

Factors Influencing Horizontal Cooperation Among Logistics Enterprises: An Empirical Study from Vietnam*

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Abstract

Horizontal cooperation is seen as an effective way to raise a competitive advantage in logistics and transportation. However, there are many logistics enterprises still operating individually instead of cooperating. This research aims to investigate the factors influencing the decision of horizontal cooperation by surveying a large sample of Vietnamese logistics companies. This study employs 161 logistics companies to examine correlations between potential factors and horizontal collaboration. The structural equation model (SEM) was used to test the conceptual model and the relationships among variables. The findings revealed that information sharing was the most important predictor of 161 supply chain providers' horizontal collaboration decisions, which resulted in increased profitability or service quality. Besides, trust in partners was found to be positively related to the degree of horizontal cooperation among logistics companies. Finally, the finding of this research is that reputation had a positive effect on the strategy of horizontal cooperation. Our findings suggest that SME managers should be concerned about their information sharing, their reputation as well as their trust in partners if they would be invited in cooperation with another firm to increase service quality, performance, and competitive advantage.

Keywords: Horizontal Cooperation, Competitive Advantage, Information Sharing, Trust, Reputation

JEL Classification Code: J54, P13, L19, L91, R4

1. Introduction

The globalization and increasing competitiveness of the supply chain necessitate Logistics Service Provider (LSPs) to enlarge their activities and improve their service quality (Crujssen, 2006; Pomponi et al., 2015). Recently, companies tend to apply cooperative strategies as new

business models to find efficiency and sustainability in business. According to Serrano-Hernandez et al. (2018), cooperation is an efficient way to find valuable information sharing, approach technology, and gain economies of scale, although companies would keep an independent legal personality. There is a broad consensus that business collaborations can bring many benefits such as cost reduction (Crujssen et al., 2007; Fernández et al., 2016), new product developments (Yam & Chan, 2015), or advances in research and development (Xiaojuan et al., 2015). In this line, the previous studies also confirmed that logistics companies can gain many benefits from collaboration (Crujssen et al., 2010; Stefansson, 2006). For example, Crujssen et al. (2007) revealed five different goals of logistics firms through cooperation such as cost reduction, growth, innovation, quick response, and social relevance. Collaboration can be conducted in many forms, consisting of vertical cooperation and horizontal cooperation (Serrano-Hernandez et al., 2018). The literature on vertical cooperation is well documented, whereas the understanding of horizontal cooperation in logistics and transportation remains unclear (Serrano-Hernandez et al., 2018; Soosay & Hyland, 2015).

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Within logistics and transportation, horizontal cooperation is an emerging way to find competitive advantage via improving service quality (Serrano-Hernandez et al., 2016), reducing cost and risk (Molenbruch et al., 2017; Stojanović & Aas, 2015), which in turn improve market share (Gou et al., 2014). According to Serrano-Hernandez et al. (2016), horizontal cooperation is an effective strategy that helps LSPs to shorten lead times substantially, which leads to improving service quality as well as the competitiveness. In support of this, Molenbruch et al. (2017) stated that LSPs can save the overall routing cost by exchanging customer requests among partners through the joint route planning of horizontal cooperation. Although the benefits of horizontal cooperation are pointed out, its implementation in logistics faces impediments. For example, Pomponi et al. (2015) evidenced that the companies' collaboration effort can be damaged if there is a lack of trust between cooperating parties. In support of this idea, Cheng et al. (2008) suggested that competition and cooperation seem to coexist in supply chains, and the level of collaboration depends on the trust between the companies. In this line, Wilhelm (2011) confirmed that trust plays a key factor influencing the results of horizontal cooperations in logistics. In addition to trust between firms, other factors might inhibit horizontal collaboration. Thus, the goal of this research is to investigate the factors that can encourage horizontal cooperation between logistics companies.

First, the present study will discuss the importance of horizontal cooperation in logistics. Next, we investigate the predictors of horizontal collaboration and build the research model. Then, we apply the quantitative method to analyze the data and approach the research objective. Finally, we discuss the findings, managerial implications, limitations of the study, and suggest further research orientation.

