4 HERE>**

## 5.2 Structural Model

A structural model is developed to assess the relationship between endogenous and exogenous variables. The model investigates the relationship between four exogenous constructs on the endogenous construct. To check the impact and significance of each relationship bootstrapping with 5000 sub-sample was performed. The result suggests that all the relationships developed are significant.

The bootstrapping result suggests that Performance Expectancy ( $\beta = 0.269$ ,  $t > 1.96$ ,  $p < 0.05$ ), Effort Expectancy ( $\beta = 0.208$ ,  $t > 1.96$ ,  $p < 0.05$ ), Social Influence ( $\beta = 0.184$ ,  $t > 1.96$ ,  $p < 0.05$ ), and Facilitating Condition ( $\beta = 0.292$ ,  $t > 1.96$ ,  $p < 0.05$ ) significantly impact the Behavioural Intention of individual toward online food delivery services. The output is depicted in Fig. 2, and the result is illustrated in Table 5.

**<INSERT FIG. 2 HERE>**

**<INSERT TABLE 5 HERE>**

The  $R^2$  value provides the proportion of variation in the dependent variable explained by the independent variables. In the present model, the value of  $R^2$  is 0.74 (see Table 6), implying that the Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Condition explain 74% of the variance in the Behavioural Intention.

<INSERT TABLE 6 HERE>

Next, a moderator, trust, was introduced, and its impact on all the four relation was analysed. Examining the influence of moderating relationships is done by evaluating the effects of interaction terms (i.e., the product of moderator and predictor). It allows one to determine whether or not moderator modifications amplify the intensity of the focus relation (Hair et al., 2016). A Product indicator approach is used so as to multiply every indicator by every other indicator (i.e., every indicator of trust will be multiplied by every indicator of Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Condition), indicators were standardized, and an automatic weighing mode is used. After that, consistent PLS Bootstrapping is applied to identify if the impact of the moderator on the relationship is significant or otherwise. The output is given in Fig. 3, and the result of the same is provided in Table 7

<INSERT FIG. 3 HERE>

<INSERT TABLE 7 HERE>

The result suggests that trust significantly moderates the relationship between Effort Expectancy and Behavioural Intention ( $t > 1.96$ ,  $p < 0.05$ ), hence supporting  $H_5$ . However, it was observed that trust does not significantly moderate the relationship between  $H_6$  other three variables, i.e., Facilitating Condition and behavioural intention ( $t < 1.96$ ,  $p > 0.05$ ), Performance Expectancy and behavioural intention ( $t < 1.96$ ,  $p > 0.05$ ), and Social Influence and behavioural intention ( $t < 1.96$ ,  $p > 0.05$ ). Thus, our hypotheses,  $H_6$ ,  $H_7$ , and  $H_8$ , are not supported.

### 5.3 ANN Analysis

The study utilized SPSS 20 to create a neural network model with four important independent variables from SEM (Effort Expectancy, Facilitating Condition, Performance Expectancy, and Social Influence) as input and one output variable (Behavioural Intention). We normalized all inputs and outputs to a range of [0,1] to optimize training effectiveness. We employed a hyperbolic tangent activation function and identity function for neurons in the hidden layer and output layers, respectively. We also implemented ten-fold cross-validation, using 90% of the data for network training and 10% for testing to prevent over-fitting. The ANN model developed is depicted in Fig. 4.

<INSERT FIG. 4 HERE>

We calculated the Root Mean Square of Error (RMSE) for both training and testing data sets and presented the averages and standard deviations for both data sets in Table 8.



<INSERT TABLE 8 HERE>

Our results demonstrated an accurate prediction with small average RMSE values (0.328 for training data and 0.320 for testing data) across all ten neural networks. The graphical representation is provided in Fig. 5

<INSERT FIG. 5 HERE>

The significance of each independent variable refers to how much the predicted value from the network model changes with varying values of the independent variable. Normalized importance is the proportion of the predictor's importance to the highest importance value. The findings of the sensitivity analysis are displayed in Table 9.

<INSERT TABLE 9 HERE>



Based on the results obtained from the analysis using both Artificial Neural Network (ANN) and Smart PLS, it can be concluded that Facilitating Condition has the highest impact on the intention of individuals using an online food delivery system. This finding is particularly noteworthy for businesses in the food delivery industry, as it suggests that providing customers with adequate resources and support to use their services can significantly increase the likelihood of customer intention to use them.

Performance Expectancy was the second highest predictor of intention behaviour, reinforcing the importance of ensuring customers have a positive perception of the benefits of using an online food delivery system. Effort Expectancy and Social Influence were also found to impact intention behaviour significantly but to a lesser extent than Facilitating Condition and Performance Expectancy.

These findings provide valuable insights for businesses looking to improve their online food delivery services and increase customer adoption. By enhancing Facilitating Conditions and Performance Expectancy, companies can improve customer intention to use their services and ultimately drive growth and profitability. This study contributes to the growing body of research on technology adoption. It highlights the importance of understanding the factors that influence customer behaviour in the context of online food delivery systems.

## 6. Conclusion

By extending the established theory by incorporating new dimensions of trust, this study sought to understand the forces for purchase Intention in the direction of OFDS. It is a significant effort considering the recent rise of online food delivery services, particularly in the wake of the COVID-19 pandemic. The investigation findings showed that all four factors, i.e., Performance Expectancy, Effort Expectancy, Facilitating Condition, and Social Influence, significantly influence the customer's Purchase Intention. It was also found that the Facilitating Condition was the most critical component in predicting the likelihood of a consumer making a purchase. The conclusion lends credence to earlier research that discovered a favourable relationship between the four variable and Purchase Intention (Al Amin et al., 2021; Bhatiasevi, 2016; Hong et al.,

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2021, 2023; Jun et al., 2022; Lau & Ng, 2019; Prasetyo et al., 2021; Ray et al., 2019; Troise et al., 2021).

The finding emphasizes the importance of trust<sup>[1]</sup> influencing customer behavior in the online food service industry, specifically in relation to effort expectancy. When customers trust the online food service provider, they are more likely to have higher expectations regarding the effort they put into using the service, believing that their efforts will yield satisfactory outcomes. This means that customers who trust the provider perceive that their actions, such as placing an order or providing feedback, will be met with positive results.

As a result<sup>[2]</sup> higher levels of effort expectancy lead to increased levels of behavioral intention among customers. Behavioral intention refers to the likelihood of customers engaging in positive behaviors, such as making repeat purchases and recommending the online food service to others through positive word-of-mouth.

Therefore, trust plays a crucial role in shaping customer behavior in the online food service industry. Customers who trust the provider are more likely to have higher expectations of their own efforts, leading to a greater likelihood of positive behaviors that contribute to the success of the business, such as repeat business and positive recommendations.

Given the significance of trust<sup>[3]</sup> online food service providers should prioritize building and nurturing trust with their customers. This can be achieved through various means, such as providing transparent and reliable service, ensuring timely and accurate deliveries, addressing customer concerns promptly, and maintaining a positive reputation in the industry. By cultivating trust, online food service providers can enhance customer satisfaction, loyalty, and overall business success.

## 6.1 Managerial Implication

Based on the research findings, several management implications<sup>[4]</sup> can be drawn.

Firstly, online food delivery service providers should focus on enhancing performance expectancy by improving food quality, providing a user-friendly interface, and ensuring timely and accurate delivery<sup>[5]</sup>. It will increase the likelihood of users returning and recommending the service to others.

Secondly, effort expectancy can be improved by simplifying the ordering and payment process, reducing the steps required to complete an order, and providing<sup>[6]</sup> a clear and concise menu. It will increase the likelihood of users completing their orders and reduce their chances of abandoning the process.

Thirdly<sup>[7]</sup>, facilitating conditions can be improved by ensuring service is available in all areas, offering multiple payment options, and providing clear and concise information about delivery times and order tracking. It will increase the convenience of the service and make it more accessible to a broader range of users.

Next, social influence can be leveraged by encouraging users to share their experiences online, providing referral incentives, and partnering with influencers to promote the service. It will increase the visibility of the service and create a positive reputation<sup>[8]</sup> which will, in turn, attract more users.

## Page: 10

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Add the analysis of the rejected hypotheses.			
Number: 3	Author: I Made Sukresna	Subject: Sticky Note	Date: 07/02/2024 10:03:14 pm
Why trust does not play a role in the impact of facilitating conditions as the highest predictor of purchase intention? Explain.			
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Number: 7	Author: I Made Sukresna	Subject: Sticky Note	Date: 07/02/2024 10:09:59 pm
Make it as the first implication.			
Number: 8	Author: I Made Sukresna	Subject: Sticky Note	Date: 07/02/2024 10:09:21 pm
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Lastly, by building and maintaining user trust, improving the ease and convenience of the ordering process, and gathering regular feedback, online food delivery service providers can increase user satisfaction and behaviour intention, leading to tremendous success and profitability. In conclusion, by focusing on these four key factors, online food delivery service providers can improve user experience and increase behaviour intention, leading to greater success and profitability.

## 6.2 Theoretical Implication

The theoretical implications of research findings highlighting the significant importance of performance expectancy, effort expectancy, facilitating conditions, and social influence on online food delivery service behavioural intention are significant.

Firstly, the study supports the Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use are the primary determinants of user acceptance and adoption of technology. The findings show that performance expectancy and effort expectancy are important predictors of behavioural intention, supporting the TAM model.

Next, the study demonstrates the importance of social influence in shaping behaviour intention, which is another key construct in the UTAUT model. The finding that subjective norms significantly predict behaviour intention supports the UTAUT model, which emphasizes the role of social influence in shaping technology adoption and usage.

Lastly, the study contributes to the growing literature on online food delivery service adoption and usage by identifying the specific factors that are most important in shaping behaviour intention. This knowledge can be used to inform the design of online food delivery services and marketing strategies and guide future research on this topic.

## 6.3 Limitation of Study

While the research provides valuable insights, the study has some limitations.


One limitation is that the study is based on self-reported data, which may be subject to response bias or social desirability bias. Participants may have provided answers that they believed would be perceived positively rather than accurately reflecting their true beliefs or behaviours.

Another limitation is that the study was conducted in a specific context and may not be generalizable to other contexts or populations. The study was conducted in a single geographic location, and the results may not apply to other regions or cultures where attitudes and behaviours toward online food delivery services may differ.


Additionally, the study only focused on a limited number of variables and did not consider other potential factors that may influence behaviour intention, such as price or convenience. Future research could explore the role of additional variables in shaping online food delivery service adoption and usage.

Finally, the study did not examine actual behaviour but only intention to behave in a certain way. It is possible that intention does not always translate into actual behaviour, and future research could explore the relationship between intention and actual behaviour in the context of online food delivery services.


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Delete this paragraph as you does not use TAM as the guiding theory in the Literature Review section.

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Delete this paragraph since you may overcome this limitation by testing Common Method Bias.

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explore another theories since the theories have their of own assumptions and perspectives.

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 Number: 1      Author: I Made Sukresna      Subject: Sticky Note      Date: 07/02/2024 10:13:33 pm  
It is better to not including a conference findings.

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What publication is this?

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Mediating Role of Perceived Risk in Food Delivery Service in Bangkok during the COVID-19 Pandemic. *Asia Social Issues*, 16(2), e253719–e253719.

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## LIST OF TABLES

Table 1: Factor Loading

	Behavioural Intention	Effort Expectancy	Facilitating Condition	Performance Expectancy	Social Influence
BI1	0.852				
BI2	0.887				
BI3	0.869				
EE1		0.756			
EE2		0.862			
EE3		0.863			
EE4		0.861			
FC1			0.803		
FC2			0.855		
FC3			0.877		
FC4			0.752		
PE1				0.846	
PE2				0.899	
PE3				0.881	
SI1					0.814
SI2					0.858
SI3					0.874

Source: The Authors (2023)

Table 2: Reliability Analysis

Construct	Cronbach's Alpha	rho_A	Composite Reliability
Behavioural Intention	0.839	0.839	0.903
Effort Expectancy	0.856	0.861	0.903
Facilitating Condition	0.84	0.847	0.893
Performance Expectancy	0.847	0.848	0.908
Social Influence	0.806	0.807	0.886

Source: The Authors (2023)

Table 3: Discriminant Validity

	<b>Behavioural Intention</b>	<b>Effort Expectancy</b>	<b>Facilitating Condition</b>	<b>Performance Expectancy</b>	<b>Social Influence</b>
Behavioural Intention	<b>0.87</b>				
Effort Expectancy	0.769	<b>0.837</b>			
Facilitating Condition	0.799	0.771	<b>0.823</b>		
Performance Expectancy	0.775	0.72	0.756	<b>0.876</b>	
Social Influence	0.766	0.767	0.773	0.729	<b>0.849</b>

Source: The Authors (2023)

Table 4: Convergent Validity

<b>Construct</b>	<b>Average Variance Extracted (AVE)</b>
Behavioural Intention	0.756
Effort Expectancy	0.7
Facilitating Condition	0.678
Performance Expectancy	0.767
Social Influence	0.721

Source: The Authors (2023)

Table 5: Result of Bootstrapping

<b>Hypothesis</b>	<b>Relation</b>	<b>Original Sample (O)</b>	<b>Sample Mean (M)</b>	<b>Standard Deviation (STDEV)</b>	<b>T Statistics (O/STDEV)</b>	<b>P Values</b>	<b>Result</b>
H1	Performance Expectancy -> Behavioural Intention	0.269	0.272	0.064	4.222	0	Supported
H2	Effort Expectancy -> Behavioural Intention	0.208	0.21	0.06	3.448	0.001	Supported
H3	Social influence -> Behavioural Intention	0.184	0.182	0.061	3.031	0.003	Supported
H4	Facilitating Condition -> Behavioural Intention	0.292	0.291	0.062	4.73	0	Supported

Source: The Authors (2023)

Table 6: R<sup>2</sup> value

	R Square	R Square Adjusted
Behavioural Intention	0.744	0.74

Source: The Authors (2023)

Table 7: Bootstrapping result

Hypothesis	Relation	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Result
H <sub>5</sub>	Trust X Effort Expectancy -> Behavioural Intention	0.108	0.107	0.049	2.208	0.028	Supported
H <sub>6</sub>	Trust X Facilitating Condition -> Behavioural Intention	-0.041	-0.051	0.068	0.604	0.546	Not Supported
H <sub>7</sub>	Trust X Performance Expectancy -> Behavioural Intention	-0.069	-0.069	0.06	1.154	0.249	Not Supported
H <sub>8</sub>	Trust X Social Influence -> Behavioural Intention	-0.076	-0.073	0.056	1.35	0.177	Not Supported

Source: The Authors (2023)

Table 8: RMSE Value

Network	RMSE [Training] [B.I.]	RMSE (Testing) [B.I.]	Absolute Difference
1	0.327	0.290	0.037
2	0.347	0.286	0.061
3	0.334	0.299	0.034
4	0.316	0.344	0.028
5	0.334	0.390	0.057
6	0.328	0.380	0.052
7	0.321	0.330	0.009
8	0.323	0.244	0.080
9	0.330	0.352	0.022
10	0.323	0.285	0.038
<b>Mean</b>	<b>0.328</b>	<b>0.320</b>	<b>0.042</b>
<b>STDEV</b>	<b>0.009</b>	<b>0.047</b>	<b>0.021</b>

Source: The Authors (2023)

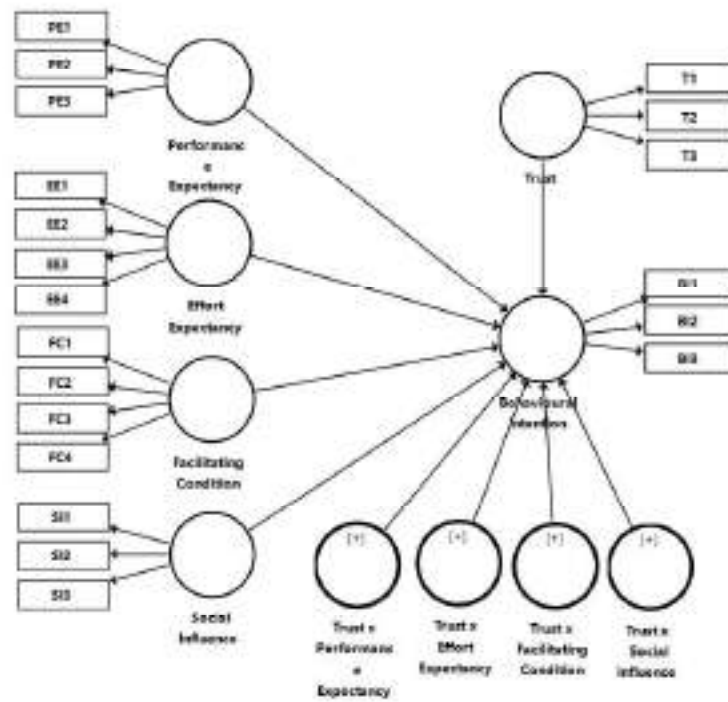
Table 9: Sensitivity analysis of input features

Neural Network (N.N.)	S.I.	FC	EE	PE
ANN1	0.20	1.00	0.95	0.44

<b>ANN2</b>	0.24	1.00	0.73	0.38
<b>ANN3</b>	0.43	0.69	0.40	1.00
<b>ANN4</b>	0.32	1.00	0.41	0.22
<b>ANN5</b>	0.65	0.85	1.00	0.94
<b>ANN6</b>	0.53	1.00	0.29	0.40
<b>ANN7</b>	0.20	0.49	0.23	1.00
<b>ANN8</b>	0.06	1.00	0.14	0.07
<b>ANN9</b>	0.25	1.00	0.12	0.16
<b>ANN10</b>	0.27	1.00	0.46	0.42
<b>Average Importance</b>	0.31	0.90	0.47	0.50
<b>Normalized Importance</b>	35%	100%	52%	56%
<b>Rank</b>	4	1	3	2

Source: The Authors (2023)

## LIST OF FIGURES



*Fig. 1: Conceptual Framework*

Source: The Authors (2023)

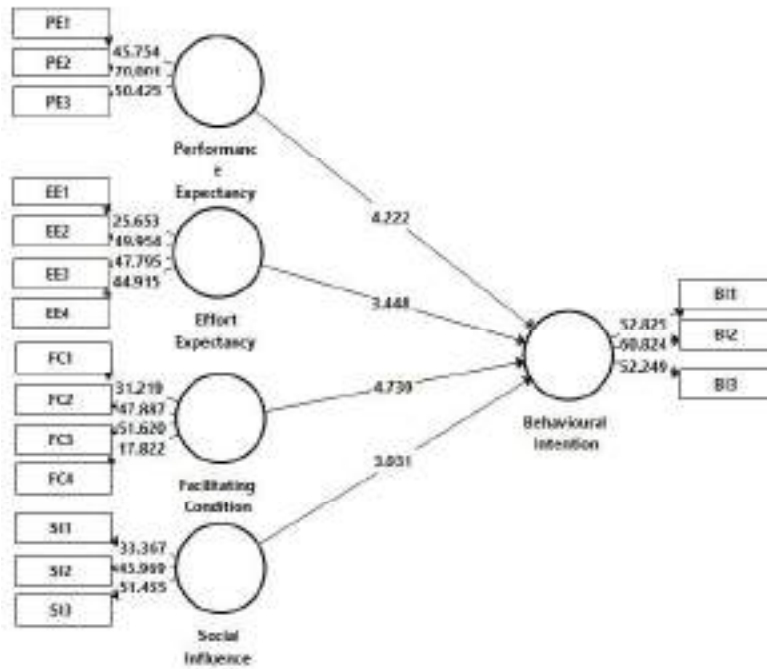


Figure 2: Result of Structural Equation Modeling

Source: The Authors (2023)

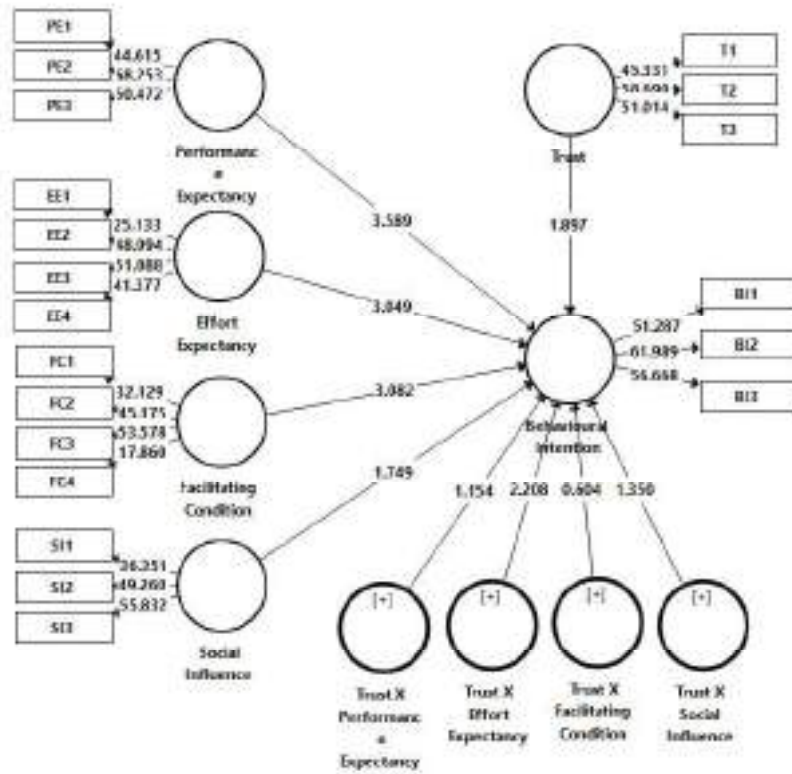


Figure 3: Result of Structural Equation Modeling after introducing trust as moderator.

Source: The Authors (2023)

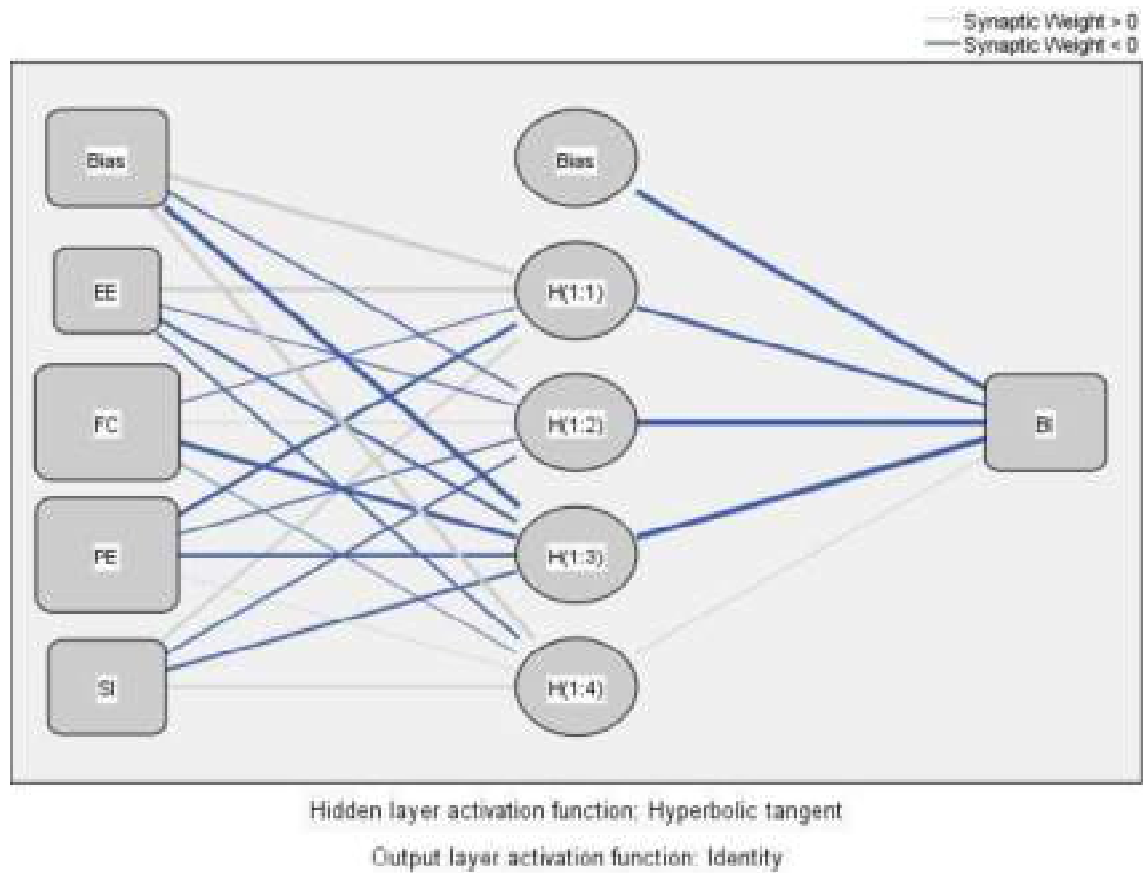
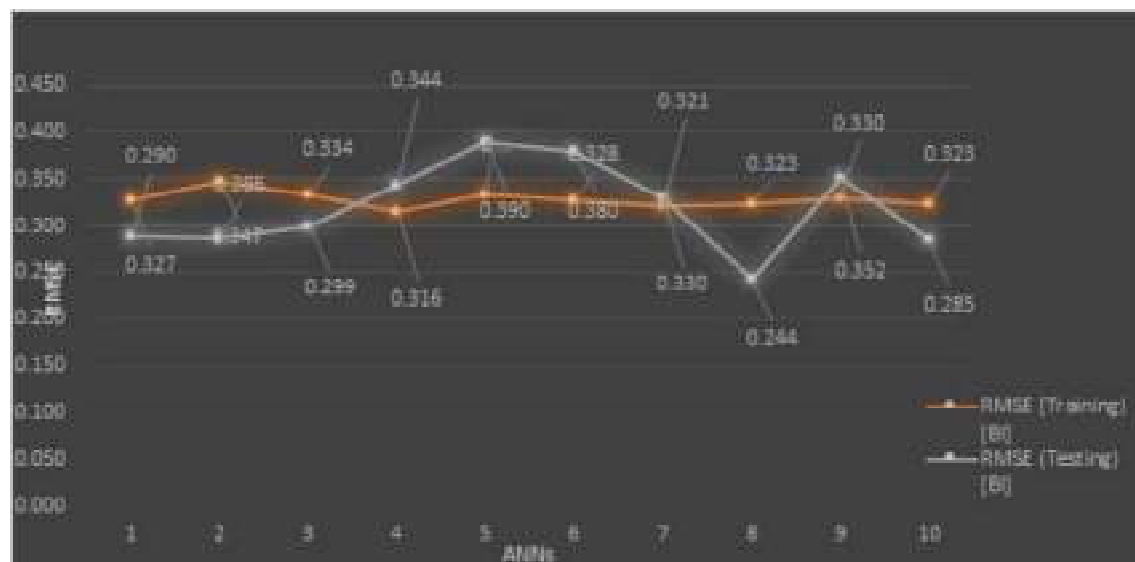


Fig. 4: Artificial Neural Network Model with three layers, four inputs, two bias terms, and one output

Source: The Authors (2023)






*Fig.5 Root mean square of error across ANN iterations.*

Source: The Authors (2023)

#### 4. Permintaan menilai revisi 1 (04-03-2024)

Inderscience Publishers: IJSTM-161670 - Article Re - Review Request External Inbox 

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to me

Mar 4, 2024, 5:23 PM  



Dear Associate Prof. Dr. I Made Sukresna,

You are kindly helping us to review an article for the journal Int. J. of Services Technology and Management.

Article title: "Cracking the code of Customer Behaviour: An integrated PLS-SEM ANN framework for anticipating buying intentions in online food delivery."

We have now received the author's revised version of the submission, amended in light of your and other Reviewer comments.

Would you please verify that the author has made the required amendments and complete a new online evaluation form, indicating in the Comments Boxes whether you are satisfied with the corrections made.

We welcome any additional comments on the article - please note them in the Comments Boxes.

The evaluation form is available at:

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5 of 16 

You can download the revised and original versions of the article here, or view them in the online submissions system with your evaluation form - see link above.

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Your original article evaluation:

##### REVIEWER 1

Review date: 07 Feb 2024

\*\*\*\*\*

##### MANUSCRIPT FEATURES

\*\*\*\*\*

Originality of the work: Marginal

Subject relevance: Good

Professional/Industrial relevance: Good

Completeness of the work: Marginal

Acknowledgement of the work of others by references: Good

Organisation of the manuscript: Acceptable

Clarity in writing tables graphs and illustrations: Good

Likelihood of passing the test of time: Acceptable

\*\*\*\*\*

#### QUALITY AND RIGOUR

\*\*\*\*\*

Have you checked the equations and/or statistics? (if applicable): no

Are you aware of prior publication or presentation of this work?: yes

Is the manuscript free of commercialism?: yes

Is the article too long?: no

\*\*\*\*\*

RECOMMENDATION: Acceptable with major revisions

\*\*\*\*\*

#### REVIEW COMMENTS:

Changes which must be made before publication:

Please read the attached manuscript.

Consider deleting the 'ANN' technique.

The table must adhere to the journal format.

The title of the figures must be located above the figure

Suggestions which would improve the quality of the article but are not essential for publication:

None.

Annotated file: [2024\\_U57M-151570\\_BAVG.pdf](#)

**\* End of reviewer comments \***

Your prompt action in carrying out this re-review would be very much appreciated.


Kind regards,  
Dr. M. A. Dorgham (Editor)  
Int. J. of Services Technology and Management  
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**5. Pengumpulan hasil penilaian atas revisi 1 (19-04-2024)**

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Dear Associate Prof. Dr. I Made Sukresna,

Thank you.  
We have received your review of the paper:  
Title: "Cracking the code of Customer Behaviour: An Integrated PLS-SEM ANN framework for anticipating buying intentions in online food delivery."  
for the Int. J. of Services Technology and Management.

We are most grateful for your valuable time and assistance during the peer-review process of this paper and appreciate your contribution to maintaining the quality of Inderscience Publishers journals.

Kind regards,

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Evaluation Form: Round 2	
Submitted: 19 Apr 2024	
MANUSCRIPT FEATURES	Reviewer Replies
Originality of the work	Good
Subject relevance	Good
Professional/Industrial relevance	Good
Completeness of the work	Good
Acknowledgement of the work of others by references	Good
Organisation of the manuscript	Good
Clarity in writing tables graphs and illustrations	Acceptable
Likelihood of passing the test of time	Good
QUALITY AND RIGOUR	
Have you checked the equations and/or statistics? (if applicable)	Yes
Are you aware of prior publication or presentation of this work?	No
Is the manuscript free of commercialism?	Yes
Is the article too long?	No
RECOMMENDATION	
Acceptable with minor revisions	
COMMENTS	
<p>Changes which must be made before publication:-</p> <p>Change Figure 1 since it is still in the stage of hypotheses development, not a statistical results stage. Refer to the attached pdf file. The rest are fine.</p> <p>Suggestions which would improve the quality of the article but are not essential for publication:-</p> <p>no further comment.</p> <p>Confidential comments only for the editor:-</p> <p>This manuscript only requires a minor amendment in Figure 1. The rest are acceptable and fine.</p>	

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## THE ROLE OF TRUST ON ENHANCING BUYING INTENTIONS IN ONLINE FOOD DELIVERY: FINDINGS FROM A DEVELOPING COUNTRY

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### COMPLIANCE REPORT

#### Reviewer 1:

Sr. No.	Reviewers Comment	Authors Response
1.	Change Figure 1 since it is still in the stage of hypotheses development, not a statistical results stage.	Author thanks the Reviewer of the valuable insight. The figure 1 has been changed, as suggested.  (Page No. 27)

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## THE ROLE OF TRUST ON ENHANCING BUYING INTENTIONS IN ONLINE FOOD DELIVERY: FINDINGS FROM A DEVELOPING COUNTRY

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**Abstract:** This study employs the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model to investigate the factors influencing user behaviour towards online food delivery systems, emphasizing trust's moderating influence. Utilizing SmartPLS, the research examines data collected from 217 users of online food delivery systems. The study reveals that facilitating conditions significantly impact users' intention behaviour, followed by performance expectancy, effort expectancy, and social influence. Consequently, the study underscores the significance of providing easy and convenient access to services within online food delivery systems to enhance proper facilitating condition. Furthermore, the research identifies trust as a significant moderator in the relationship between effort expectancy and intention behaviour. The implications of these findings are invaluable for online food delivery companies, as they offer insights to improve their services and attract a more extensive customer base.

**Keywords:** Online Food Delivery System, UTAUT, SmartPLS, Trust

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### 1 Introduction

Users of an Online Food Delivery System (OFDS) may look through menus and make orders from nearby eateries, all from the convenience of their computer or smartphone (Ray et al., 2019). The food orders are then prepared by the restaurant and delivered to the customer's location by a delivery person (Raza et al., 2023). Many OFDS also offer the option for customers to pick up their orders at the restaurant (Hong et al., 2023).

OFDS offers convenience to customers, allowing them to order food from their preferred restaurants without the need to venture out from their homes or workplaces (Lau and Ng, 2019). They also offer a suitable option for people who may not have transportation access or prefer not to drive (Visser et al., 2014). Additionally, the items delivered via OFDS are one-of-a-kind: extremely perishable and diverse (Kotler et al., 2016).

Many different OFDS operate in various countries, including Grubhub, UberEats, & DoorDash in the United States; and Swiggy in India (McCain et al., 2022). These companies typically charge a fee for their services, which may be paid by the customer or the restaurant (Prasetyo et al., 2021).

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India's online food delivery market has grown remarkably in the past few years. As per statistics provided by the Indian Brand Equity Foundation, the market value of online food delivery services in India reached around \$3.9 billion in 2020 and is projected to exhibit a compound annual growth rate of 22% from 2020 to 2025.

Since the 1890s, India has had a rich history of food delivery services, including early examples such as the Mumbai dabbawallas (Baindur & Macário, 2013). The growth of online food delivery services (OFDS) in India can be attributed to several factors, with one of the primary drivers being the surge in popularity of e-commerce and internet growth in the country. As per the World Bank, the proportion of India's population with internet access rose from 15% in 2013 to 55% in 2020, representing a substantial increase in internet users. This trend is expected to continue, leading to a surge in demand for online services like OFDS as more individuals in India gain internet access and become comfortable with online platforms.

In addition, OFDS offers a convenient option for customers who may not have the time or desire to go out to a restaurant or who may not have access to transportation. The growth of OFDS has also been facilitated by the expansion of internet infrastructure and the increasing availability and affordability of internet-enabled devices such as smartphones.

India's online food delivery market has witnessed substantial expansion in recent times and is poised to continue growing in the foreseeable future. Nevertheless, online food delivery services (OFDS) may expose restaurant owners and customers to potential risks concerning the maintenance of appropriate temperatures during delivery, the hygiene of delivery drivers, and the possibility of food tampering. Temperature control is an essential factor in safely handling and delivering food. If food is not kept at the appropriate temperature during delivery, eating can become unsafe. OFDS faces challenges in maintaining the proper food temperature during delivery, especially if the delivery takes a long time.

Delivery drivers' hygiene is also a concern for OFDS, as poor hygiene practices can lead to food contamination. OFDS can implement measures such as providing drivers with hand sanitizer and requiring them to wear masks to help reduce the risk of contamination (Kim et al., 2008).

Food tampering is another risk associated with OFDS. While the risk of food tampering is low, it is still a concern for restaurant owners and customers. OFDS can implement measures such as using tamper-evident packaging and training drivers on food handling procedures to help reduce



the risk of tampering (Ray et al., 2019). Despite the implementation of measures such as tamper-evident packaging and driver training on food handling procedures within Online Food Delivery Services (OFDS) to reduce the risk of food tampering, there remains a significant research gap concerning the aspect of trust. While these measures aim to enhance food safety and security, the level of trust between consumers and OFDS platforms regarding the efficacy and reliability of these measures remains understudied and hence is investigated in current study. Furthermore, this study addresses another gap in the existing literature, which pertains to understanding how customers adopt online food services within the framework of UTAUT. In spite of the widespread adoption of various ICT (Marino and Pariso, 2022) and mobile platforms (Çera et al., 2022; Niasin and Belkhamza, 2021), the specific factors influencing consumers' adoption decisions within the context of UTAUT on OFDS remain relatively underexplored.

Thus, trust is crucial in the food delivery system as it encourages customer loyalty, contentment, and preservation (Assaker et al., 2020; Sinha et al., 2021) helps build a positive reputation for the food delivery service (Munikrishnan et al., 2023). Building customer trust requires high-quality food, timely delivery, good customer service, data security, and transparency (Aslam et al., 2020; Ratasuk and Gajesanand, 2023). The main objective of this research is to explore the relationship among Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) on OFDS adoption, utilizing the UTAUT model as the theoretical framework.

Additionally, this research aims to examine the moderating role of trust in the relationships within the context of OFDS. By exploring these relationships and the moderating influence of trust, the study seeks to provide valuable insights into the factors influencing consumers' intention to adopt and use OFDS platforms, thereby contributing to a deeper understanding of consumer behaviour in the online food delivery industry.

## **2. Literature Review**

UTAUT2 is a theory that attempts to explain and foretell how people would adopt and utilize technological systems. The theory expands on the work of Venkatesh et al. (2003), who created the UTAUT framework and identified four primary constructs—PE, EE, SI and FC—that affect technology acceptance and usage. Hedonic Motivation (HM) (i.e., the pleasure one derives from utilizing the technology) and habit formation are two constructs that builds UTAUT2 on the original concept (i.e., the

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automatic and unconscious use of the technology). In addition, it stresses the significance of human variables (such as age, gender, and experience) and contextual elements (such as culture and task characteristics) in determining technology adoption and usage (Murarka et al., 2020).

Performance Expectancy (PE) represents the degree to which an individual believes that using a specific technology will aid them in achieving their objectives (Yapp et al., 2018). It is a significant factor in determining a person's intention to use technology and is considered a crucial indicator of technology acceptance and adoption (Gunden, Morosan and A DeFranco, 2020).

The term "performance expectation" describes a person's confidence that using a particular technology would improve performance and facilitate attaining set objectives. Efficiency, communication, decision-making, and convenience are some possible upsides. Individuals are more likely to accept and use new technologies if they are confident that such technologies will improve their performance (Hong et al., 2023).

Customers are more inclined to utilize an online meal delivery app if they feel that doing so would help them complete a task more quickly and easily and save time while placing their food orders (Jawabreh et al., 2023; Lin et al., 2024; Morosan and DeFranco, 2016; Rane et al., 2002; Suhartanto et al., 2019). On the other hand, if they believe that the app is difficult to use or that the food quality will be lower, they may be less likely to use it and hence it led to our first hypothesis:

*H<sub>1</sub>: The level of performance expectancy among customers of online food delivery services positively influences their purchase intention.*

The following significant component to purchase intent is Expected effort. In an online meal delivery system, client contentment and loyalty are determined mainly by the speed of delivery. When consumers use technology to place their food orders, they anticipate a streamlined and straightforward experience that makes it simple to locate what they're searching for and finish the transaction swiftly (Chua et al., 2017).

Pillai et al., (2022) found that consumer purchase intention was impacted by perceived risk, perceived benefit, and online persuasion in their study in the U.S. When individuals perceive high benefits and low risks associated with a particular action or behavior, they are more likely to expect the effort involved in performing that action to be worthwhile. Several other previous studies have underscored the significance of Effort Expectancy or ease of

use during technology adoption (Alalwan et al., 2018; Kesharwani and Bisht, 2012; Martins et al., 2014; Rodrigues et al., 2016).

The user-friendliness of the application or website used to make the purchase is a factor in estimating the effort required. It includes navigational convenience, the ability to search for particular menu items, and the availability of extensive information about each item, such as its components and nutritional content (Hong et al., 2023). A well-designed and user-friendly interface may make the ordering experience for clients considerably more efficient. Hence, providing for our second hypothesis:

*H<sub>2</sub>: The level of effort expectancy among customers of online food delivery services positively influences their purchase intention.*

Social influence is the effect of others' beliefs, behaviours, and attitudes on one's thoughts and actions (Fishbein and Ajzen, 1977). In the case of online meal delivery, customers' purchasing choices may be significantly impacted by the level of social influence they are exposed to.

Word-of-mouth recommendations are one way social influence may affect the desire to buy online meal delivery (Gunden, Morosan and AL DeFranco, 2020). Customers are more inclined to purchase from a meal delivery service if they hear excellent reviews from friends, family, and other reliable sources (Pitchay et al., 2022). These suggestions may influence consumers' opinions of the service's quality, dependability, and value, hence increasing the likelihood that they will place an order.

Social proof is one way that peer conditioning may affect purchasing intent. Social proof is when individuals turn to others for direction when making judgments (Bao and Zhu, 2022). For instance, if customers discover that a meal delivery service has a significant number of favourable comments or a higher rating on a review website, they may be more inclined to buy from that service because they believe it to be a reliable and popular one (Jun et al., 2022).

Similarly, the popularity of online meal delivery services with many followers on social media platforms may influence the customer's propensity to buy (Ariffin et al., 2021). Hence on the backdrop of previous literature, we propose following hypothesis:

*H<sub>3</sub>: The level of social influence among customers of online food delivery services positively influences their purchase intention.*

Facilitating conditions are external variables that make it simpler for customers to execute a transaction. In food delivery, these factors might

include payment choices, delivery alternatives, and general website or application usability (Zhao and Bacao, 2020).