2. Literature Review

2.1. The Importance of Horizontal Cooperation in Logistics

While collaboration between logistics service providers (LSPs) and customers or suppliers is called vertical cooperation, horizontal cooperation is concerted practices between companies operating at the same level(s) in the market (Bahinipati et al., 2009). Schmoltzi and Wallenburg (2012) defined horizontal cooperation in logistics as “*voluntarily initiated, long-term relationships among autonomous LSPs that operate on the same stage of the supply chain as close or distant competitors and that strive for benefits that could not be achieved by the individual companies alone*” (p. 11). These companies can cooperate to share information, facilities, or resources for

reducing costs or enhancing the service quality (Leitner et al., 2011).

Cruijssen (2006) studied horizontal cooperation and showed benefits from this model, including quick response, innovation, cost reduction, growth, and social relevance. According to Cruijssen, these goals can be achieved via applying different models of collaboration, including “knowledge center”, “purchasing group”, or “freight sharing” between parties. To support this idea, Defryn and Sörensen (2018) revealed that the main goal that companies employed horizontal cooperation is to minimize total logistics costs, use better resources and capacity, have a smaller environmental impact, as well as provide better service. Leitner et al. (2011) indicated that logistics suppliers can save 15% general cost, 50% of fuel cost, and decrease 40% CO₂ emissions by employing horizontal cooperation. At the same time, horizontal cooperation helps Spain-based competitors to achieve a 14% decrease in the number of journeys and a 17% reduction in CO₂ emissions.

2.2. The Predictors of Horizontal Cooperation in Logistics

2.2.1. Trust

Ryciuk and Nazarko (2020) stated that trust is a key factor leading to collaboration between parties. According to Tran et al. (2020), trust and satisfaction are positively related to building a high-quality relationship between rice enterprises in supply chains. Currall and Inkpen (2002) defined trust as “Trust is the decision to rely on a partner with the expectation that the partner will act according to a common agreement”. “*Trust is the soul and foundation of supply chain management*” and “*it is also the key factor to maintain long-term cooperation*” (Zhou et al., 2016, p. 1).

The prior studies confirmed the essential role of trust in cooperation between entities (Cao & Zhang, 2011; Morgan & Hunt, 1994; Pomponi et al., 2015; Ryciuk & Nazarko, 2020; Selamet & Prabowo, 2020; Semeijn et al., 2006). For example, Morgan and Hunt (1994) demonstrated that trust can diminish uncertainty, opportunistic behavior as well as risk in cooperation. In this line, Semeijn et al. (2006) also evidenced that trust can eliminate unnecessary works that waste time and cost such as making a detailed contract or other principles applied to secure and monitor the execution of transactions. In the supply chain context, trust is a factor that significantly influences information sharing between all parties involved in a relationship (Redondo & Fierro, 2010; Wong et al., 2005). Furthermore, Ryciuk and Nazarko (2020) investigated the elements that influence supply chain partner cooperation, emphasizing that trust has a significant impact on cooperation and commitment.

Based on the above logic, we propose that the higher the trust of the partners is, the higher the possibility of horizontal cooperation is.

H1: Trust in partners positively influence the possibility of horizontal cooperation.

2.2.2. Reputation

Alzola (2019) defined firm reputation as “*the judgments made by observers about the firm. Such judgments are rooted in perceptions of the firm’s identity and impressions of its image*” (p. 36). However, Alzola revealed that identity is fixed, while reputation can change via a firm’s actions and communications. Although a corporation may have multiple identities and images, the result of collecting all of these identities and images is just one reputation (Fombrun & Van Riel, 2004). Alzola (2019) explained that reputation is one of the most important intangible assets of firms that competitors feel difficult to imitate. Firm reputation is defined as customers’ perceptions of how well a firm takes care of customers and is genuinely concerned about their welfare. Vo et al. (2021) demonstrated that reputation is one of five key assets of a sub-contractor that help them to gain the advantages in evaluation and selection of the main contractor.

Previous studies evidenced the role of reputation on the firm performances, such as getting lower costs, attracting more applicants, better stakeholders as well as customers (Fombrun, 1996), achieving more profits (Roberts & Dowling, 2002), and making competitive advantages (Milgrom & Roberts, 1982). Besides, Galbreath and Shum (2012) explained that reputation is a key factor contributing to customer satisfaction, which in turn positively influences the firm performance. Wang and Vassileva (2007) studied the reputation in e-commerce and found that reputation and trust in partners have a strong correlation.

In the collaboration context, according to Fombrun (1996), collaboration reputation is “*a perceptual representation of a company’s past actions and future prospects that describes the firm’s overall appeal to all of its key constituents when compared with other leading rivals*” (p. 72). While Weigelt and Camerer (1988) defined collaboration reputation as “*A set of attributes ascribed to a firm, inferred from the firm’s past actions*” (p. 443). Game theory explains that reputation is seen as a factor that might promote or restrict the process of cooperation. For example, the good reputation of firms can attract more stakeholders who contract with the firm (Alzola, 2019). It is reasonable to assume that firms will seek out and collaborate with partners who have a good reputation because they’re more

likely to boost the partners’ reputation by improving their activities and results. Thus, we propose that:

H2: Reputation of partners positively influence the possibility of horizontal cooperation.

2.2.3. Information Sharing

Information sharing refers to when members of a business group share market and business information with one another (Wu, 2008). Saleem et al. (2020) found that knowledge or information sharing between partners tends to contribute to mutual trust, increase two-way interaction, and help to achieve competitive advantage. Supporting this, Zohrehvand et al. (2020) explained that information sharing positively influences the relationship between foreign banks’ penetration and competition. Information sharing, according to Fawcett and Magnan (2002), occurs when supply chain partners use Internet information technology to communicate information about shipping demand, product supply, inventory status, or product delivery. The quality of the information sharing between supply chain partners is reflected through aspects such as the accuracy, timeline, and completeness of the information (Myrelid & Jonsson, 2018). There is a consensus that information sharing is positively associated with the performances of supply chain firms (Khan et al., 2016; Liang, 2015; Yang et al., 2019). For example, information sharing has been seen as a way to reduce supply chain costs (Khan et al., 2016), reduce risks and ambiguities (Yang et al., 2019), and enhance supply chain service quality (Liang, 2015). Based on the above logic evidence, we suggest that information sharing helps to improve the performances as well as positively affect the cooperation between supply chain firms. Therefore, we expect that:

H3: Information sharing of partners positively influences the possibility of horizontal cooperation.

3. Research Method

3.1. Participants and Data Collections

The survey of the present study was conducted at Vietnam Logistics Business Association. We recruited 328 SMEs in this group. A total of 328 invitations were sent to the email of the firm managers. The invitation consists of one link to the online questionnaire and one consent letter introducing the purpose of this survey. All the measures were translated into Vietnamese and back-translated into English to ensure the final accuracy of the translation.

We have a six-month lag between the first and second data collection. For the first time, we sent a questionnaire when firms started to join in Vietnam Logistics Business Association. After six months, an email was sent to all managers of SMEs to participate in the second wave (Time 2). At Time 1, 236 people joined in the first questionnaire (response rate = 72%). Next, 161 managers of SMEs finished the subsequent questionnaire (the response rate = 68%).

3.2. Measures

3.2.1. Trust

The scale developed by Ryciuk and Nazarko (2020) was used to assess trust in supply chain partners. Following Ryciuk and Nazarko (2020), we used three items to measure trust ($\alpha = 0.89$). One example statement is “we believe that our partners know what they are doing and will do their job well”. The answer ranged from 1 = “strongly disagree” to 5 = “strongly agree”.

3.2.2. Reputation

Reputation was measured by five items developed by Saeidi et al. (2015). The example statement is “we are seen by customers as being a very professional organization”, “Our firm’s reputation is highly regarded”, “Customers view our firm as one that is stable”. Saeidi et al. (2015) reported the reliability of reputation was 0.90. Respondents rated the extent to which each item described themselves on a 5-point Likert type scale ranging from 1= strongly disagree to 5 = strongly agree.