Payment choices are an essential enabling condition. Customers need the ability to pay for food delivery in an easy and secure manner (Pitchay et al., 2022). The greater the number of possible payment methods, the greater the likelihood that a consumer will finish their transaction.

Another crucial criterion is the availability of delivery choices. Customers want a selection of delivery alternatives, such as standard delivery, rapid delivery, and pickup, and the ability to choose a delivery time that is convenient for them. More delivery choices increase the likelihood that a consumer will make an order.

The usability of a website or application is also a critical enabling condition. A well-designed and user-friendly website or app may make it much simpler for clients to locate what they need and finish a transaction (Suhartanto et al., 2019). It includes navigational simplicity, product information clarity, and a straightforward checkout procedure. It provides for our next hypothesis:

*H4: Facilitating conditions positively impact the Purchase Intention of Online Food Delivery Service Customers.*

Trust is faith in the technology and its provider's dependability, integrity, and capability. High levels of trust may promote increased acceptance and use of technology, but low levels might stymie adoption and usage (Hong et al., 2021). Customers who have faith in a delivery service will likely come back and utilize it again. They believe the service would bring their meals on schedule and in excellent shape. The trust may aid in developing a favourable reputation for delivery service (Troise et al., 2021). Customers are more inclined to promote a service when they had a pleasant experience. It may lead to more business and customers. Trust is also essential when safeguarding client information's security (Zhao and Bacao, 2020). Customers who trust a service are more inclined to reveal sensitive information, like credit card numbers, without hesitation. It is critical for avoiding fraud and other security risks. Trust is also essential for ensuring customer items are delivered on time. Customers who trust a service are confident that their meals will be delivered on time (Lau and Ng, 2019). It is critical for preserving client satisfaction since delays or delivery difficulties may cause irritation and discontent (Sinha et al., 2021). Finally, trust helps to guarantee that consumers get high-quality meals. Customers who trust a delivery service have faith that the food will be properly cooked, wrapped, and safe to consume (Siddiqui and Siddiqui, 2021). It is critical

for sustaining client satisfaction since food quality concerns may lead to discontent. To investigate the moderating role of trust, following hypothesis has been framed:

*H<sub>5</sub>: Trust moderates the relationship between Performance Expectancy and Purchase Intention.*

*H<sub>6</sub>: Trust moderates the relationship between Effort Expectancy and Purchase Intention.*

*H<sub>7</sub>: Trust moderates the relationship between Social Influence and Purchase Intention.*

*H<sub>8</sub>: Trust moderates the relationship between Facilitating Condition and Purchase Intention.*

Figure 1 shows the theoretical underpinnings of the research.

**<INSERT FIG. 1 HERE>**

### **3. Materials and Methods**

The PLS-SEM approach enables the identification of latent variables and their relationships with observed variables. PLS SEM has several advantages as it is known for its robustness in handling complex models with limited data. This method allows to explore relationships among variables effectively without requiring a large sample. Secondly, it prioritizes predictive power, making it suitable for studies aimed at understanding and predicting relationships among constructs. The use of PLS-SEM, hence provides with the flexibility, robustness, and predictive power needed to address the objectives of research effectively (Hair et al., 2017).

The methodology involves employing PLS-SEM to identify the key factors that influence customer purchase intention. This approach can result in a more accurate and robust predictive model. PLS-SEM approach can better customer behaviour in online food delivery services, which can help companies improve their marketing strategies, optimize their services, and increase customer satisfaction and loyalty.

#### **3.1 Data Description**

After conducting an exhaustive search of the available research (Assaker et al., 2020; Hong et al., 2023; Jun et al., 2022; Prasetyo et al., 2021), A questionnaire intended for self-completion was specifically designed for this study. During the screening process, it was determined whether each participant had placed at least five orders for food delivery through the Internet during the last four months. Some previous studies are based on

single order (Jun et al., 2022). However, the focus group formed for the present study opined that a single order may create a bias based on a single experience; hence, a minimum of five orders will provide a better result. As a result, the screening criteria were extended to include at least five online orders.

The survey was widely shared throughout the most well-known and often-used social media networks like Twitter, Facebook, Linked-in, etc., to acquire the necessary responses. The online platform was selected for purpose as it ensures that the questionnaire is filled by those respondents who are active online. There were two parts to the questionnaire. In the first part, we asked respondents to fill out some demographic details about themselves. The next part included items about the constructs. A total of 20 items were sourced from previously published works. The participants were instructed to express their preferences by selecting a response option on a 5-point Likert scale for each item. In 26 instances out of a total of 250 responses, respondents failed to fully complete the survey.

Furthermore, seven of the respondents were disqualified for providing an incorrect response to the attention check query. Following the removal of extraneous information, 217 responses remained for subsequent analysis.

In determining the adequate sample size for our study, we utilized Daniel Soper's sample size calculator, which offers a comprehensive approach to estimating sample sizes for structural equation modeling (SEM) studies. We provided the following parameters to the calculator: the number of latent variables in our model (5), the number of observed variables (indicators) associated with these latent variables (20), a probability level of 0.05, an anticipated effect size of 0.01, and a desired statistical power of 0.8. The calculator indicated that the minimum sample size required for our model structure was 156. However, our sample size of 217 exceeds this minimum requirement, providing us with a robust dataset for our SEM analysis. This approach ensured that we had adequate statistical power to detect the anticipated effects while maintaining the desired level of confidence in our findings.

### 3.2 Measure Development

In developing measures to assess the intention to use online food delivery services, authors drew upon the UTAUT model (Venkatesh et al., 2003), which posits that intention to use technology is influenced by key constructs including PE, EE, SI, and FC. The same has been used in several previous studies (Ariffin et al., 2021; Gunden, Morosan and AL DeFranco, 2020; Mishra et al., 2022; Srivastava and Srivastava, 2021)

These constructs were adjusted to suit the context of online food delivery services: Performance Expectancy was redefined to capture the perceived benefits such as convenience and variety of food options, while Effort Expectancy was tailored to reflect the ease of ordering and delivery processes. Social Influence was adapted to consider peer recommendations and online reviews' impact. Facilitating Conditions were reconceptualized to include factors like internet access and familiarity with online payment methods. The measures were operationalized into survey items using validated scales and tailored to fit the specific nuances of the online food delivery service context, ensuring clarity and relevance. Additionally, it's noteworthy that the items for constructs of Intention to Use were also adopted from the UTAUT model while the modified item of Trust was derived from the study conducted by Aslam et al. (2020). Using a Likert scale from 1 to 5, with 1 representing "totally disagree" and 5 "totally agree," respondents were asked to indicate their level of agreement with statements.

### 3.3 Common Method Bias (CMB)

CMB arises when the variation across variables is attributed to the measuring technique rather than the actual constructs being studied. It can lead to inflated relationships between constructs, thereby compromising the validity of study findings. To address this issue, researchers often employ common method bias tests to assess the extent to which method effects may be present in their data.

A Variance Inflation Factor (VIF) over 3.3 may indicate severe collinearity issues and indicates that the model might be affected by multicollinearity. Consequently, if all VIFs in the model, as determined by a thorough collinearity evaluation, are 3.3 or below, the model may be considered free from CMB (Kock, 2015).

In present study, SmartPLS was used to find the values of VIF for inner model. It was found that the values were below 3.3 as provided in table 1. Hence, it can be said that the model is free from CMB (Kock, 2015).

**<INSERT TABLE 1 HERE>**

## **4. Results & Finding**

Model fit indices are crucial in assessing the adequacy of a statistical model in explaining the relationships between variables and representing the

observed data accurately. In this case, two common fit indices, the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI), were used to evaluate the fit of the model.

The SRMR value of 0.031 indicates a good fit for the current model. The SRMR measures the average absolute standardized residual covariance between observed and predicted values in the model. A lower SRMR value suggests better fit, with values close to zero indicating excellent model fit. In this case, the SRMR value of 0.031 falls within the range typically considered indicative of a good fit, thus suggesting that the model adequately represents the relationships between variables in the data.

Similarly, the NFI value of 0.934 also indicates a good fit for the model. The NFI is a goodness-of-fit index that compares the chi-square value of the estimated model with the chi-square value of the independence model (i.e., a model where all variables are assumed to be unrelated). NFI values range from 0 to 1, with values closer to 1 indicating better fit. In this instance, the NFI value of 0.934 is close to 1, suggesting that the estimated model fits the data well compared to the independence model.

Overall, the combination of a low SRMR value and a high NFI value provides evidence that the current model fits the observed data well. This indicates that the specified relationships between variables in the model are supported by the data, suggesting that the model is a reliable representation of the underlying processes or phenomena being studied.

#### 4.1 Measurement Model

PLS algorithm was performed to investigate whether the item loaded into their respective construct or otherwise. The finding suggests that all the items load into their respective construct with values more than 0.7, and there was no case of cross-loading (Vinzi et al., 2010). The same is depicted in *Table 2*.

**<INSERT TABLE 2 HERE>**

PLS algorithm also provided the value of Cronbach alpha. The value was above the minimum threshold of 0.7, hence providing for the reliability of the items used in the research. Assessing construct reliability permits determining whether a given variable or group of variables reliably measures what they claim to measure (Straub et al., 2004). The score for construct reliability was



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also found to be above the threshold of 0.7, emphasizing internal reliability. The value of Cronbach alpha and Construct reliability is provided in Table 3.

**<INSERT TABLE 3 HERE>**

To measure the discriminant validity Fornell & Larcker, (1981) criteria is applied. Measurement models' discriminant validity is often examined using this criterion, which is a standard statistical test. As per this criteria, a construct's correlation with other constructs must be lower than the square root of the average variance retrieved by the construct. When this prerequisite is met, discriminant validity is established. The finding is shown in Table 4, which highlights the fact that discriminant validity is well established.

**<INSERT TABLE 4 HERE>**

Convergent validity provides how well the scale correlates with existing measures of the same concept. The concept should have a positive correlation with comparable variables and no correlation with unrelated ones. The AVE is determined by averaging the squared loadings of all indicators that belong to a specific construct. The statistical threshold for convergent validity is an AVE of >0.50. Table 5 depicts the AVE value of the constructs. The finding suggests that the value of AVE is above the minimum threshold.

**<INSERT TABLE 5 HERE>**

A correlation matrix is a fundamental tool to examine the relationships between variables within a dataset. The coefficients quantify the strength and direction of linear relationships between pairs of variables, ranging from -1 to 1. A correlation coefficient of 1 indicates a perfect positive correlation, while -1 denotes a perfect negative correlation. A coefficient of 0 suggests no linear relationship between the variables. The Correlation matrix is provided in Table 6 and the value indicate that the relation is strong for the variable of same construct than other.

**<INSERT TABLE 6 HERE>**

#### 4.2 Structural Model

A structural model is developed to assess the relationship between endogenous and exogenous variables. The model investigates the relationship between four exogenous constructs on the endogenous construct. To ascertain the impact and significance of each relationship, bootstrapping with 5000 sub-samples was conducted. This involved randomly selecting subsets of the original dataset with replacement to create the sub-samples. The significance of each relationship was then assessed by calculating confidence intervals or p-values based on the distribution of values obtained from the bootstrapped sub-samples. The result of this analysis indicates that all the relationships developed are statistically significant.

The bootstrapping result suggests that Performance Expectancy ( $\beta = 0.269$ ,  $t > 1.96$ ,  $p = 0.000$ ), Effort Expectancy ( $\beta = 0.208$ ,  $t > 1.96$ ,  $p = 0.001$ ), Social Influence ( $\beta = 0.184$ ,  $t > 1.96$ ,  $p = 0.003$ ), and Facilitating Condition ( $\beta = 0.292$ ,  $t > 1.96$ ,  $p = 0.000$ ) significantly impact the Behavioural Intention of individual toward online food delivery services. The output is depicted in Fig. 2, and the result is illustrated in Table 7.

**<INSERT FIG. 2 HERE>**

**<INSERT TABLE 7 HERE>**

The  $R^2$  value provides the proportion of variation in the dependent variable explained by the independent variables. In the present model, the value of  $R^2$  is 0.74 (see Table 8), implying that the Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Condition explain 74% of the variance in the Behavioural Intention.

**<INSERT TABLE 8 HERE>**

Next, a moderator, trust, was introduced, and its impact on all the four relation was analysed. Examining the influence of moderating relationships is done by evaluating the effects of interaction terms (i.e., the product of moderator and predictor). It allows one to determine whether or not moderator modifications amplify the intensity of the focus relation (Hair et al., 2016). A Product indicator approach is used so as to multiply every indicator by every other indicator (i.e., every indicator of trust will be multiplied by every indicator of Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Condition), indicators were standardized, and an automatic weighing mode is used. After that, consistent PLS Bootstrapping is applied to identify if the impact of the moderator on the relationship is significant or otherwise. The output is given in Fig. 3, and the result of the same is provided in Table 9

**<INSERT FIG. 3 HERE>**

**<INSERT TABLE 9 HERE>**

The analysis revealed that trust significantly moderates the relationship between Effort Expectancy and Behavioural Intention ( $t > 1.96$ ,  $p = 0.028$ ), supporting H<sub>5</sub>. This suggests that the influence of Effort Expectancy on Behavioural Intention varies depending on levels of trust. A multi-group analysis was performed among two group of higher and lower level of trust for this relation. The result revealed that individuals with higher levels of trust are more influenced by Effort Expectancy in forming their intention to engage in the behavior compared to those with lower levels of trust.

However, it was observed that trust does not significantly moderate the relationships between Facilitating Condition and Behavioural Intention ( $t < 1.96$ ,  $p > 0.05$ ), Performance Expectancy and Behavioural Intention ( $t < 1.96$ ,  $p > 0.05$ ), and Social Influence and Behavioural Intention ( $t < 1.96$ ,  $p > 0.05$ ). This implies that the impact of these factors on Behavioural Intention remains consistent across different levels of trust. As a result, hypotheses H<sub>6</sub>, H<sub>7</sub>, and H<sub>8</sub> are not supported.

Further examination of trust levels revealed that for individuals with varying levels of trust, the relationships between three predictor variables (Facilitating Condition, Performance Expectancy, and Social Influence) and Behavioural Intention were non-significant ( $t < 1.96$ ,  $p > 0.05$ ). Conversely, for individuals with high levels of trust, the relationship between Effort Expectancy and Behavioural Intention was significant ( $t > 1.96$ ,  $p = 0.028$ ), indicating that

trust amplifies the influence of Effort Expectancy on Behavioural Intention in this subgroup.

Hence, it can be concluded that trust plays a significant moderating role in the relationship between Effort Expectancy and Behavioural Intention, particularly for individuals with high levels of trust. However, trust does not significantly moderate the relationships between other variables (Facilitating Condition, Performance Expectancy, and Social Influence) and Behavioural Intention. These findings provide insights into how trust influences individuals' intentions in the context of the studied behavior. Hence, findings support H<sub>5</sub> but do not support hypotheses H<sub>6</sub>, H<sub>7</sub>, and H<sub>8</sub>.

## **5. Discussion**

By extending the established theory by incorporating new dimensions of trust, this study sought to understand the forces for purchase Intention in the direction of OFDS. The investigation findings showed that all four factors, i.e., PE, EE, FC and SI, significantly influence the Purchase Intention. It was discovered that the Facilitating Condition (FC) was the most critical component in predicting the likelihood of a consumer making a purchase. The conclusion lends credence to earlier research that discovered a favourable relationship between the four variable and Purchase Intention (Al Amin et al., 2021; Bhatiasavi, 2016; Lau & Ng, 2019; Prasetyo et al., 2021; Ray et al., 2019).

For customers with high levels of trust, the perception of effort expectancy is notably influenced. They perceive the effort involved in using the online food service as a worthwhile investment, confident that their actions will lead to favourable outcomes. In other words, they are more inclined to engage with the service actively, anticipating that their efforts will be reciprocated with efficient service, quality products, and overall satisfaction. Conversely, customers with low levels of trust may exhibit a different perspective on effort expectancy. Their lack of trust in the online food service provider may lead to scepticism regarding the effectiveness of their efforts. They may perceive the required effort as burdensome or futile, doubting whether their actions will lead to satisfactory outcomes. Consequently, these individuals may approach the service with caution, hesitant to invest significant effort due to their apprehensions about the reliability and credibility of the provider.

The rejection of the hypotheses related to the moderating role of trust also shed light into the dynamics of customer behavior within the OFDS. Firstly, the findings suggest that trust does not substantially alter the relationship

between Facilitating Condition and Behavioural Intention. This implies that factors such as user-friendly interfaces or convenient payment options may not be significantly influenced by customers' trust in the online food service provider when forming their intentions to engage with the service. Facilitating conditions typically encompass functional aspects such as user interface design, ease of navigation, and convenience of payment methods. These elements are primarily transactional and operational in nature, focusing on streamlining the process of using the online food service. Customers may base their perceptions of facilitating conditions more on the objective usability and functionality of the platform rather than on their subjective trust in the provider. Hence, trust may have less impact on customers' assessments of these functional aspects.

Similarly, the results indicate that customers' perceptions of the benefits and outcomes associated with using the online food service, captured by Performance Expectancy, are not significantly influenced by their level of trust in the provider. Additionally, the rejection of the hypothesis related to Social Influence implies that customers' susceptibility to social influence, such as recommendations from friends or online reviews, may not be significantly influenced by their level of trust in the provider. Overall, while trust significantly moderates the relationship between Effort Expectancy and Behavioural Intention, its impact on other factors like Facilitating Condition, Performance Expectancy, and Social Influence appears to be less pronounced. These findings underscore the complex interplay of factors shaping customer behavior in the online food service industry and highlight the importance of a comprehensive understanding of these dynamics for effective strategic decision-making by service providers.

Hence, the finding emphasizes the importance of trust in influencing customer behavior in the online food service industry, in relation to effort expectancy only. When customers trust the online food service provider, they are more likely to have higher expectations regarding the effort they put into using the service, believing that their efforts will yield satisfactory outcomes. This means that customers who trust the provider perceive that their actions, such as placing an order or providing feedback, will be met with positive results.

As a result, higher levels of effort expectancy lead to increased levels of behavioral intention among customers. Behavioral intention refers to the likelihood of customers engaging in positive behaviors, such as making repeat purchases and recommending the online food service to others through positive word-of-mouth.

Therefore, trust plays a crucial role in shaping customer behavior in the online food service industry. Customers who trust the provider are more likely to

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have higher expectations of their own efforts, leading to a greater likelihood of positive behaviors that contribute to the success of the business, such as repeat business and positive recommendations.

Given the significance of trust, online food service providers should prioritize building and nurturing trust with their customers by providing transparent and reliable service, ensuring timely and accurate deliveries, addressing customer concerns promptly, and maintaining a positive reputation in the industry. By cultivating trust, online food service providers can enhance customer satisfaction, loyalty, and overall business success.

#### 6.1 Managerial Implication

Various managerial implications might be inferred from the study results.

First, in light of facilitating conditions being identified as the highest predictor, the firm should prioritize enhancing these aspects of the online food service platform. This can be achieved by ensuring that the service is readily available in all areas served by the business, offering a variety of payment options to accommodate different customer preferences, and providing clear and concise information regarding delivery times and order tracking. By improving facilitating conditions in these ways, the firm can enhance the convenience and accessibility of its service, making it more appealing to a broader range of users and increasing the likelihood of positive user experiences and repeat purchases.

Second, regarding the findings on trust, the firm should focus on building and maintaining trust among its user base. This can be accomplished through various means, such as ensuring transparency in business practices, consistently delivering on promises, and promptly addressing any customer concerns or issues. Additionally, efforts should be made to improve the ease and convenience of the ordering process, further enhancing user trust and satisfaction. Regularly gathering feedback from customers can also be beneficial in identifying areas for improvement and strengthening trust over time. By prioritizing trust-building initiatives, the firm can foster stronger relationships with customers, increase user satisfaction, and ultimately, enhance behavioral intention and profitability.

In conclusion, by addressing both facilitating conditions and trust-building initiatives, online food delivery service providers can significantly improve the user experience and increase behavioral intention, leading to greater success and profitability in the highly competitive online food service industry. These strategic actions emphasize the importance of focusing on key

factors that drive user satisfaction and engagement, ultimately contributing to the long-term viability and growth of the business.

## 6.2 Theoretical Implication

The theoretical implications of research findings highlighting the significant importance of PE, EE, FC and on online food delivery service behavioural intention are significant.

The study demonstrates the importance of social influence in shaping behaviour intention, which is another key construct in the UTAUT model. The finding that subjective norms significantly predict behaviour intention supports the UTAUT model, which emphasizes the role of social influence in shaping technology adoption and usage.

Lastly, the study adds to the increasing body of research on online food delivery service adoption and usage by identifying the specific factors that are most important in shaping behaviour intention. This knowledge can be used to inform the design of online food delivery services and marketing strategies and guide future research on this topic.