3.2.3. Information Sharing

We measured information sharing using six items developed by Lee et al. (2018). The Cronbach’s alpha of this scale was 0.810. The example statements are “We inform trading partners in advance of changing needs”, “Our trading partners keep us fully informed about issues that affect our business”. The answer ranged from 1 = “strongly disagree” to 5 = “strongly agree”.

3.2.4. Horizontal Cooperation

Horizontal cooperation was measured by the scale developed by Perry et al. (2004). In the research of Perry et al. (2004), the Cronbach’s alpha of this variable = 0.82. The example statements are “Our company is willing to dedicate whatever people and resources are necessary to maintain this cooperation.” “Our company is willing to make a long-term investment in this cooperation.”, “Our company is willing to make sacrifices to help our cooperation partner.”

3.2.5. Control Variable

Based on previous studies (Akter et al., 2016; Ali et al., 2018; Aydiner et al., 2019; Galbreath & Shum, 2012), this study employs SMEs specific characteristics such as firm size, type of business, age, total assets, and revenue as control variables (Table 1). This study used one single question to measure one control variable.

3.3. Analytical Strategy

The SPSS 22.0 and AMOS 22.0 were used for all statistical analyses. First, we used SPSS 22.0 to find the means, standard deviations, reliability, and correlations of all study variables. Second, we employed the AMOS 22.0 to test the convergent validity and discriminant validity of the latent variables by running a series of confirmatory factor analyses (CFAs). Finally, we used structural equation modeling (SEM) to test our hypotheses.

Table 1: SMEs Sample Characteristics

Attributes	Frequency	Percent
Age		
0–5	42	26.1
6–10	65	40.4
11–15	38	23.6
Over 15	16	9.9
Revenue		
< 20	48	29.8
21–40	69	42.9
41–60	29	18.0
Over 60	15	9.3
Types of Business		
Freight Companies	16	9.9
Freight Forwarders	68	42.2
Carriers	32	19.9
3PL	45	28.0
Number of Employees		
0–50	89	55.3
51–100	46	28.6
101–200	18	11.2
Over 200	8	5.0

4. Results

4.1. Descriptive Statistics

Table 2 showed the mean, standard deviation and correlations of all study variables. The results indicated that age of firms positively correlated with revenue and horizontal cooperation ($r = 0.220, p < 0.01$), ($r = 0.110, p < 0.05$), respectively. While revenue was only related with information sharing ($r = 0.169, p < 0.01$). The correlations were also found between type of business and trust as well as information sharing ($r = 0.113, p < 0.05$) and ($r = 0.120, p < 0.05$), respectively. The results indicated that number of employees had correlation with information sharing ($r = 0.195, p < 0.01$).

Table 2 exhibited that trust ($r = 0.399, p < 0.01$), reputation ($r = 0.358, p < 0.01$) and information sharing ($r = 0.320, p < 0.01$) were related with horizontal cooperation. The results of Table 2 also showed that trust correlated with reputation ($r = 0.316, p < 0.01$), trust correlated with information sharing ($r = 0.200, p < 0.01$), and reputation correlated with information sharing ($r = 0.396, p < 0.01$).

4.2. Scale Validity and Reliability

The Cronbach alpha, composite reliability (CR), average variance extract (AVE) were shown in Table 3. All significant correlations were in the expected direction because the result showed that the CR and AVE for all variables were more than 0.5 and 0.6 (Fornell & Larcker, 1981). The composite reliability (CR), average variance extract (AVE) of variables ranged (0.87–0.93), (0.51–0.67), respectively. While Cronbach’s alpha of all variables was higher than 0.88.

We employed the AMOS software 22.0 to run confirmatory factor analysis (CFA) for testing the fitness

of the proposed measurement model. To do so, four factors (trust, reputation, information sharing, horizontal cooperation) were interlinked with each other and examined using CFA. The results of CFA revealed that the suggested measurement model is acceptable and provides an excellent fit, as well as meeting the model fitness threshold indices established by Hair et al (2010). The results from Table 4 revealed that the CFA had an excellent fit for the data.

The results of structural equation modeling (SEM) indicated that the structural model had a good fit (Hair et al., 2010). The results from Table 4 revealed that the SEM had an excellent fit for the data.