## 6.3 Limitation of Study

While the research provides valuable insights, the study has some limitations.

One limitation is its lack of generalizability to other situations or populations due to being done in a specialised environment. The research was done in a specific geographic area, and the findings may not be generalizable to other countries or cultures with potentially different attitudes and behaviours towards online meal delivery services.

Additionally, the study only examined a restricted set of attributes, future research could explore other theories since the theories have their own assumptions and perspectives.

Finally, the study did not examine actual behaviour but only intention to behave in a certain way. It is possible that intention does not always translate into actual behaviour, and future research could explore the relationship between intention and actual behaviour.

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*Title*

## LIST OF TABLES

**Table 1** VIF

	VIF
Performance Expectancy -> Behavioural Intention	2.647
Trust -> Behavioural Intention	2.809
Social Influence -> Behavioural Intention	2.894
Effort Expectancy -> Behavioural Intention	2.993
Facilitating Condition -> Behavioural Intention	3.111

**Table 2** Factor Loading

	Behavioural Intention	Effort Expectancy	Facilitating Condition	Performance Expectancy	Social Influence
BI1	0.852				
BI2	0.887				
BI3	0.869				
EE1		0.756			
EE2		0.862			
EE3		0.863			
EE4		0.861			
FC1			0.803		
FC2			0.855		
FC3			0.877		
FC4			0.752		
PE1				0.846	
PE2				0.899	
PE3				0.881	
SI1					0.814
SI2					0.858
SI3					0.874

Source: The Authors (2023)

**Table 3** Reliability Analysis

Construct	Cronbach's Alpha	rho_A	Composite Reliability
Behavioural Intention	0.839	0.839	0.903
Effort Expectancy	0.856	0.861	0.903
Facilitating Condition	0.84	0.847	0.893
Performance Expectancy	0.847	0.848	0.908
Social Influence	0.806	0.807	0.886

Source: The Authors (2023)

**Table 4** Discriminant Validity

	Behavioural Intention	Effort Expectancy	Facilitating Condition	Performance Expectancy	Social Influence
Behavioural Intention	<b>0.87</b>				
Effort Expectancy	0.769	<b>0.837</b>			
Facilitating Condition	0.799	0.771	<b>0.823</b>		
Performance Expectancy	0.775	0.72	0.756	<b>0.876</b>	
Social Influence	0.766	0.767	0.773	0.729	<b>0.849</b>

Source: The Authors (2023)

**Table 5** Convergent Validity

Construct	Average Variance Extracted (AVE)
Behavioural Intention	0.756
Effort Expectancy	0.700
Facilitating Condition	0.678
Performance Expectancy	0.767
Social Influence	0.721

Source: The Authors (2023)

*Title*

**Table 6** Correlation Matrix

	BI1	BI2	BI3	EE1	EE2	EE3	EE4	FC1	FC2	FC3	FC4	PE1	PE2	PE3	SI1	SI2	SI3	T1	T2	T3
BI1	1	0.756	0.74	0.495	0.564	0.565	0.563	0.546	0.581	0.596	0.512	0.557	0.592	0.581	0.531	0.56	0.57	0.544	0.565	0.557
BI2	0.756	1	0.772	0.516	0.589	0.589	0.588	0.57	0.607	0.622	0.534	0.582	0.618	0.606	0.554	0.584	0.595	0.568	0.59	0.581
BI3	0.74	0.772	1	0.505	0.577	0.577	0.576	0.558	0.594	0.609	0.523	0.57	0.605	0.593	0.542	0.572	0.582	0.556	0.578	0.569
EE1	0.495	0.516	0.505	1	0.652	0.652	0.651	0.468	0.498	0.511	0.438	0.46	0.489	0.479	0.472	0.497	0.507	0.482	0.5	0.493
EE2	0.564	0.589	0.577	0.652	1	0.744	0.743	0.534	0.569	0.583	0.5	0.525	0.558	0.547	0.539	0.568	0.578	0.55	0.571	0.563
EE3	0.565	0.589	0.577	0.652	0.744	1	0.743	0.535	0.569	0.584	0.501	0.526	0.558	0.547	0.539	0.568	0.579	0.55	0.572	0.563
EE4	0.563	0.588	0.576	0.651	0.743	0.743	1	0.534	0.568	0.582	0.5	0.524	0.557	0.546	0.538	0.567	0.577	0.549	0.57	0.562
FC1	0.546	0.57	0.558	0.468	0.534	0.535	0.534	1	0.687	0.704	0.604	0.513	0.546	0.535	0.506	0.533	0.543	0.524	0.544	0.536
FC2	0.581	0.607	0.594	0.498	0.569	0.569	0.568	0.687	1	0.749	0.643	0.547	0.581	0.569	0.538	0.567	0.578	0.557	0.579	0.57
FC3	0.596	0.622	0.609	0.511	0.583	0.584	0.582	0.704	0.749	1	0.659	0.56	0.595	0.584	0.552	0.581	0.592	0.571	0.593	0.585
FC4	0.512	0.534	0.523	0.438	0.5	0.501	0.5	0.604	0.643	0.659	1	0.481	0.511	0.501	0.473	0.499	0.508	0.49	0.509	0.502
PE1	0.557	0.582	0.57	0.46	0.525	0.526	0.524	0.513	0.547	0.56	0.481	1	0.76	0.745	0.502	0.529	0.539	0.506	0.526	0.518
PE2	0.592	0.618	0.605	0.489	0.558	0.558	0.557	0.546	0.581	0.595	0.511	0.76	1	0.792	0.533	0.562	0.573	0.538	0.559	0.551
PE3	0.581	0.606	0.593	0.479	0.547	0.547	0.546	0.535	0.569	0.584	0.501	0.745	0.792	1	0.523	0.551	0.561	0.527	0.548	0.54
SI1	0.531	0.554	0.542	0.472	0.539	0.539	0.538	0.506	0.538	0.552	0.473	0.502	0.533	0.523	1	0.698	0.712	0.527	0.547	0.539
SI2	0.56	0.584	0.572	0.497	0.568	0.568	0.567	0.533	0.567	0.581	0.499	0.529	0.562	0.551	0.698	1	0.75	0.555	0.576	0.568
SI3	0.57	0.595	0.582	0.507	0.578	0.579	0.577	0.543	0.578	0.592	0.508	0.539	0.573	0.561	0.712	0.75	1	0.565	0.587	0.579
T1	0.544	0.568	0.556	0.482	0.55	0.55	0.549	0.524	0.557	0.571	0.49	0.506	0.538	0.527	0.527	0.555	0.565	1	0.754	0.743
T2	0.565	0.59	0.578	0.5	0.571	0.572	0.57	0.544	0.579	0.593	0.509	0.526	0.559	0.548	0.547	0.576	0.587	0.754	1	0.772
T3	0.557	0.581	0.569	0.493	0.563	0.563	0.562	0.536	0.57	0.585	0.502	0.518	0.551	0.54	0.539	0.568	0.579	0.743	0.772	1

**Table 7** Result of Bootstrapping

Hypothesis	Relation	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Result
H1	Performance Expectancy -> Behavioural Intention	0.269	0.272	0.064	4.222	0	Supported
H2	Effort Expectancy -> Behavioural Intention	0.208	0.21	0.06	3.448	0.001	Supported
H3	Social influence -> Behavioural Intention	0.184	0.182	0.061	3.031	0.003	Supported
H4	Facilitating Condition -> Behavioural Intention	0.292	0.291	0.062	4.73	0	Supported

Source: The Authors (2023)

**Table 8** R<sup>2</sup> value

	R Square	R Square Adjusted
Behavioural Intention	0.744	0.74

Source: The Authors (2023)

**Table 9** Bootstrapping Result

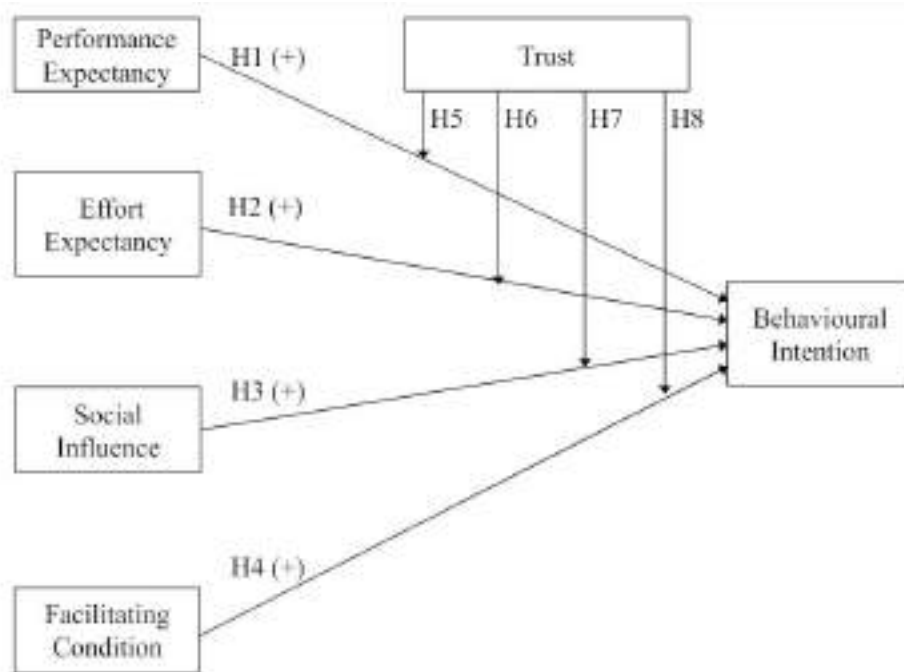
Hypo.	Relation	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Result
H5	Trust X Effort Expectancy -> Behavioural Intention	0.108	0.107	0.049	2.208	0.028	Supported
H6	Trust X Facilitating Condition -> Behavioural Intention	-0.041	-0.051	0.068	0.604	0.546	Not Supported
H7	Trust X Performance Expectancy -> Behavioural Intention	-0.069	-0.069	0.06	1.154	0.249	Not Supported
H8	Trust X Social Influence -> Behavioural Intention	-0.076	-0.073	0.056	1.35	0.177	Not Supported

Source: The Authors (2023)

Title

## LIST OF FIGURES

**Fig. 1: Conceptual Framework**

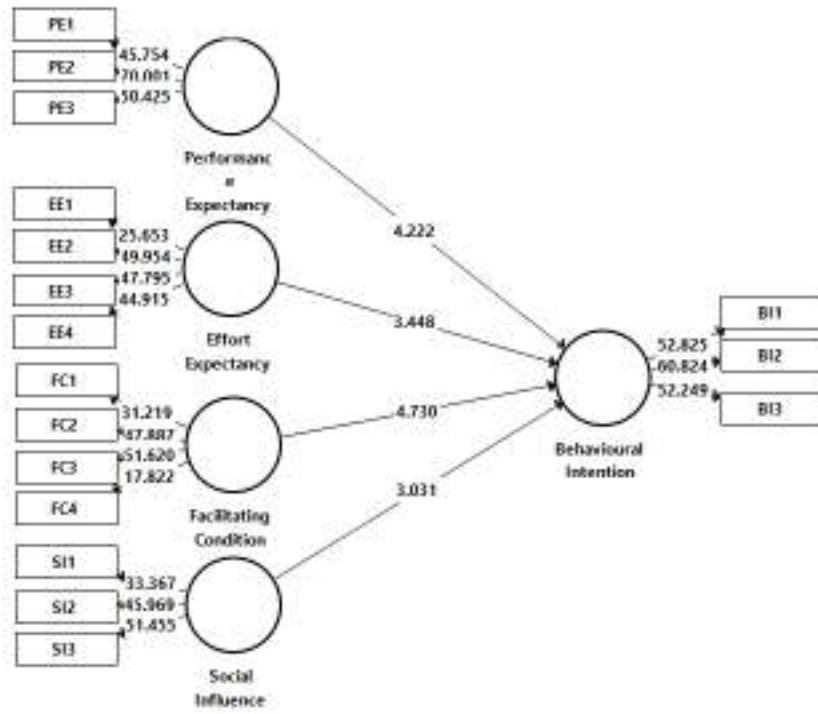


Source: The Authors (2023)



Author

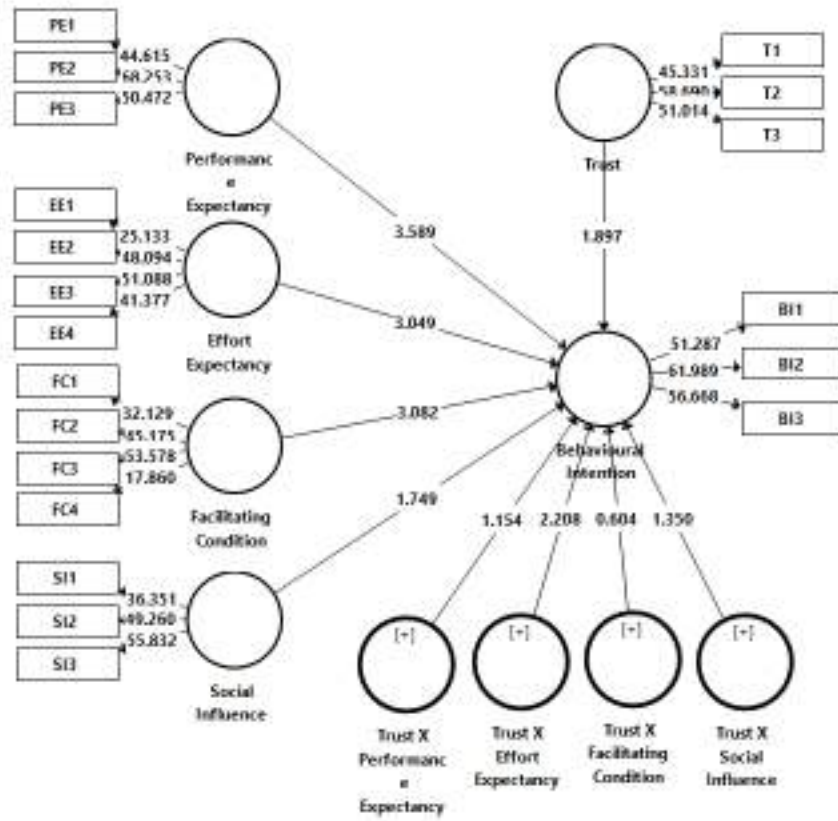
Figure 2: Result of Structural Equation Modeling



Source: The Authors (2023)

Title

Figure 3: Result of Structural Equation Modeling after introducing trust as moderator.



Source: The Authors (2023)

## 6. Permintaan menilai revisi 2 (24-04-2024)

Inderscience Publishers: IJSTM-161670 - Article Re - Review Request External INDEX 11

Inderscience Submissions <no-reply@indersciencesubmissions.com>  
to me

Apr 24, 2024, 2:17 AM ☆ ↶



Dear Associate Prof. Dr. I Made Sukresna,

You are kindly helping us to review an article for the journal Int. J. of Services Technology and Management.

Article title: "Cracking the code of Customer Behaviour: An Integrated PLS-SEM ANN framework for anticipating buying intentions in online food delivery."

We have now received the author's revised version of the submission, amended in light of your and other Reviewer comments.

Would you please verify that the author has made the required amendments and complete a new online evaluation form, indicating in the Comments Boxes whether you are satisfied with the corrections made.

We welcome any additional comments on the article - please note them in the Comments Boxes.

The evaluation form is available at:

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Your original article evaluation:

REVIEWER 1

Review date: 19 Apr 2024

\*\*\*\*\*

MANUSCRIPT FEATURES

\*\*\*\*\*

Originality of the work: Good

Subject relevance: Good

Professional/Industrial relevance: Good

Completeness of the work: Good

Acknowledgement of the work of others by references: Good

Organisation of the manuscript: Good

Clarity in writing tables graphs and illustrations: Acceptable

Likelihood of passing the test of time: Good

\*\*\*\*\*

#### QUALITY AND RIGOUR

\*\*\*\*\*

Have you checked the equations and/or statistics? (if applicable): yes

Are you aware of prior publication or presentation of this work?: no

Is the manuscript free of commercialism?: yes

Is the article too long?: no

\*\*\*\*\*

RECOMMENDATION: Acceptable with minor revisions

\*\*\*\*\*

#### REVIEW COMMENTS:

Changes which must be made before publication:

Change Figure 1 since it is still in the stage of hypotheses development, not a statistical results stage. Refer to the attached pdf file. The rest are fine.

Suggestions which would improve the quality of the article but are not essential for publication:

no further comment

Annotated file: 2024\_UJSTM-161670\_RAV@.pdf

\* End of reviewer comments \*

Your prompt action in carrying out this re-review would be very much appreciated.

Kind regards,

Dr. M. A. Dorgham (Editor)

Int. J. of Services Technology and Management

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## 7. Pengumpulan hasil penilaian atas revisi 2 (27-04-2024)

Inderscience Publishers: **IJSTM-161670** - Thank you for your review External Inbox

Inderscience Submissions <submissions@inderscience.com>  
to me

Sat, Apr 27, 2024, 2:16 PM ☆ ↶



Dear Associate Prof. Dr. I Made Sakresna,

Thank you.  
We have received your review of the paper:  
Title: "Cracking the code of Customer Behaviour: An integrated PLS-SEM ANN framework for anticipating buying intentions in online food delivery."  
for the Int. J. of Services Technology and Management.

We are most grateful for your valuable time and assistance during the peer-review process of this paper and appreciate your contribution to maintaining the quality of Inderscience Publishers journals.

Kind regards,  
The Inderscience Submissions Team

Evaluation Form: Round 3	
Submitted: 27 Apr 2024	
MANUSCRIPT FEATURES	Reviewer Replies
Originality of the work	Good
Subject relevance	Good
Professional/industrial relevance	Good
Completeness of the work	Good
Acknowledgement of the work of others by references	Good
Organisation of the manuscript	Good
Clarity in writing tables graphs and illustrations	Good
Likelihood of passing the test of time	Good
QUALITY AND RIGOUR	
Have you checked the equations and/or statistics? (if applicable)	Yes
Are you aware of prior publication or presentation of this work?	Yes
Is the manuscript free of commercialism?	Yes
Is the article too long?	No
RECOMMENDATION	
Acceptable	

#### COMMENTS

Changes which must be made before publication:-

None

Suggestions which would improve the quality of the article but are not essential for publication:-

None

Confidential comments only for the editor:-

None

**LAMPIRAN SYARAT TAMBAHAN: REVIEWER JURNAL BEREPUTASI TERINDEKS SCOPUS**

**C. Nama Jurnal: Journal of Distribution Science**

**Penerbit: Korea Distribution Science Association (KODISA)**

**Terindeks: Scopus Q4**


**SJR 2023: 0,18**

**Judul Artikel:**

- 1. Post-Adoption of Online Shopping: Do Herding Mentality or Health Beliefs Matter?**
- 2. Information distribution and intention to choose university.**
- 3. The competencies of sellers as the determinants of sales performance in e-commerce: Focusing on the mediating effects of innovative marketing activities.**

No.	Butir	Tanggal	Halaman
1	Tawaran untuk menilai artikel 1	30 November 2021	1
2	Pengumpulan hasil penilaian artikel 1	4 Desember 2021	3
3	Tawaran untuk menilai artikel 2	30 November 2021	13
4	Pengumpulan hasil penilaian artikel 2	4 Desember 2021	14
5	Tawaran untuk menilai artikel 3	1 Desember 2021	22
6	Pengumpulan hasil penilaian artikel 3	5 Desember 2021	23

**1. Tawaran untuk menilai artikel 1 (30-11-2021)**

JDS-Nov-25-2021-243 to request a review of the manuscript. External 

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to me

Nov 30, 2021, 3:35 PM ☆

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# Post-Adoption of Online Shopping: Do Herding Mentality or Health Beliefs Matter?

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## Abstract

**Purpose:** The Covid-19 pandemic has triggered several herd purchase behaviors, and online shopping has been considered a health-related preventative behavior. This study aims to the relative impact of health threat beliefs concerning Covid-19 (perceived susceptibility and perceived severity) and herd mentality on consumers' online shopping post-adoption disconfirmation and continuance intention of online shopping. **Research design, data and methodology:** An internet survey was conducted with Vietnamese consumers, and upon screening, usable data of 292 responses were analyzed using PLS-SEM. Results showed that while herd mentality positively affects disconfirmation, health threat beliefs including perceived susceptibility and perceived severity of Covid-19 do not. **Results:** Results also provided further support for the notion that disconfirmation is a crucial determinant of post-adoption continuance intention. Moreover, herd mentality also has a significantly negative influence on online shopping post-adoption continuance intention. **Conclusions:** The research provides evidence supporting the role of herd mentality and post-adoption disconfirmation in driving consumers' intention to continue online shopping. However, the research shows that neither the perceived susceptibility of Covid-19 nor the perceived severity of Covid-19 has significant impact on post-adoption disconfirmation, adding mixed evidence to the application of health belief theory in technology (such as online shopping) adoption.

**Keywords:** Health Beliefs, Perceived Susceptibility of Covid-19, Perceived Severity of Covid-19, Herd Mentality, Continuance Intention, Online Shopping, Online Distribution.

**JEL Classification Code:** L81, M31

## 1. Introduction

The Covid-19 pandemic since its outbreak in early 2020 has created unprecedented upheavals, prompting people and businesses to change their way of life and course of doing business. One of the significant changes in consumer behavior is that many consumers have previously hesitated since the pandemic began to turn to or intensify online shopping because of health or safety/self-protection concerns (Standish & Bossi, 2020). According to Kim (2020), the Covid-19 pandemic has prompted 'late adopters'

to switch to online shopping for the first time. Some consumers do online shopping mainly because of tight lockdown periods. Some other consumers maintain the increased online shopping for both strict social distance and when society is in a 'new normal.' Vietnam E-Commerce Association reported that the Vietnamese e-commerce market has a very high growth rate, an average annual rate of 30%, in 2015-2019, thanks to the internet usage rate and high smartphone ownership rate. However, while 30% of consumers have done online shopping, the share of online shopping in Vietnam's total retail sales is modest, only about

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10%, and still behind other ASEAN countries such as Indonesia, Thailand, and Singapore (McKinsey & Company, 2019). Those statistics mean that most Vietnamese consumers are still hesitant and not ready to accept online shopping. A report by International Trade Administration explained that the reasons for that hesitation are that consumers do not trust online shopping, and the popularity of online payments is still low. According to the Vietnam E-commerce Association, the Covid-19 pandemic has further promoted the development of e-commerce. Specifically, when the third outbreak is close to the lunar new year of 2021, consumers have turned to online shopping for items previously purchased only directly, such as Tet flowers. According to International Trade Administration, the Government of Vietnam has also introduced many regulations and solutions, such as increasing online payments to promote e-commerce; one of the goals is to account for 50% of total retail sales in urban areas by 2025. The pandemic is complicated in many countries worldwide and Vietnam, but the pronounced effects of covid-19 vaccination allow people to be optimistic about the future after the pandemic. In the retail sector, the question for researchers and regulators is whether consumers who had hesitated to shop online before the pandemic and had begun to turn to or increase online shopping as a technology-acceptance behavior since the pandemic will continue their newly-adopted behavior.

Since the pandemic began, several researchers have suggested that consumers changed their behavior due to perceived health threats (Mehroli, Alagarsamy, & Solaikutty, 2021; Sreelakshmi & Prathap, 2020). The link between one's health beliefs and resulting behavioral change in response to an adverse health event to protect themselves could potentially be explained by the health belief model (Rosenstock, 1974). Although the health belief theory has been updated over time, the two most common variables of the health belief model are perceived susceptibility and perceived severity (Laato, Islam, Farooq, & Dhir, 2020; Suess, Maddock, Dogru, Mody, & Lee, 2022). Accordingly, the perceived susceptibility and perceived severity of Covid-19 could explain the adoption of new and post-pandemic behaviors (Deng, Wang, Xie, Chao, & Zhu, 2020; Sreelakshmi & Prathap, 2020; Yuen, Bin Saidi, Bai, & Wang, 2021). Tan, Goh, and Lee (2006) argued that the Health Belief model remains applicable when a new infectious agent presents itself after a time-lapse. As the ongoing situation of the pandemic with recent Covid-19 variant outbreak and no end yet in sight, in the face of more people getting vaccinated, the effects of individuals' beliefs surround the threat Covid-19 on post-adoption behavior are essential to understand.

On the other hand, extant literature also suggested that technology adoption behavior could be explained by herd

mentality (Sun, 2013). Herd mentality is a state in which, in uncertain conditions, people underestimate their information and engage in imitating behavior, following the crowd (Sun, 2013). While the impact of herd psychology has been considered in the context of information technology adoption or panic buying behaviors when the Covid-19 pandemic breaks out, there is little research looking at the effects of herd psychology on consumers' post-adoption continuance behaviors. The pandemic has spread the fear of people around the world. The general fear of the crowd exacerbates the individual's anxiety, prompting them to imitate others when they think the majority's thoughts, feelings, and behaviors are right (Vedadi & Warkentin, 2020). Since herd psychology may operate in consumers' minds in such an uncertain context of the Covid-19 pandemic (Lee, Wu, & Lee, 2021), it is also essential to understand whether herd mentality was fragile and had no further effect on post-adoption behavior.

This study was conducted during May-June when social distancing measures were still loose in most areas and consumers still had a choice in shopping channels. The strict social distancing measures applied in Ho Chi Minh City from early July 2021 onwards forced most consumers to rely on online shopping. This unique situation might allow consumers to experience online shopping fully, and positive or negative disconfirmation of online shopping probably arises. Under expectancy-disconfirmation theory, disconfirmation of expectations, defined as the difference between the actual results or observed experience and the original expectations, is a crucial determinant of continuance intention (Oliver, 1980). Indeed, several previous studies have used expectancy-disconfirmation theory to explain the intention to continue using the technology (Bhattacharjee & Premkumar, 2004; Sun, 2013). Many countries, including Vietnam, have prepared to live with the Covid-19 pandemic, at least in the foreseeable future. The return to "new normal" life has allowed consumers to choose shopping channels again. It is significant to understand the role of disconfirmation in the post-adoption intention concerning online shopping.

Research that leverages and integrates these theoretical perspectives – expectancy-disconfirmation theory, health belief theory, herd psychology literature, and expectation-confirmation theory – to examine the technology post-adoption behavior in consumer behavior literature more generally and in the specific complicated context like the Covid-19 pandemic is lacking. Therefore, this study aimed to investigate the relative impact of perceived susceptibility, perceived severity, and herd mentality on the consumers' post-adoption disconfirmation and, ultimately, online shopping continuance. An online survey was conducted with Vietnamese consumers who adopted online shopping under the Covid-19 pandemic to collect quantitative data to test the

hypotheses. Respondents were screened on the criteria that they either switched from fully offline to online shopping or significantly increased online shopping due to the pandemic. The current study is novel as it integrates theoretical perspectives to predict the post-adoption of online shopping. While developed in the context of COVID-19 and online shopping, this study's integrated framework can be applied to future research that examines continuance intentions of other forms of technology adoption. The present study offers insight into developing online distribution strategies to drive post-adoption continuance behaviors from a practitioner standpoint.

## 2. Theoretical background

The expectancy-disconfirmation theory has been widely adopted in consumer behavior research to explain repurchase or continuance behavior (Dabholkar, Shepherd, & Thorpe, 2000; Oliver, 1980). The fundamental notion of this theory is that consumers will compare their perceived actual results to their initial expectations and form a perceived confirmation of expectations (which marketing researchers frequently refer to as disconfirmation (Oliver, 1980)). The expectancy-disconfirmation theory conceptualizes a distinction between pre-purchase attitude/intention and post-purchase attitude/intention, and disconfirmation captures the difference between initial expectations (attitude) and post-acceptance perceptions (Oliver, 1980). According to expectancy-disconfirmation theory, once a consumer confirms acceptance of online shopping and then uses it, they form perceptions of performance in terms of online shopping benefits. Satisfaction develops when perceived performance exceeds initial expectations, resulting in a continuance intention to use the service (Bhattacharjee, 2001a). Viewing disconfirmation as a deviation from initial expectations, researchers have classified disconfirmation into two types: positive disconfirmation (often referred to in short as disconfirmation) formed when the experience is better than the initial thought, and negative disconfirmation when the experience is worse than initially expected (Sun, 2013).

Bhattacharjee (2001b) argued that the expectancy-disconfirmation theory is applicable to technology adoption thanks to that distinction but suggested that the theory could be modified since the users' use of technology does not fully correspond to actual purchasing behavior. Some researchers integrated expectancy-disconfirmation theory with other technology adoption theories such as the technology acceptance model by including perceived usefulness (Bhattacharjee, 2001b; Lee, 2010) or theory of planned behavior by including subjective norms and perceived behavioral control (Kim, 2010). These works implied the

possibilities to extend or modify expectancy-disconfirmation theory and revealed that such extension could increase explanatory power for the continued use of technology. To investigate the intention to continue behaviors adopted due to the pandemic related to other Covid-19 relevant variables, this study integrated this theoretical foundation with the health belief model and herd psychology literature. Since the expectancy-disconfirmation model is well-tested as indicated by a meta-analysis (Ambalov, 2018), rather than testing all links within the model, this study only examined the relationship between disconfirmation of expectations and post-adoption continuance. In this study, adopting from Bhattacharjee (2001a), the post-adoption continuance of online shopping is defined as the degree to which a user intends to continue using online shopping. Based on the above discussions, it could be hypothesized that:

**H1:** Online shopping post-adoption disconfirmation has a positive influence on online shopping post-adoption continuance intention.

Initially developed in the 1950s, the health belief theory is predicated on the notion that a person's willingness to alter their behaviors is determined mainly by their health perceptions (Rosenstock, 1974). The health belief theory, also widely referred to as the health belief model, stipulates that the perceived threat of a disease, as assessed by perceived susceptibility and perceived severity, as well as other factors such as perceived barriers and perceived self-efficacy contribute to the formation of health-related protective behavior (Tan et al., 2006). The health belief model has also been widely utilized in technology adoption research. Several researchers have integrated the health belief model's perceived threat that includes perceived susceptibility and perceived severity into technology adoption theories such as the unified theory of acceptance and use of technology and the theory of planned behavior to explain technology-based health behavior (Melzner, Heinze, & Fritsch, 2014; Wei, Vinnikova, Lu, & Xu, 2021; Zhang, Liu, Luo, Xie, Liu, & Zhou, 2019; Zhao, Ni, & Zhou, 2018).

Noteworthy, most research focused on the direct link between health belief model components and technology adoption, such as mobile health application usage (Melzner et al., 2014) or the use of mobile health service (Sun, Wang, Guo, & Peng, 2013) or diabetes management application usage (Zhang et al., 2019). Other researchers also examined the indirect impact of health belief model constructs on technology adoption via technology (mobile fitness apps) performance expectancy (Wei et al., 2021). A meta-analysis of health belief model components showed that perceived threat (perceived severity and perceived vulnerability) had a substantial effect (Zhao et al., 2018). Little research has been paid to the link between the health belief model and post-

adoption. In the context of the current study, the adoption or continuance of online shopping can be viewed as a preventative health behavior that helps keep the risk of Covid-19 infection to a minimum.

Rogers (1995) suggested that once deciding on the adoption, one continues his appraisal of the technology and further decides on continuance/ discontinuance. In this regard, the adoption construct is conceived as confirmation (Humbani & Wiese, 2019; Rogers, 1995). Bhattacharjee (2001b) the confirmation, which is the realization of anticipated benefits from a technology use would drive continuance intention. Oliver (1980) viewed the post-decision deviations from ones' expectations. This study formulates hypotheses based on an integrated framework of HBM and expectancy-disconfirmation perspectives. It could be argued that disconfirmation of health-protective technology could be explained by the health belief model's constructs of perceived susceptibility and perceived severity of a disease. Since the use of online shopping becomes increasingly necessary in the event of a pandemic, the study examines perceived threat dimensions, including perceived susceptibility to and perceived severity of COVID-19 as antecedents of expectancy disconfirmation for online shopping adoption. Perceived susceptibility is defined as one's perceptions of the likelihood of encountering a potentially hazardous health condition, and perceived severity is referred to as the extent to which the condition poses a threat to that person (Sreelakshmi & Prathap, 2020). Based on the above discussions, it could be hypothesized that:

- H2:** Perceived susceptibility of Covid-19 has a positive influence on online shopping post-adoption disconfirmation.
- H3:** Perceived severity of Covid-19 has a positive influence on online shopping post-adoption disconfirmation.

In terms of technology adoption, a phenomenon that has sparked considerable interest among researchers and managers is that many people use technology and then abandon it. For instance, a challenge facing many social networks, such as Twitter or Facebook, is a large number of users who have ceased to interact on these platforms (Perrigo, 2019). Several researchers referred to this behavioral phenomenon as herd behavior (Sun, 2013; Vedadi & Warkentin, 2020). In the field of technology, information systems users may exhibit herd behavior in response to intense anxiety about personal information being exploited (Vedadi & Warkentin, 2020). Some researchers argued that the equilibrium of herd mentality is extremely fragile (Lee et al., 2021), which means that once people adopt a technology, they can re-evaluate the benefits and reverse their initial decision, resulting in widespread

abandonment of that technology (Sun, 2013). In this sense, the post-adoption abandoning behavior en masse is coincident but not herd behavior.

Researchers confirmed the importance of distinguishing herd psychology from herd behavior, as herd behavior does not always reflect an intention to imitate but can sometimes represent the same behavior based on the same available information inadvertently (Wu & Lin, 2017). In uncertain situations, herd mentality is a state in which individuals underestimate their information and imitate the crowd's behavior regardless of their own information, suggesting a different approach to problem-solving (Sun, 2013). Indeed, herd mentality and behavior have been prominent since the start of the Covid-19 pandemic (Prentice, Quach, & Thaichon, 2021). When the pandemic began in early 2020, people worldwide were fearful of the spread of the disease, the scarcity of health protection equipment and information from the media and online; and the pervasive fear of the majority in society has exacerbated individual anxiety (Lee et al., 2021). This sense of insecurity has sparked a panic buying spree in a wide variety of products, from masks to instant noodles to toilet paper, in many countries (Moran, 2020). Most research has concentrated on herd behavior during the pandemic (Lee et al., 2021; Moran, 2020). Few publications examine the impact of herd mentality on consumer perceptions and behavior, which is critical for forecasting the continuation of pandemic-related behaviors.

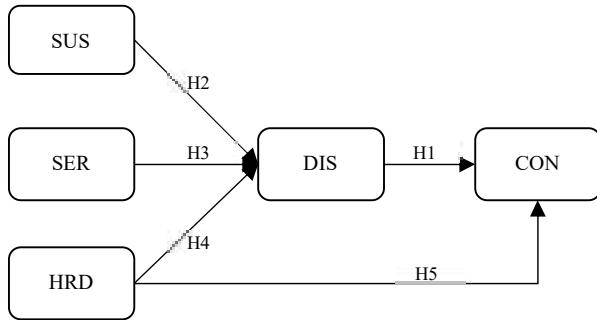
Extant herd literature suggests two dimensions of herding: underestimating one's own information and imitating others (Sun, 2009). There is empirical evidence that imitation reduces negative disconfirmation following technology adoption (Sun et al., 2013). Specifically, en-masse imitation demonstrates that an individual may have a low initial expectation, thereby increasing the probability of the expectation being confirmed or the degree of disconfirmation. Besides, the University of Oxford (2010) research revealed that once a product or service falls short of the required level of popularity, customers will abandon it. In this regard, the post-adoption continuance (or discontinuance) behavior is still a herd one. Researchers also suggested that herd mentality is a factor demonstrating social influence on an individual's behavior by researchers (Folkestad, 2016; Onnela & Reed-Tsochas, 2010). Thus, herd mentality could potentially be a determinant of post-adoption intention. Prior research provided evidence that herd mentality caused the discontinuance of technology use (Perrigo, 2019; University of Oxford, 2010; Vedadi & Warkentin, 2020). Based on the above discussions, it could be hypothesized that:

- H4:** Herd mentality has a positive influence on online shopping post-adoption disconfirmation.
- H5:** Herd mentality has a negative influence on online



shopping post-adoption continuance intention.

Figure 1 presents a visual representation of the hypothesized relationships discussed above.



Note: CON: Online shopping continuance intention; DIS: Online shopping post-adoption disconfirmation; SUS: Perceived Susceptibility of Covid-19; SER: Perceived Severity of Covid-19; HRD: Herd mentality.

**Figure 1:** The proposed research model.

### 3. Methodology

Data were collected during May – June 2021 using a survey with a convenience sample of Vietnamese customers who answered screening questions that they switched to online shopping for the first time or significantly increased online shopping since the outbreak of the Covid-19 pandemic. Due to the nonexistence of a sampling frame of those who adopted online shopping under the pandemic, the convenience sampling method was proper (Cooper & Schindler, 2011). Google-form-based questionnaire link was posted on online forums and social media. The questionnaire included screening questions, statements of scales adapted from the literature, and demographic questions. Respondents rated their agreement/disagreement to the statements using a 5-point Likert scale, with 1 completely disagree and 5 completely agree.

The study adopted scales with good psychometric properties from previous studies to measure the concepts in the research model. Specifically, the scale of herd mentality was adopted from Sun (2013) as a second-order construct consisting of two dimensions – discounting one's information and imitating others; perceived susceptibility and perceived severity of Covid-19 from Sreelakshmi and Prathap (2020); disconfirmation of expectation and continuance intention from Bhattacharjee (2001b). The scale statements are first translated from English to Vietnamese and next back-translated. Then, the two English versions (original and back-translated) were compared, and the translation was adjusted to ensure the content equivalence. After being designed, the survey questionnaire

was pilot-tested to ensure that the content and instructions were free of misunderstandings and grammatical errors.

The research stopped collecting data after 308 responses were collected. According to Hair, Black, Babin, and Anderson (2010), a previously required sample size of 300 may not be appropriate, but 200 is sufficient to perform SEM estimation procedures. After screening for careless responses such as the same rating for almost or all items, usable data of 292 was analyzed to assess scales and test hypotheses using PLS-SEM on SmartPLS 3.3.3 software. PLS-SEM was chosen since this method is suited to predict variables and does not require data assumption of data normality (Hair, Risher, Sarstedt, & Ringle, 2019).

## 4. Results and Discussion

### 4.1. Results

Table 1 presents descriptive statistics of the sample.

**Table 1:** Descriptive statistics

Demographic characteristics	N=292	%
<b>Gender</b>		
Male	118	40.4
Female	174	59.6
<b>Education</b>		
Up to high school	2	0.7
College / vocational school	24	8.2
University	140	47.9
Postgraduate	126	43.2
<b>Age</b>		
18 – 30 yrs. old	98	33.6
31 – 45 yrs. old	111	38.0
46 – 60 yrs. old	71	24.3
Above 60 yrs. old	12	4.1
<b>Monthly Income</b>		
Below 5 million VND	61	20.9
5 to less than 10 million VND	34	11.6
10 to less than 20 million VND	69	23.6
20 to less than 30 million VND	33	11.3
Above 30 million VND	95	32.5

Note: 1 million VND ≈ USD 45 (as of November 2021)

An examination of descriptive statistics showed that in the research sample, there was a higher percentage of women (about 60%) than men (40.4%); most of them have a university degree or higher (about 90% have a bachelor's degree). Undergraduate and graduate, the sample composition is relatively young, with 33.6% under 30 years old and 38% between 31 and 45 years old. The income group of over 30 million Vietnamese Dong accounts for the highest

proportion, almost one-third of the total sample number.

Because the research adopted scales from previous studies, the structures of the latent variables have been theoretically determined, thereby using confirmatory factor analysis criteria to assess scales would be appropriate (Hair et al., 2010). The current study analyzed the data using SmartPLS 3.3.3 software. The SmartPLS-based model includes the measurement and structure models (Hair, Hult, Ringle, & Sarstedt, 2016). As suggested by Hair et al. (2019), the study assessed the scale in terms of reliability, convergent validity, and discriminant validity. Specifically, outer loadings were examined to assess item reliabilities with recommended and minimum thresholds of 0.7 and 0.5, respectively. Cronbach's alpha and composite reliability (CR) coefficients were used to evaluate internal consistency with the recommended thresholds of 0.7 and 0.6, respectively, and convergent validity would be deemed satisfactory if the average variance extracted (AVE) values were greater than 0.5 (Hair et al., 2016). In the first run, all parameter values but the AVE value for herd mentality were satisfactory. An observed variable of imitating others factor was removed, and the model was re-run. While one first-order factor (DOI) was below 0.7, it was still well above the acceptable threshold of 0.6 (Hair et al., 2010). The results in Table 2 show that Cronbach's Alpha, CR, and AVE values meet the respective requirements as above, demonstrating scale reliability and convergent validity.

**Table 2:** The reliability and convergent validity

Variables	Factor loadings	Cronbach Alpha	CR	AVE
CON	[0.883 - 0.945]	0.937	0.955	0.842
DIS	[0.882 - 0.909]	0.879	0.926	0.806
SUS	[0.819 - 0.936]	0.855	0.902	0.756
SER	[0.626 - 0.939]	0.811	0.843	0.580
HRD			0.580	0.730
DOI	[0.677 - 0.835]	0.638	0.804	0.579
IMO	[0.939 - 0.941]	0.868	0.938	0.883

Note: CON: Online shopping continuance intention; DIS: Online shopping post-adoption disconfirmation; SUS: Perceived Susceptibility of Covid-19; SER: Perceived Severity of Covid-19; HRD: Herd mentality (second-order reflective construct consisting of DOI and IMO); DOI: discounting own information; IMO: Imitating others.

Discriminant validity of the scales was assessed using the criteria of Heterotrait-Monotrait (HTMT) values of less than 0.9, as suggested by Hair et al. (2019). Results in Table 3 shows that HTMT values of concept pairs are less than 0.9, thereby scales' discriminant validity was satisfactory.

The SmartPLS output regarding collinearity statistics showed that VIF values of latent variables ranged from 1.001 to 1.252, thereby multi-collinearity being not an issue in this study as suggested by Hair et al. (2010).

**Table 3:** Heterotrait-Monotrait Ratio (HTMT)

	CON	SER	SUS	DIS
SER	0.081			
SUS	0.073	0.462		
DIS	0.760	0.088	0.086	
HRD	0.203	0.112	0.122	0.312

Note: CON: Online shopping continuance intention; DIS: Online shopping post-adoption disconfirmation; SUS: Perceived Susceptibility of Covid-19; SER: Perceived Severity of Covid-19; HRD: Herd mentality.

The adjusted coefficient of determination ( $R^2$ ) of continuance intention is 0.483, showing that the model explains 48.3% of online shopping continuance intention variation. Besides, the adjusted  $R^2$  value of disconfirmation is 0.062, indicating that the three antecedents explained only 6.2% of online shopping post-adoption disconfirmation variation.

The study also performed the SmartPLS blindfolding procedure to examine  $Q^2$ , another means of assessing predictive accuracy with the system's suggested omission distance of twelve. Results also showed that  $Q^2$  values of continuance intention and disconfirmation are 0.403 and .042, respectively. As all  $Q^2$  values are larger than zero, the findings indicated that continuance intention and disconfirmation have predictive relevance with their respective predecessors, as Hair et al. (2019) proposed.

The size of the effect of herd mentality on online shopping post-adoption disconfirmation and online shopping continuance intention was deemed small, with  $f^2$  being 0.062 and 0.016, respectively. Meanwhile, the path from online shopping post-adoption disconfirmation to online shopping continuance intention had a large effect size,  $f^2=0.934$ . The effect sizes of both health belief antecedents of online shopping post-adoption disconfirmation were very minimal,  $f^2=0.002$  for the perceived susceptibility of Covid-19 and  $f^2=0.007$  for the perceived severity of Covid-19.

The PLS-SEM was also run using the bootstrapping method to test the research hypotheses and model. As in Table 4, the results showed that H1, H4, and H5 were supported. This means that both disconfirmation and herd mentality significantly and positively affect online shopping post-adoption disconfirmation. The result also suggests that herd mentality significantly and negatively affects online shopping post-adoption continuance intention. H2 and H3 were not supported. Both health threat beliefs, perceived susceptibility, and perceived severity of Covid-19 do not affect online shopping post-adoption disconfirmation as anticipated based on the health belief model and prior literature.

**Table 4:** Hypothesis testing results

	Reg. Coeff.	Std. Dev.	t values	p values	Results <sup>(1)</sup>
H1	0.717	0.038	18.712	0.000	Supported
H2	0.053	0.078	0.560	0.576	Not supported
H3	0.084	0.097	0.899	0.369	Not supported
H4	0.238	0.069	3.500	0.001	Supported
H5	-0.093	0.046	2.007	0.045	Supported

Note: Reg. Coeff.: Regression coefficients; Std. Dev.: Standard deviation; <sup>(1)</sup>: at  $\alpha = 5\%$

With H1, H4, and H5 having been supported, the mediating role of disconfirmation on the link between herd mentality and online shopping post-adoption continuance intention was also examined, using the results from bootstrapping method as suggested by (Preacher & Hayes, 2008). The results showed that the indirect effect from herd mentality to online shopping post-adoption continuance intention via disconfirmation was statistically significant (statistic=0.171,  $p=0.001<0.05$ ). This significantly positive indirect effect, coupled with the significantly negative direct effect of herd mentality on online shopping post-adoption continuance intention, made the total effects statistically insignificant (statistic=0.078,  $p=0.278>0.05$ ).

## 4.2. Discussion

The result of H1 was consistent with expectancy – disconfirmation theory and prior research that disconfirmation of expectations is an important driver of post-adoption continuance intention (Oliver, 1980; Sreelakshmi & Prathap, 2020; Sun, 2013). The absence of the satisfaction construct as a mediator in the relationship between disconfirmation and continuance intention in this research, as usually hypothesized in some prior research such as Sreelakshmi and Prathap (2020), could explain the high regression coefficient for disconfirmation ( $\beta = 0.717$ ,  $p<0.001$ ). Therefore, the size of the effect of disconfirmation on continuance intention should be interpreted as the total effects from disconfirmation to continuance intention. Nonetheless, this research focused on the impact of health beliefs on the post-adoption stage, as the research integrated the health belief model and herd psychology literature into expectancy-disconfirmation theory.

H2 was not supported, meaning that the perceived susceptibility of Covid-19 did not have a statistically significant impact on online shopping disconfirmation. They do not see that online shopping can help reduce the chance of getting infectious with Covid-19. Neither was H3, indicating that the perceived severity of Covid-19 did not have a statistically significant impact on online shopping disconfirmation. Thus, they do not see that online shopping can further reduce the chance of bearing the consequences of the Covid-19 infection. Both results of H2 and H3 were

inconsistent with the research of Sreelakshmi and Prathap (2020), which examined the perceived susceptibility and the perceived severity of Covid-19 on mobile-based payment in India. The H2 and H3 findings meant that in the context of this study, perceptions of the health threat of Covid-19 do not contribute to the positive appraisal of online shopping benefits. A plausible explanation is that Vietnamese consumers have not fully grasped the benefits of online shopping. They might still view online shopping as either a convenient or forced choice due to strict social distancing measures rather than a preventative way to avoid physical contact in time of the pandemic.

The result of supported H4 was consistent with Sun (2009, 2013). Though the size of the regression coefficient for herd mentality impacting disconfirmation is modest ( $\beta=0.238$ ,  $p=0.001$ ), the finding suggested that people may discount their own information about the technology and imitate others in adopting technologies. Subsequently, the the-crowd-is-right belief could contribute to their positive disconfirmation of technology expectations. One reason is that when consumers discount their own information, they lower their expectations. Another reason is that consumers are more susceptible to social influence and believe that others may know the technology better since herd mentality represents the social influence on one's behavior (Folkestad, 2016). However, the statistically significant impact of herd mentality on disconfirmation should not be merely interpreted as in the argument of Sun (2009) that people do not rely on their own information about technology, but they herd to make decisions. Because the other focus of this study is on the impact of herd mentality on the post-adoption stage as it integrated herd psychology literature into expectance-disconfirmation theory, this study only argued that herd mentality is one possible explanation for post-adoption disconfirmation.

The result of supported H5 is noteworthy as it further supports the argument that herding is not as fragile in the technology adoption context as in the finance or economics fields (Sun, 2013; Vedadi & Warkentin, 2020). The finding was consistent with earlier research that users adopted technology and might follow the crowd and abandon the technology en masse either because of its popularity (Perrigo, 2019; University of Oxford, 2010) or the crowd boycotting (El-Manstrly, Ali, & Line, 2021). While the total effects of herd mentality on post-adoption continuance intention is statistically insignificant ( $\beta_{total}=0.078$ ,  $p=0.278>0.05$ ), the combined findings of H5 and H4 suggested that the role of herd mentality should not be discounted. In this respect, herd mentality matters to the post-adoption stage in both ways. Specifically, herd mentality contributes to consumers' appraisal of the expectations, thereby forming their own beliefs and wielding a social influence towards consumers' herd



behaviors.

## 5. Conclusions & implications

Although the evolution of the COVID-19 pandemic is still complicated, early vaccination results in some countries encourage people to be optimistic about a post-pandemic world. Thus, this study contributes to a better understanding of consumer behavior once things return to normal. This study contributes to theoretical development by combining expectancy-disconfirmation theory, health belief theory, and herd psychology theory to examine the relative impact of the health belief model's perceived susceptibility, perceived severity, and herd mentality on post-adoption disconfirmation and, ultimately, continuance intention. In the context of the Covid-19 pandemic in Vietnam, which has resulted in technology acceptance of online shopping, the evidence provided support for the role of herd mentality and post-adoption disconfirmation in driving consumers' intention to continue online shopping. Moreover, the research adds mixed evidence to the application of health belief theory in technology adoption on the role of health threat dimensions in driving online shopping. Finally, the research contributes research evidence of consumer behavior in Vietnam, a country often mentioned in the literature calling for research in emerging markets (Le, Nguyen, & Kieu, 2020)

Practically, the examination of acceptance of technology in the form of online shopping in the unprecedented Covid-19 pandemic context could also help maintain the practical relevance of theories utilized as the theoretical foundations in this study. The study also offers insights for managers to develop online distribution strategies in the 'new normal' or possible post-pandemic period to motivate Vietnamese to continue online shopping as they have done through the pandemic. On the one hand, while perceived health threat does not significantly affect the post-adoption stage, unlike prior research on the use of health-related technologies such as mobile health service or diabetes management apps, managers of online shopping channels may need to develop effective strategies to communicate health-related benefits of online shopping. They may consider integrating online shopping platforms with contactless payment methods for consumers to fully realize the social distancing benefits of online shopping.

On the other hand, managers may promote a general attitude toward online shopping among the public, as a herd mentality mechanism will reinforce an individual's positive disconfirmation of their initial adoption decision. Managers should also closely monitor the online sentiments toward their online platforms, as consumers may herd and leave en masse if service failures or corporate social responsibility

issues arise. For example, in the context of this study, retailers/retail platforms must solve issues inhibiting adoption before the pandemic, and most complained during periods of social isolation: product quality and delivery time.

Like any other study, this study is not without its limitations. Firstly, the study has the limitations of a cross-sectional survey, so future research can be done with other methods, such as time-series data so that the results can be more generalized. Future research may also need to consider regional differences in terms of effects and consumer behaviors. Future research could look at changes in beliefs and attitudes before and after an unprecedented event like the Covid-19 pandemic to better understand the psychological process before and after accepting technology.

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# The Relationship between Information Distribution and Intention to Choose a University

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## Abstract

**Purpose:** Research on the intention to choose a university has an important role for universities in enrollment. The information element is considered essential to help students have specific information before making their decisions. However, how to distribute this information appropriately is an issue that needs to be studied. Therefore, this study was conducted to evaluate the influence of information distribution on intention to choose a university. **Research design, data, and methodology:** The study showed a survey on 259 samples from first-year students at public universities in Vietnam. PLS-SEM model was performed to find out the relationship between information distribution and intention to choose a university. **Result:** The results show that information quality and information helpfulness positively impact on attitudes towards universities. Attitude towards university has a positive effect on the intention to choose a university. **Conclusion:** From the results of this study, the authors also make some recommendations to help universities have good communication policies to improve their ability to attract students to choose a university. Quality and helpful information will help universities to be able to attract students more effectively to enroll based on an effective communication strategy.

**Keywords :** Information Distribution, Information Quality, Information Helpfulness, Intention to Choose a University.

**JEL Classification Code:** B55, H23, M10, P36.

## 1. Introduction

Information communication or marketing activities are no longer limited to enterprises but have become ubiquitous in universities (Carvalho, Brandão, & Pinto, 2020; Smørsvik & Vespestad, 2020; Štimac & Šimić, 2012; Vukasovic, 2015). Information communication helps organizations or individuals who want to bring information to their

customers (Kotler, 2017). The customers in this study are college-going students. Therefore, the competition to attract students to enroll in universities or higher is higher when schools have more tools to carry out university promotion (Johnston, 2010). According to the Vietnamese Ministry of Education and Training statistics, in the 2018-2019 school year, the number of new students is 413,277, and in 2019-2020 the number increases to 447,483. It can be seen that

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schools have expanded to attract more students. Therefore, universities are still competing fiercely in terms of enrollment. In the context of university financial autonomy, it is even more important to attract students (Dao & Thorpe, 2015) actively. Furthermore, online advertising and communication activities are becoming more and more popular and essential in the context of the complicated development of the COVID-19 pandemic in Vietnam.

To promote the effectiveness of online communication channels, it is indispensable to support information technology. With the development of technology, online communication has become more effective. Therefore, the concept of marketing 4.0 was born in the context of the development and application of science and technology in marketing (Jara, Parra, & Skarmeta, 2012; Kotler, 2017). This can be considered a market trend for businesses and universities in terms of market access - students. First, however, how to use communication or marketing needs to be considered scientifically to optimize the information and science provided by the media.

Information asymmetry can occur in the relationship between universities and students when the university releases information to attract students to enroll. Students will be the object of lack of information, so what the university offers will be well received by students and less likely to backfire. Therefore, the more information that shows the advantages of the university, the more students will admire the university.

In Vietnam, universities have many electronic information channels. First, it is a common source of information from the university (related to general activities). Second, separate information are in charge of departments and faculties. Therefore, some info is presented separately, making the approach inconsistent. The information has not been controlled for quality: How useful is it, how good is the quality. At the same time, The universities are expanding in size, leading to higher competition in attracting students to the university. Third, the fierce competition between universities in the admissions work. Therefore, universities have been investing and marketing more to attract learners. Not only small universities but also large universities focus on marketing for enrollment. Since universities' main source of revenue lies in student fees, the optimal number of students will bring sustainable finance to the universities.

There are many studies worldwide on the influence of media distribution on the decision to choose a product or service (Nguyen, Nguyen, & Nguyen, 2020). However, studies related to information quality and usefulness are still limited (Erkan & Evans, 2016). Therefore, in this study, we develop a model to evaluate the influence of information through the university information system on choosing a university. This study will investigate how the distribution

of reliable information helps to increase the intention of choosing a school for universities. The study will contribute theoretically to finding out the distribution of university information, attitudes, and intentions to choose universities. Does information theory explain the attitudes and behavior of university choice well?. The subjects of the survey were first-year students at universities. Research results will help universities have effective information-based marketing policies.

## **2. Literature Review**

### **2.1. Intention to Choose a University**

Research of behavior of intention and use of services in technology come from the development of Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and other theories as Social Cognitive Theory (SCT), etc. to build theories predicting intention and use as Technology Acceptance Model (TAM) (Davis, 1989; Davis, 1993; Venkatesh, Morris, Davis, & Davis, 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), Model of Information Systems Success (ISS) (DeLone & McLean, 1992; 2003).

Before enrolling in a university, students will begin to research information and lead to an intention to choose the university that they will attend. Universities are selected based on students' and parents' criteria about personal ability, ability to complete programs, and employment after graduation (Hiatt, Swaim, & Maloni, 2018; Swaim, Maloni, & Napshin, 2014). Like other decisions, the intention to choose a particular university can be influenced by the information provided (Erkan & Evans, 2016; Sussman & Siegal, 2003; Tapanainen, Dao, & Nguyen, 2021), the attitude degree of information recipients (Lee & Koo, 2015), the helpfulness of information (Erkan & Evans, 2016; Pai & Huang, 2011).

### **2.2. Information Distribution, Attitudes Towards with University and Intention to Choose a University**

#### **2.2.1. Information Quality**

Distributing information is the type of information given to provide the information to be communicated to the target audience. The factors of information quality and information helpfulness are mainly concerned (DeLone & McLean, 1992; DeLone & McLean, 2003). Information quality refers to user relevance and responsiveness (Huang & Bilal, 2019). Information quality is considered an essential factor affecting decision-making (Salehi-Esfahani,



Ravichandran, Israeli, & Bolden., 2016). Several factors related to information quality influence how helpful a review is in the eyes of potential consumers when making a decision (Tapanainen et al., 2021). Therefore, we propose two hypothesis:

**H1:** Information quality has a positive impact on the information helpfulness.

Quality information will bring reliable information and exactly what the audience needs. When the source of information that readers find is adequate and relevant to them, they will have a better attitude towards the university that issued the information (Salehi-Esfahani et al., 2016). Furthermore, those who approach find that the university understands and fits themselves, so they will have a positive attitude (Salehi-Esfahani et al., 2016). Therefore, information quality will improve the attitude towards the product/service. Therefore, we propose two hypothesis:

**H2:** Information quality has a positive impact on attitudes towards universities.

### 2.2.2. Information Helpfulness

Information usefulness is the degree to which information is usefully received and can be effectively used in decision-making (Cheung, Lee, & Rabjohn, 2008). The usefulness of information is often considered an essential factor in influencing attitude towards services (Lee & Koo, 2015). Many studies show evidence of the effect of helpfulness on the attitudes of information recipients. For example, research by (Luna-Nevarez & Torres, 2015) for advertising on social networks found that perceived usefulness positively influences users' attitudes towards advertising. Therefore, the study proposes two hypothesis:

**H3:** Perceived helpfulness of information has a positive impact on students' attitudes towards university.

The information that is considered useful will bring a sense of closeness between learners and the university. Furthermore, helpful information helps users not to spend much time filtering information as well as evaluating and checking information (Ajzen, 1991). Due to saving time and effort in searching for information and evaluating information, forming an intention to choose a university is faster. Also according to Tapanainen et al. (2021), information helpfulness also results in higher intention to choose. Providing information helpfulness will make students have a better attitude towards the university and increase the student's intention to choose the university. Therefore, the study proposes two hypothesis:

**H4:** Perceived helpfulness of information has a positive impact on students' intention to choose the university.

### 2.2.3. Attitude towards with University

Attitudes towards with university are students' affective perceptions of university. Attitudes towards a particular subject or service are expressed in favor or rejection of that object (Davis, 1993). Attitude is considered an essential factor in predicting behavior. The assumption of the existence of a causal relationship between attitudes and intentions in the theory of rational action and planned behavior (Ajzen, 1991). According to TRA, TPB suggests that attitudes can predict behavior and proposes that a positive university attitude will positively affect a student's ability to choose a college for enrollment. Therefore, the study presents the following hypothesis:

**H5:** Attitude towards with university has a positive impact on intention to choose university.

The research model is presented in figure 1.

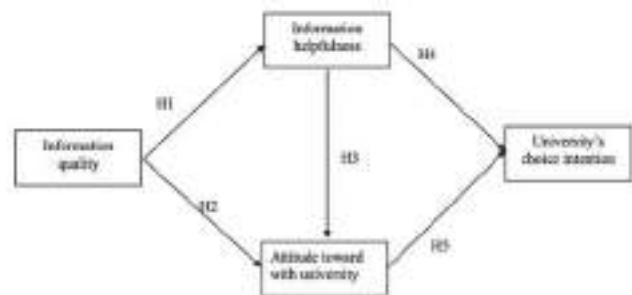


Figure 1: Research Model

## 3. Method

### 3.1. Research Design

The scales are designed based on Filieri, McLeay, Tsui, and Lin (2018) study with three items on information helpfulness. Information quality was measured by five items referenced from Kim, Lee, Shin, and Yang (2017). Attitude towards the university is measured by five items referenced from Hiatt et al. (2018). And the intention to choose a university is measured by four items referenced from Hiatt et al. (2018). The study uses a 5-point Likert scale with 1- strongly disagree; 5- strongly agree. Data were collected for first-year university students. Because this is an audience that has just gone through the university choice process, they will have the closest perception and assessment of the intention to choose a university through university

information distribution. The questionnaire was collected from February 2021 to May 2021.

### 3.2. Data

Student survey results show that female students make up the majority, with 177 students (68.3%), and male students are 82 students (31.7%). In addition, information about parents' education was also surveyed. The results show that most parents of students surveyed have university (120 people, accounting for 46.3%). Next is the education level below high school with 97 people, accounting for 37.5%, and the lowest level is the college level with 42 people, accounting for 16.2%. The detail information is presented in table 2.

**Table 2:** Description of Student Characteristics

		Frequency	%
Gender	Female	177	68.3
	Male	82	31.7
Education level of Parents	< High school	97	37.5
	College	42	16.2
	University	120	46.3

### 3.3. Data Analysis

To ensure the reliability of the analyzed data, reliability tests are performed with two criteria: (1) Cronbach's Alpha coefficient greater than 0.6 and (2) composite reliability (CR) greater than 0.7 (Bui & Nguyen, 2022). In addition, the constructs need to ensure convergence through the factor loading index greater than 0.5 and the Average Variance Extracted (AVE) greater than 0.5. Finally, before entering into the PLS-SEM analysis, the discriminant validity test was also used with the square root index of AVE being greater than the corresponding correlation coefficient between the factors. The primary benefits of PLS-SEM include the relaxation of distributional assumptions required by the maximum likelihood method used to estimate models using covariance-based SEM (CB-SEM) and the ability of PLS-SEM to estimate much more complex models with smaller sample sizes. Therefore, PLS-SEM is applied in this study based on the advantages as mentioned earlier. At the same time, with a sample size of just over 200 respondents, PLS-SEM is considered more suitable than CB-SEM.

#### *Qualitative*

After having the results of the PLS-SEM analysis, we conducted qualitative research by interviewing some learners about their information, attitude, and intention to choose the university. This qualitative study is only intended to supplement and explain the research results in-depth. The authors conducted random interviews with 16 first-year students and synthesized opinions to clarify the quantitative results. The qualitative analysis in this study did not focus

on discovering new factors. Therefore, verbatim citations of typical interview responses will be included in the discussion section.

## 4. Results and Discussion

### 4.1. The Reliability Test

Items will be included in the analysis for reliability. The analysis results show that all constructs are reliable and convergent with Cronbach's Alpha coefficients all greater than 0.6, CR all greater than 0.7, AVE all greater than 0.5, and factor loading all greater than 0.5. The results of reliability test in table 3.

**Table 3:** The Reliability Test

Items	Loading
<b>Attitude towards with university</b> (iCronbach's Apha=0.906 ; CR=0.93 ; AVE = 0.727)	
ATT1_ You think this university choose is good	0.831
ATT2_ You think this university choose is smart	0.892
ATT3_ You think choosing this university is beneficial	0.847
ATT4_ You think this university choose is desirable	0.861
ATT5_ You think choosing this university is worthwhile	0.828
<b>Information helpfulness</b> (Cronbach's Apha=0.823 ; CR=0.824 ; AVE = 0.655)	
IH1_ Media information channel to help you evaluate the university you intend to choose	0.777
IH2_ Information channel to help you familiarize yourself with the university you intend to choose	0.867
IH3_ Media information channel to help you understand the activities of the university you intend to choose	0.812
IH4_ In general, the media helps you decide to choose your current university	0.777
<b>Intention to choose</b> (Cronbach's Apha=0.912 ; CR=0.938 ; AVE = 0.791)	
INT1_ Are you planning to choose your current university to complete your undergraduate program	0.870
INT2_ Your goal is to complete your undergraduate program at your current university	0.908
INT3_ Are you planning to complete your undergraduate studies at your current university	0.887
INT4_ In general, did you intend to choose your current university before taking the university entrance exam	0.893
<b>Information quality</b> (Cronbach's Apha=0.814 ; CR=0.871 ; AVE = 0.575)	
IQ1_ You see the media channel providing general information about the university	0.791
IQ2_ You find the media to provide relevant information about the university	0.813
IQ3_ You see the media channel providing timely information about the university	0.791
IQ4_ You see a media channel that provides complete information about the university	0.709
IQ5_ You find the media channel providing interesting information about the university	0.680



## 4.2. Discriminant Test

The table 5 shows discriminant validity. The analysis results indicated that the value of square root of AVE were all greater than the correlation between any constructs. This presented that the constructs in the model achieved discriminant validity. Table 5).

**Table 5:** Discriminant Validity

	ATT	IH	INT	IQ
ATT	<b>0.852*</b>			
IH	0.594	<b>0.809*</b>		
INT	0.639	0.513	<b>0.890*</b>	
IQ	0.656	0.67	0.465	<b>0.759*</b>

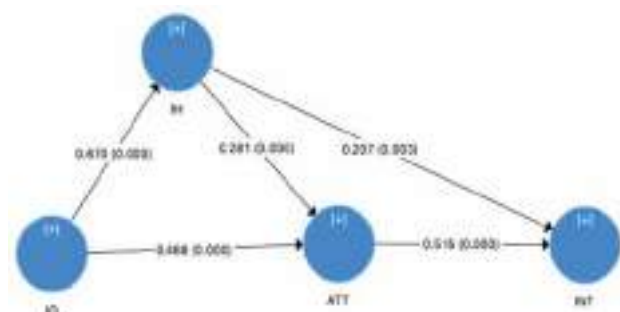
\* Square root of AVE.

## 4.3. Testing the Hypotheses

The results of the PLS-SEM model analysis show that information quality has a positive impact on information helpfulness and attitude towards universities. ( $\beta_{IQ-IH} = 0.670$ ;  $\beta_{IQ-ATT} = 0.468$ ) and are both statistically significant at 5%. Therefore, hypotheses H1 and H2 are both accepted. The IH also has a positive effect on ATT and INT ( $\beta_{IH-ATT} = 0.281$ ;  $\beta_{IH-INT} = 0.207$ ) and are both statistically significant at 5%. Hypotheses H3 and H4 are also accepted. Finally, ATT has a positive effect on INT ( $\beta_{ATT-INT} = 0.516$ ) and is statistically significant at 5%. Hypothesis H5 is also accepted. The results is shown in table 6 and figure 2.

**Table 6:** The Result of PLS-SEM

	Beta	Std	T-stats	P-Values
ATT -> INT	0.516	0.063	8.149	0.000
IH -> ATT	0.281	0.073	3.840	0.000
IH -> INT	0.207	0.069	3.012	0.003
IQ -> ATT	0.468	0.061	7.646	0.000
IQ -> IH	0.670	0.046	14.664	0.000



**Figure 2:** The Result of PLS-SEM

## 4.4. Discussion

Information quality has a positive effect on information helpfulness. This result same with the study of Erkan and Evans (2016). When the school releases complete information about the university, its services, programs, or student benefits while attending the university, it will give students enough details to know if they are a good fit for the school. The information provided will attract students. Such information will be really helpful for students to provide all the positive information that students need in choosing the university they will attend. In addition to complete and detailed information, providing timely information to students makes them more active in choosing a university. "First come first serve" is one of the advantages of the university's timely information release. Information becomes valuable when the univeristy provides it in a comprehensive, attractive, and timely manner.

The results from the interview also show that information quality has a positive meaning in increasing information usefulness.

*"When I receive information related to enrollment as well as study programs, this is really the information I think is most useful to learners. Besides, I only see information that really matters to me when it is sent to me at the right time when I am looking for information and have not made a decision on my choice of univerisity."*

Information quality has a positive effect on attitudes towards universities. This also shows that when students receive good information from the university, they also have a good attitude. In other words, students' affection for the university will increase when students receive information about the university's communication or marketing. Furthermore, it is a positive sign for transmitting good information from the university to the students on time. At the same time, the helpful information factor also positively affects the attitude towards the university. This result shows that when students find the information provided by a helpful university, they consider the university attractive. From there, students have a good attitude towards the university and come to the intention to choose the univerity to attend (attitude towards the university and useful information both have a positive impact on the intention to choose university). This result same with the study of Erkan and Evans (2016). The interview results also support the results of this study.

*"When I think that the information is of good quality, really helpful to me in my decision to choose the university, I have really good feelings for that university. I would almost consider it as one of the univercitites that I would choose. From there, it increased my intention to choose the university."*

*"Before choosing the university I will attend, I often search the internet for information related to my interests"*

*and schools that match those interests. Then, after I have the right schools, I will filter the information of universities that match my academic ability. Next, I will learn about admissions and training programs. Finally, if the information about any school is helpful to me, I will consider applying to that university. Therefore, it can be seen that the usefulness of the information provided by the university is important in my choice of university."*

Attitudes towards the university are increased by helpful information and good quality information. This result indicates that the increase in intention to choose a school also comes from useful information and a good attitude about the university. Therefore, it can be seen that the important role of information on university choice intention.

## 5. Conclusion and Implications

### 5.1 Conclusion

This study has answered the research objective set out. First, the study has systematized the theory of distribution of information to increase the intention to choose a university. Second, the study has built a research model and research hypotheses about the relationship between distribution information. And the intention to choose a University. Tuesday, the survey research on 259 first-year students has once again confirmed the importance of media information and university choose intentions. The study answered the following objectives: (1) Information quality has a positive effect on attitudes and information helpfulness; (2) Useful information has a positive effect on attitude towards university and intention to choose the university; (3) Attitude towards university has a positive effect on the intention to choose the university. At the same time, research has shown that the important participatory university selection comes from the information factors that the university emits. These signals will help students have a lot of information needed to choose a university.

From the results of this study, the authors also give some implications to help improve the intention to choose the university.

### 5.2. Theoretical Implications

This study shows that the theory of information asymmetry can occur and is well handled through the signal information distribution factor. A student's lack of information is needed to access and evaluate before making a school choice. This will be found and provided by the school with complete information, better reducing the information asymmetry factor. Therefore, the study proves that the theory of information asymmetry exists in the

enrollment problem of universities.

### 5.3. Practics Implications

First, schools need to develop good communication content related to the school and the curriculum in a readily receptive way. Second, univeristy determine the time to release university information at the right time to bring timely information to students. Third, the university's positive information and the right audience will help students have a good feeling and attitude towards the university. Fourth, provide information that is considered helpful to students, or the information given should be the correct information that students need in choosing a university. With the existence of information asymmetry theory in enrollment. This will help students reduce this negative impact by collecting information from the school. Moreover, reliable information will be a good reference for school selection. At the same time, attitudes that have a positive effect on the intention to choose a university will positively improve the perception of the university through communication channels.

## 6. Limitations and Future Research

Although the study has met the research objective, certain limitations still exist. Firstly, the number of samples is not large due to pandemic factors that can make the survey more difficult. Second, the study only focused on universities in the north and central regions but not in other areas (south), so comparing regions is still difficult. Third, the survey object is a first-year student. Still, no 12th-grade student is preparing to choose a university, so the results do not fully reflect the entire audience who intends to choose a university. So there won't be any other factors except the attitudinal factor, which is used mainly in behavioral intention models.

Therefore, the authors also recommend future research: expand the survey sample size more widely over more geographical areas to bring more comprehensive results. In addition, the survey subjects extended to the 12th-grade target audience for more detailed results in choosing a school.

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# The Competencies of Sellers in e-Commerce and Innovative Sales Activities for Sales Performance\*

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## Abstract

**Purpose:** This study aims to identify the core competency of sellers on their sales performance in the context of e-commerce, and to verify the mediating effect of innovative sales activities. **Research design, data, methodology:** A questionnaire survey was carried out to 200 sellers in e-commerce. Exploratory factor analysis and reliability analysis for Cronbach's Alpha were performed to verify the validity and reliability of the and the regression analyses of 5,000 bootstrap samples were carried out to test hypotheses. **Results:** Based on the analysis, the elements of competencies of sellers in e-commerce such as self-control, trust-building, social interaction skills were positively related to the innovative sales activities and sales performances. Innovative sales activities also affected sales performances. Indirect effects of competencies of sellers on sales performance via innovative sales activities were partially effective depending on variables that brought practical implications. From a practical perspective, the valid competencies found in this study may be applied for the recruitment and selection of sellers. **Conclusion:** This study shed light on theories of e-commerce sales and sales practices by examining the competencies of sellers in e-commerce compared to those of traditional sellers and by revealing innovative sales activities as the effective mediator for sales performance.

**Keywords :** e-Commerce, Competencies of Sellers, Innovative Sales Activities, Sales Performance.

**JEL Classification Code:** L14, L25, M15, M31, M37

## 1. Introduction

The last decades witnessed the development of internet-based telecommunication technology and its effects on the everyday life of individuals as well as business strategies and practices. In particular, the retail e-commerce that creates commercial transactions in the virtual internet space showed rapid growth at an unprecedented rate and, in particular, the global pandemic started in 2019 resulted in a dramatic increase in online sales volume (Statista, 2019).

Compared to the traditional sales and distribution channel, the context in e-commerce seems to provide

convenience and efficiency by reducing time and costs as well as enhancing interactivity and accessibility. In addition, online sales via the internet innovate the paradigm of marketing as a whole in various areas such as sales routes, time to market, product promotion, and trust formation with customers and create new, previously unimaginable business opportunities. Seller sales capabilities are found to be central to performance and customer behaviors in the different contexts of e-commerce (Mu & Zhang, 2021). It is, therefore, necessary to identify a novel definition of the competencies of sellers and their effects on sales

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performances that are inevitably different from those of traditional sellers.

Based on reviewing previous studies, the competencies of sellers in traditional terms have continued until recently in various works of literature (Park & Park, 2016; Yeo, Chang, & Kim, 2021). Only a few pieces of research have been found on sellers in e-commerce but they addressed the seller's role for online sales, behavior, and reputation of sellers in the online platform (Zhao, Wang, Sun, Liu, Fan, & Xuan, 2019; Wang, Cai, Xie, & Chen, 2021; Chen, Zheng, Xu, Liu, & Wang, 2018). None of them examined sellers' competencies and their effects on innovative activities and sale. Thus, it is necessary to find the required competencies of e-commerce sellers to define expertise as a profession and how these competencies result in actual innovative behavior to enable sellers in e-commerce to develop necessary competencies and desirable sales performance.

This study aims to identify the core competencies of sellers as the determinants of sales performance in the context of e-commerce and to verify the mediating effect of innovative sales activities. To achieve the objective, this study asks the following research questions. What are the valid competencies of sellers that positively affect sales performance? What competencies, in particular, are related to innovative sales activities? Are competencies of sellers directly affecting sales performance or are there mediators that lead competencies to actual sales performances? How significantly do innovative sales activities mediate the competencies of sellers and sales performance?

By answering the above questions and based on possible findings derived from analysis, this study may shed a light on the literature related to the competencies of sellers and sales performance in e-commerce with a novel approach. In addition, we also anticipate that this study may contribute to enhancing the individual competencies of sellers in e-commerce as well as to help organizations develop schemes for selection, training their sales teams, and innovative sales practices.

The structure of this study is as follows. The previous studies were reviewed firstly and the hypotheses and research model are derived based on the theoretical considerations. After elaborating methodology and data analysis, the results of this study are summarized and discussed in the discussion and implications sectors that are finally followed by the conclusion.

## **2. Literature Review**

### **2.1. Competencies of Sellers and Sales Performance**

Competencies of sellers are essential strategic elements of firms for their strategic plan and implementation in

marketing as they significantly affect sales performance (Zhou & Li, 2010; Ellis-Chadwick & Doherty, 2012). Sypniewska (2013) suggested that an individual competency-based approach should be adopted to evaluate and develop sellers for the growth of an enterprise. It is also suggested that individual competencies of sellers have greater effects on sales performance than advertisement by multiple folds (Kotler, Kartajaya, & Setiawan, 2010).

Among other competencies of sellers, self-control was pointed out as a critical factor (Chen, Huang, Davision, & Hua, 2015; Sypniewska, 2013; Spencer & Spencer, 1993). As sub-elements of self-control, the ability to make a decision, pride, positive confirmation, conscience on a mission, self-confidence to turn a negative crisis into a positive opportunity were suggested (Sypniewska, 2013; Spencer & Spencer, 1993). Adaptive selling behavior is also considered as the important sub-factor for self-control as it indicates the seller's customer orientation and capability to adapt promptly to changing context of the business environment (Franke & Park, 2006).

A trusting relationship is defined as a tendency of reliance based on the confidence of customers in the seller as the counterpart of transaction and a critical factor for firm's performance (Liu, Che, Liu, & Zhang, 2012). The distrust of customers derived from the anonymous context of e-commerce is found to be negatively affecting customer relationships and sales performance (Thorpe, 2011). Park and Pyeon (2018) confirmed that an intentional improvement of seller-customer trust is the foremost interest for relationship enhancement between sellers and customers. As a competency of sellers, an ethical attitude is suggested to enhance trust between a seller and customers in the context of e-commerce. (Pavleska & Blažič, 2017). In particular, trust in the other party is considered an inevitable element to maintain sustainable and long-term buyer-seller relationships and to increase market share in e-commerce (Newell, Belonax, McCardle, & Plank, 2011; Pavlou & Gefen, 2004; Gunzi & Georges, 2011).

Effective sellers also should have competency for social interaction to create and maintain favorable relationships with interested parties to achieve sales objectives (Henning-Thurau, Gwinner, & Gremer, 2002). Social interaction as a competency of sellers includes capabilities to pay attention to customers' personal information provided by customers such as birthday, preferred purchase time, favorable products (Ahearne, Jones, Rapp, & Mathieu, 2008). Sellers also need to have the competency to understand the issues, ideas, and interests of customers partially expressed by them (Oh, Bae, & Yoon, 2010). As sellers pay attention to information and the voice of customers, they also may cultivate related competencies to provide relevant services to customers at a right time (Ahearne et al., 2008). In addition, positive influence is suggested as one of the critical

social competencies as sellers need to persuade customers by providing assurance and showing strong impressions to achieve their objectives (Spencer & Spencer, 1993).

Other studies considered knowledge and technology of individuals including negotiation, communication, utilization of technology, capacity to collect information as the important competencies of sellers (Greenwood & Buren, 2010; Ramadan, 2019; Ahearne et al., 2008; Pavlou & Gefen, 2004; Zhuang, Xi, & Tsang, 2010; Gomber, Kauffman, Parker, & Weber, 2018).

In the particular context of e-commerce, the development of information technology and the prosperity of online communities, as a result, affected business strategies significantly and created an important marketing sphere (Park, Cho, & Ahn, 2015). Thus, knowledge and technology as competencies in the area of e-commerce inevitably include information and communication technologies and they are widely used to drive e-commerce as well as to innovate business processes, organizational structure, and culture. Several studies suggested that information technology-related competencies are considered as distinctive factors to differentiate customers' e-commerce experience and online sellers with IT capability is the important human asset that would increase customer loyalty and reduce marketing expenses (Chae, Koh, & Park, 2018). Managing information technology and infrastructure is identified as the critical element of technology-related competency (Haffke, Kalgovas, & Benlian, 2017). Bhargava and Choudhary (2004) also categorized programming, system analysis, and planning as information technology-related competencies of sellers. Many firms utilize e-business strategically to enhance the company-wide value chain and online seller equipped with technology is required to develop a successful framework (Kane, Palmer, Phillips, Kiron, & Buckley, 2015).

## 2.2. Innovative Sales Activities

Innovation is considered as an essential element for the inherited competitiveness of an enterprise regarding organizational structure, business process, product, and service that create value for customers (Gunday, Ulusoy, Kilic, & Alpan, 2011). In particular, some studies reported that marketing-related innovation is directly and positively related to sales performance (Bowen, Rostami, & Steel, 2010; Chen, 2015; Ellis-Chadwick & Doherty, 2012).

Innovative sales activities in e-commerce are practically important because these activities endow greater value for customers and enhance sales by making customer elasticity less sensitive (Kannan, 2017; Naidoo, 2010). Marketing innovation from its definition brings significant changes in sales and marketing methodology in various areas such as price, product relocation, promotion, design, and packaging

of products compared to existing marketing efforts to enhance product attractiveness and brand recognition (Kalkan, Bozkurt, & Arman, 2014).

Ahearne et al. (2008) mentioned that successful online marketing innovation should include the active participation of online sellers utilizing software, data, and online assistance provided by the operating system of an organization. Marketing innovation means proactive use of new technologies and business processes innovation to approach customers effectively using price reduction and efficient distribution channels (Micheaux & Bosio, 2019). This process innovation and the employment of new technologies include a strategic approach in product design and packaging, launching new brands, promotion, and other efficient attempts to boost sales performance (Chaffey & Ellis-Chadwick, 2019). Research by OECD in 2018 revealed that marketing innovation by e-commerce usually adopts multiple channels and methods to promote new brands, to collect customer information, to understand customer's needs, to identify the patterns of consumption, and advertise new concepts and identity of products and services (OECD, 2018).

It is also suggested product innovation, the introduction of new brands, product design, and packing innovation using ICT through active communication with customers is the process of online marketing innovation and together with this, companies aim to develop efficient supply chain system and price competitiveness (Coenen & Kok, 2014). Faulds, Mangold, Raju, and Valsalan (2018) expanded the concept of marketing innovation in the context of e-commerce by applying it to all activities to expose intangible intellectual properties and those also may apply to tangible products. Park and Park (2016) defined online marketing innovation as an extensive concept including SNS marketing, viral marketing, online advertisement, social CRM (SCRM), web-log analysis, product recommendation service, and customized advertisement.

As stated above, innovative sales activities in e-commerce are related to aggressive marketing strategies in product, price, promotion, and place by utilizing information and communication technologies (Naidoo, 2010). In particular, online marketing innovation is critical for the success of sellers in the context of e-commerce because it enables them to provide exceeding value for customers and to positively affect sales performance by making demand elasticity less sensitive (Bowen et al., 2010; Oklander, 2018; Naidoo, 2010; Raman & Menon, 2018).

## 2.3. Research Model and Hypotheses Development

This study establishes a construct of research model and hypotheses based on the previous studies as the competencies of e-commerce sellers are categorized into 4



groups; self-control skills, trust-building skills, social interaction skills, and knowledge and technical skills. Each category also consists of a total of 12 sub-categories derived from the literature review. In particular, we included questions in our survey to ask trustworthiness, ethical decision making based on Lucia and Lepsinger (1999) and adaptiveness, customer service, interest in personal information, and knowledge from the study of Ahearne et al. (2008), and ICT capabilities as a human asset are derived from Chae, Koh, and Park (2018).

**H1:** Self-control skills of sellers in e-commerce will be positively related to their innovative sales activities.

The first hypothesis is derived among other competencies of sellers, self-control was pointed out as a critical factor (Chen et al., 2015; Sypniewska, 2013; Spencer & Spencer, 1993). Trust is also confirmed as interest for relationship enhancement between sellers and customers (Park & Pyeon 2018; Liu, Che, Liu, & Zhang, 2012). The second hypothesis, therefore, points out trust-building as an important skill of sellers' in e-commerce.

**H2:** Trust-building skills of sellers in e-commerce will be positively related to their innovative sales activities.

Effective sellers also should have competency for social interaction to create and maintain favorable relationships with interested parties to achieve sales objectives (Ahearne et al., 2008; Henning-Thurau et al., 2002; Oh et al., 2010). In the particular context of e-commerce, the development of information technology and the prosperity of online communities, as a result, affected business strategies significantly and created an important marketing sphere (Park et al., 2015; Greenwood & Buren, 2010; Ramadan, 2019; Ahearne et al., 2008; Pavlou & Gefen, 2004; Zhuang, Xi, & Tsang, 2010; Gomber et al., 2018). The third and fourth hypotheses are established based on these suggestions as follows;

**H3:** Social interaction skills of sellers in e-commerce will be positively related to their innovative sales activities.

**H4:** Knowledge and technical skills of sellers in e-commerce will be positively related to their innovative sales activities.

Many studies reported that marketing-related innovation is directly and positively related to sales performance (Bowen et al., 2010; Chen, 2015 Ellis-Chadwick & Doherty, 2012). Online sales innovation is critical for the success of sellers in the context of e-commerce because it enables them to provide exceeding value for customers and to positively affect sales performance by making demand elasticity less sensitive (Bowen et al., 2010; Oklander, 2018; Naidoo, 2010;

Raman and Menon (2018). Based on the suggestion of previous studies, the fifth and sixth hypotheses are derived.

**H5:** Innovative sales activities of sellers in e-commerce will be positively related to their sales performance.

**H6:** Innovative sales activities will mediate the relationship between seller competencies and sales performance.

A research model is developed based on previous studies and hypotheses suggested above.

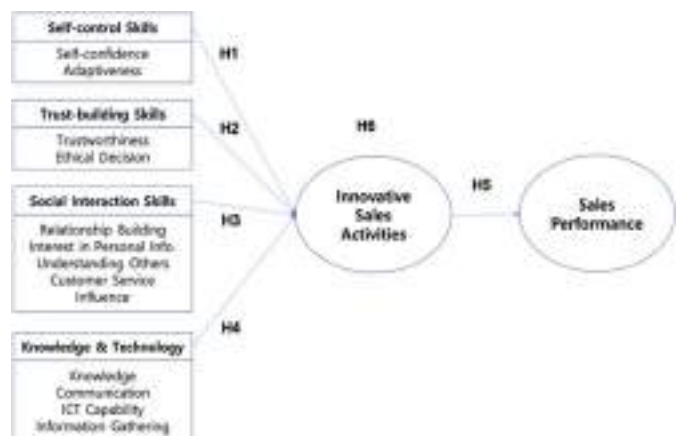


Figure 1: Research Model

### 3. Methodology

#### 3.1. Measurement and Data Collection

This study identified self-control skills, trust-building skills, social interaction skills, knowledge, and technical skills as main variables based on the previous studies and attempted to measure each category by giving out a survey for sub-factors asking the level of agreement for each factor in 5-point Likert scale. Self-control is measured by asking about self-confidence in judgment and capabilities, confidence in any challenging situation, and planning skills without relying on anyone around and the measures are adapted from Spencer and Spencer (1993) and Chen (2015). Trust-building is adapted from Newell et al. (2011) and measured by asking questions diligently and promise-keeping behavior, suggesting honest price, respect for others and fair treatment, staying away from other's matters, compliance with principles. Social interaction skills are adapted from Ahearne et al. (2008) and measured by capabilities to identify common information with customers as sellers are sharing information, ability to contact customers informal settings, attitude to remain as the favorable relationship with customers out of business situations, and the usage of customers' anniversaries. Lastly,

knowledge and technical skills are measured by asking questions related to online communication with customers, the swift transition of IT strategy depending on the types of customers, and the effective gathering of information that the seller is handling and the measures are adapted from Ahearne et al. (2008).

Innovative sales activities as a mediating variable are adapted from Aksoy (2017) and it is measured by assessing how often a seller introduces new ideas in marketing efforts, the degree of using recent marketing methods, activity to rearrange product lines according to the popularity of products, the amount of time that seller is spending to collect relevant information, attitude to improve the way to communicate with customers, and efforts to cultivate various marketing channels.

Sales performance as a dependent variable is adapted from Wisker and Poulis (2015) and it is measured by asking comparison between present sales against previous sales records, how sales are consistently increasing, an actual sales performance compared to expectation, and recognition about profit generation.

Considering the effects of exogenous factors that might have a direct and indirect influence, it is necessary to include those as control variables. This study incorporated the employment type (self-employed or employed), gender, experience, main products that the seller is dealing with as exogenous factors to control. Experience is measured as we ask for total months and recalculated to a ten years scale. Main products are categorized into cosmetics, apparel, accessories, and others.

This study focused on sellers in the e-commerce sector in Korea. The definition of the seller is anyone who works in sales in the e-commerce domain as an occupation. This study adopted the snowball approach in the non-probability sampling technique for the survey. The population was determined by asking for interviews to introduce his or her friends and email or post-survey questionnaire were sent out regardless of the type of products and sellers' employment types such as B2B and B2C. The questionnaires were filled in by respondents of their own and 205 questionnaires were collected out of 220 showing a 93.1 percent of responding rate. 200 questionnaires were selected for analysis as 5 respondents were excluded as inappropriate. We applied SPSS 23.0 and Hayes Process Macro (Model 4) to examine the mediating effects of the innovative sales activities and the overall effects of competencies of sellers in e-commerce on sales performance.

### 3.2. Demographic Information of the Data

To find the general representativity of samples for the population, we analyzed the demographic information of the survey. The following table shows the general

characteristics of samples (Table 1). Demographic distribution of gender indicates 48 percent of males and 51.5 percent of females. 24.5 percent of the sample population were 36~40 years old, 22.5 percent were 26~30, and 22 percent were 31~35. The average experience of respondents was about 60 months and 64.5 percent work for an enterprise and 35.5 percent were self-employed. Annual sales volume showed diverse answers such as 23 percent recorded less than KRW 300 million, 21 percent indicated 1 KRW billion, and 17 percent marked between KRW 300~500 million in sales.

**Table 1:** Demographic Information of Respondents (N=200)

		Frequency	%	Average	Standard Deviation
Gender	Male	97	(48.5)	-	-
	Female	103	(51.5)	-	-
Age	<25	6	(3.0)	-	-
	26-30	45	(22.5)	-	-
	31-35	44	(22.0)	-	-
	36-40	49	(24.5)	-	-
	41-45	21	(10.5)	-	-
	46<	35	(17.5)	-	-
Experience (Months)				60.47	(44.82)
Main Products	Cosmetics	39	(19.5)	-	-
	Apparels	62	(31.0)	-	-
	Domestic Appliances	13	(6.5)	-	-
	Accessories	46	(23.0)	-	-
	Furniture	9	(4.5)	-	-
	Etc.	31	(15.5)	-	-
Type of Employment	Self-employed	71	(35.5)	-	-
	Employed	129	(64.5)	-	-
Sales (Annual)	<50 mil.	34	(17.0)	-	-
	50-100 mil.	33	(16.5)	-	-
	100-300 mil	46	(23.0)	-	-
	300-500 mil	18	(9.0)	-	-
	100-1 bil	27	(13.5)	-	-
	1 bil<	42	(21.0)	-	-

## 4. Results and Discussion

### 4.1. Analysis of Reliability and Validity

The following table summarizes the result of Exploratory Factor Analysis (Table 2).

**Table 2:** Exploratory Factor Analysis

	Innovative sales activities	Trust-building	Social Interaction	Knowledge and Technic	Self-Control
MIA1	.710	.113	.152	.141	.209
MIA2	.693	.204	.146	.143	.192
MIA3	.669	.129	.198	.121	.076
MIA4	.641	.288	.252	.122	.053
MIA5	.630	.141	.156	.237	.076
MIA6	.628	.091	.126	.346	.214
MIA7	.627	.255	-.002	.379	.155
TBS1	.086	.776	.081	.294	.068
TBS2	.249	.739	.114	.196	.188
TBS3	.297	.723	.112	-.053	.079
TBS4	.138	.546	.151	.502	.301
TBS5	.227	.535	.023	.413	.077
SIS1	.049	.063	.773	.170	.065
SIS2	.322	.033	.753	-.067	.130
SIS3	.130	.217	.750	.170	.082
SIS4	.271	.027	.668	.140	.223
KTS1	.252	.198	.182	.691	.118
KTS2	.288	.211	.020	.684	.242
KTS3	.408	.176	.251	.541	.142
KTS4	.376	.161	.324	.509	.126
SCS1	.144	.118	.147	.055	.791
SCS2	.114	.105	.125	.270	.689
SCS3	.303	.151	.145	.147	.683
Eigen Value	4.03	2.74	2.68	2.62	2.06
Cumulative %	17.53	29.46	41.09	52.47	61.43
Kaiser-Meyer-Olkin Sampling Adequacy			.918		
Bartlett's test of sphericity test	Approximate chi-square		2031.67		
	df		253		
	p value		.000		

This study employed principal component analysis for the factor extraction, used Varimax for factor rotation. Cumulative explanatory power is 61.43 percent and this figure satisfied the minimum requirement suggested by Hair, Black, Anderson, and Tatham (2006).

The result of correlation analysis is suggested in the following table (Table 3). The diagonal line shows Cronbach's Alpha coefficient. The scale reliability of each variable is found to be appropriate. The table shows that sales performance is particularly related to social interaction and online innovative sales activities.

**Table 3:** Correlation Analysis

	1	2	3	4	5	6
Self-control	0.699					
Trust-building	.454**	0.827				
Social Interaction	.404**	.351**	0.796			
Knowledge-Technology	.522**	.644**	.470**	0.790		
Innovative sales activities	.509**	.590**	.496**	.713**	0.866	
Sales Performance	.490**	.475**	.618**	.570**	.686**	0.856

\*\* p<0.01, The diagonal line shows Cronbach's Alpha coefficient.

## 4.2. Hypotheses Testing

The results of hypothesis testing employing the Hayes Process, model 4, and 5,000 bootstraps are suggested in the following table (Table 4). Innovative sales activities is employed as mediating variable in this study but when it was positioned as a dependent variable, social interaction ( $b=0.139$ ,  $p<0.01$ ), trust-building ( $b=0.174$ ,  $p<0.01$ ), knowledge and technology skills ( $b=0.474$ ,  $p<0.01$ ) were found to be statistically significant. Together with this, the self-control variable also showed marginal significance ( $b=0.112$ ,  $p<0.058$ ). All control variables were found to be insignificant. Therefore, hypotheses one to four examining the effects of seller skills on innovative sales activities were adopted. The second regression analysis model positioned sales performance as the dependent variable and tested the effect of innovative sales activities. The result shows that innovative sales activities were found significantly related to sales performance ( $b=0.470$ ,  $p<0.01$ ). Thus, hypothesis 5 propositioning the effect of innovative sales activities on sales performance is adopted. It is worth noting that the effects of self-control skills, trust-building skills, knowledge, and technology skills on sales performance become irrelevant as sales innovation as mediating variable is added. In other words, the complete mediation of innovative sales activities is confirmed in the relationship of those variables with sales performance.

In addition, social interaction skills have direct effects on the sales performance even with the mediating variable ( $b=0.304$ ,  $p<0.01$ ) that indicates this variable determines the sales performance disregards innovative sales activities.

**Table 4:** Result of Hypotheses Test

	Dependent Var: ISA			Dependent Var: SP		
	$\beta$	SE	p	$\beta$	SE	p
Constant	.309	.231	.182	-.256	.252	.310
Social Interaction Skills	.139	.048	.004	.304	.053	.000
Self-control Skills	.112	.059	.058	.077	.065	.235
Trust-building Skills	.174	.062	.006	.075	.069	.273

		Dependent Var: ISA			Dependent Var: SP		
		$\beta$	SE	p	$\beta$	SE	p
Knowledge and Technology Skills		.474	.073	.000	.080	.087	.362
Innovative sales activities (Mediator)					.470	.079	.000
Control Variables	Gender (Male=1)	.012	.061	.852	-.038	.066	.572
	Experience (years)	.010	.011	.360	.008	.011	.507
	Employment Types (Employer=1)	-.260	.065	.692	.054	.071	.443
	Product (Cosmetic=1)	-.011	.093	.909	.309	.101	.003
	Product (Apparel=1)	.099	.083	.235	.136	.090	.135
	Product (Other=1)	.028	.088	.752	-.086	.095	.367
F-value (df1, df2)		26.46 (10, 189)			28.19 (11, 188)		
R <sup>2</sup>		.583			.623		

This study proceeded with further regression analysis to examine the indirect effects of seller's competencies mediated by the market innovation activities utilizing the Hayes Process macro employing model 4 with 5,000 bootstraps. The results of this analysis are suggested in the following table (Table 5).

**Table 5:** Results of Mediating Effect Testing.

Paths of Indirect Effects	Coeff.	BootSE	BootLLCI	BootULCI
SCS → ISA → SP	0.053	0.031	-0.000	0.120
TBS → ISA → SP	0.082	0.034	0.026	0.157
KTS → ISA → SP	0.223	0.055	0.121	0.334
SIS → ISA → SP	0.066	0.027	0.018	0.124

The results show the indirect effect of knowledge and technology on sales performance via innovative sales activities is the greatest among other skills (0.223). The next variable is trust-building skills that have indirectly affected sales performance less than knowledge and technology but greater than other variables (0.082). Social interaction also has an indirect effect on sales performance via innovative sales activities (0.066). The indirect effects of these variables are statistically significant as the value of BootLLCI, and BootULCI is above 0. Nevertheless, the indirect effects of self-control on sales performance via innovative sales activities are found to be independent and mediating effects were not observed as the value of BootLLCI was negative, and Booth ULCI showed a positive figure. This result may indicate that self-control affects

innovative sales activities directly but it does not necessarily result in enhanced sales performance.

### 4.3. Discussion and Implications

Based on the hypotheses testing and subsequent findings of this study, we may discuss the results to identify several theoretical and practical implications. For the theoretical perspectives, firstly, the previous studies attempted to identify the importance of applying information technology for the performance (Ahearne et al., 2008; Ogilvie, Agnihotri, Rappa, & Trainor, 2018) did not consider seller specific characteristics and behaviors and examined them as mediating variables. This study is differentiated from previous attempts by suggesting that sellers' competencies as their specific characteristics would also affect work-related behavior. This attempt is novel in the area of e-commerce as a perspective from the finance sector that personal character affects behavior and performance via behavioral changes is applied to another sector for the first time (Byegon, 2020).

Secondly, the results of the analysis showed us some understanding of the competencies of sellers in the e-commerce sector. In the previous studies, self-control was pointed out as a critical factor (Chen et al., 2015; Sypniewska, 2013; Spencer & Spencer, 1993). As we witnessed self-control skills affect innovative sales activities directly but are less relevant to the sales performance, this implies that sellers' competencies such as knowledge and technology, trust-building, and social interaction are effective factors enhancing the sales performance when it comes to sales innovation efforts. Therefore, it is necessary to emphasize those elements when each seller attempts to develop competencies that result in better sales performance. The same principle may be applied to any organization that educates sales representatives intending to increase sales. In particular, the importance of trust-building and social interaction skills as competencies of sellers showed us maintaining a good relationship with customers and other parties may facilitate enhanced performances through innovative sales activities. As trust-building skills are considered to be a critical element for better sales performance, innovative sales activities should always be based on ethical foundations. Innovative sales activities are including the element of ethical sales. In the era of unlimited competition in the e-commerce business, sellers may secure sustainability with a clear business identity through ethical sales activities.

Thirdly, this study also identified the critical role of innovative sales activities. The sales performance is found to be mediated by innovative sales activities. We may assume that this result is derived from the recent changes in the e-commerce environment requiring dynamic adjust to



fluctuating business conditions. It is alleged that in the stable business environment we experienced in the past, the effect of dynamic and innovative capabilities such as market sensitivity and resource re-allocation was not critical as exogenous changes were gradual and predictable (Awadh & Saad, 2013). To adjust the volatile and dynamic business environment of e-commerce requires innovative sales skills and actual activities from sellers to acquire relevant and recent information and apply these to sales practices. This background may explain how sales performance in e-commerce might be related to sellers' innovative sales activities.

This analysis also implies that the personal competencies of e-commerce sellers are not only effective on sales performance but also their effects are enhanced and sustained by innovative sales activities. This result, therefore, shows us that innovative sales activities that sense recent changes in the marketplace and the collection of relevant information about preferences and purchasing behavior of customers determines the sales performance together with the seller's skill sets.

Fourthly, we may relate the results of this study to the development of the competencies of sellers in the e-commerce sector. For sellers in e-commerce, it is necessary to understand how innovative sales activities work and how personal competencies may be connected to develop innovative sales activities. For instance, social interaction skill is a competency of sellers to establish a relationship with work-related partners and customers and to form a sustainable network with them. Sellers should make efforts to utilize this competency to acquire relevant information and ideas to apply to innovative sales activities. It seems even more important to develop this competency in the first place. Maintaining communication channels to ensure customer connection by using word-of-mouth channels and review functions would be effective to increase social interaction and trust-building skills.

Fifthly, the results of this study also provide some practical implications for organizations when they select and train sellers in e-commerce. Seller's competencies in e-commerce were found to be critical elements for not only sales performances but also using media technology and grasping the behavioral information of customers (Avlonitis & Panagopoulos, 2010; Ingram, LaForge, & Leigh, 2002). This finding tells us that organizations in e-commerce should focus on not only sales-related specific techniques but enhancing sellers' competencies when they recruit, select and train their sellers.

Finally, this study shed a light on the perspective that the utilization of information technology may help positive sales performance in e-commerce. Based on the theoretical identity of this study, the existing perspective suggesting that information technology may enhance sales performance

is also confirmed (Chae, Koh, & Park, 2018; Haffke, Kalgozas, & Benlian, 2017; Kane et al., 2015). Nevertheless, the mediating role of innovative sales activities brought a new perspective on how sellers could accelerate relevant processes affecting better sales performance by connecting information technology and sales innovation in the e-commerce sector.

## 5. Conclusion

This study examined the core competencies of sellers in the e-commerce sector and filled the research gap by relating those competencies with innovative sales activities and sales performance. Most of the previous studies focused on the direct effects of the competencies of sellers on sales performance as this study clarified the mediating role of innovative sales activities on sales performance and the relationship between competencies of sellers and sales innovation. This approach is the first attempt in this area of research which makes this study distinctive theoretically.

The findings of this study indicate that the elements of online seller competencies such as self-control, trust-building, social interaction skills affected innovative sales activities and sales performances. Innovative sales activities also influence sales performances. Indirect effects of seller competencies on sales performance via innovative sales activities were partially effective depending on variables that brought practical implications.

From a practical perspective, any organization considering sales in e-commerce should carefully recruit and select sellers according to the valid competencies found in this study. Together with this, the sales performance of sellers would be improved if trust-building, social interaction, knowledge, and technological skills are properly thought. It is worth noting that the focus of education should be placed on how to enable those competencies to actuate innovative sales practices. This implies that personal competencies should be practiced by the implementation of sales innovations in the context of e-commerce. It is, therefore, necessary for sellers in this sector to place a weight on developing effective competencies as well as ideas to utilize those competencies into innovative sales activities.

Despite the theoretical and practical contributions this study provided, it is necessary to extend the scope of the study due to a certain extent of limitations. Firstly, as this study focused only on innovative sales activities as the mediating factor affecting the sales performance, other mediating or control variables should be identified and examined that might have potential effects on sales performance. Secondly, studies applying this research model and findings on other specific industries, customers,

and types of products should follow. This comprehensive character of this study encouraged to include all sellers in e-commerce disregarding industrial differences, types of customers, and various products. It seems plausible that the competencies of sellers and their effects on sales practices and sales performance, in the end, might be various in the different marketing contexts.

Finally, subsequent researches on establishing an adequacy index for the competencies of sellers in e-commerce are also necessary based on the findings of this study. This index may be practically used as criteria when organizations attempt to recruit, select and train sellers.

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