4.3. Hypothesis Testing

After the acceptance of the structural model, the path analysis of the Structural Equation Model (SEM) was used to test the correlation between the variables such as trust, reputation, information sharing, and horizontal cooperation (Figure 1). The findings indicated that trust is positively associated with horizontal cooperation ($\beta = 0.268, S.E = 0.016, p < 0.001$), thus hypothesis 1 was supported. Reputation is related to horizontal cooperation ($\beta = 0.198, S.E = 0.014, p < 0.05$), therefore hypothesis 2 was also supported. Finally, the results of Table 5 indicated that information sharing correlated with horizontal cooperation ($\beta = 0.377, S.E = 0.024, p < 0.01$). Hypothesis 3 was supported.

5. Discussion and Conclusion

The goal of this research was to investigate the predictors of horizontal cooperation between supply chain firms. Also, the current study attempted to find the most important factor promoting collaborations that positively affect the parties’ performances. As expected,

Table 2: Descriptive Statistics and Inter-Correlations Among Variables

Variables	Mean	SD	1	2	3	4	5	6	7
1 Age	2.62	1.06	1						
2 Revenue	2.18	0.92	0.220**	1					
3 Type of business	2.24	1.21	0.384	0.287	1				
4 Number of employees	2.02	0.91	0.274	0.320	0.115	1			
5 Trust	3.83	0.56	0.123	0.166	0.113*	0.191	1		
6 Reputation	3.95	0.57	0.056	0.027	0.016	0.063	0.316**	1	
7 Information sharing	3.84	0.50	0.133	0.169**	0.120*	0.195**	0.200**	0.396**	1
8 Horizontal cooperation	3.97	0.54	0.110*	0.048	0.097	0.033	0.399**	0.358**	0.320**

Note: *p-value < 0.05; **p-value < 0.01; significant at the 0.05 level. N = 161.

Table 3: Confirmatory Factor Analysis

Variables		Loadings	Estimates	S.E	C.R (t)	Alpha	CR	AVE
Trust	TR3	0.92	1.000			0.91	0.90	0.51
	TR2	0.74	0.930	0.044	21.275			
	TR3	0.85	0.956	0.044	21.550			
Reputation	RE1	0.84	1.000			0.89	0.87	0.64
	RE2	0.91	0.843	0.038	22.048			
	RE3	0.79	0.769	0.034	22.344			
	RE4	0.86	0.860	0.035	24.538			
	RE5	0.79	0.766	0.036	21.472			
Information sharing	IS1	0.88	1.000			0.93	0.89	0.67
	IS2	0.86	0.918	0.025	36.580			
	IS3	0.78	0.743	0.037	20.357			
	IS4	0.79	0.810	0.037	21.705			
	IS5	0.72	0.754	0.033	22.887			
	IS6	0.89	0.904	0.030	29.817			
Horizontal cooperation	HC1	0.74	1.000			0.88	0.93	0.65
	HC2	0.82	0.992	0.018	54.424			
	HC3	0.78	0.876	0.023	37.584			
	HC4	0.84	0.923	0.022	41.119			

Note(s): All loadings and estimates are significant at $p < 0.001$.

Table 4: Model Fitness Indices

Fitness Indices	Measurement Model	Structural Model	Cut-off Criteria
CMIN/DF	1.526	1.387	<3
CFI	0.983	0.974	>0.90
RMSEA	0.026	0.022	<0.08
p-value	0.000	0.000	<0.05
SRMR	0.020	0.025	<0.06
NFI	0.953	0.946	>0.90
IFI	0.983	0.974	>0.95
TLI	0.981	0.972	>0.90

Table 5: The Results of the Hypothesis Testing

Relationships	Estimates	S.E	C.R (t)	p-value	Decision
1: TR → HC	0.268	0.016	10.214	0.000	Supported
2: RE → HC	0.198	0.014	7.016	0.026	Supported
3: IS → HC	0.377	0.024	11.641	0.008	Supported

Note: TR: Trust; RE: Reputation; IS: Information Sharing; HC: Horizontal Cooperation.

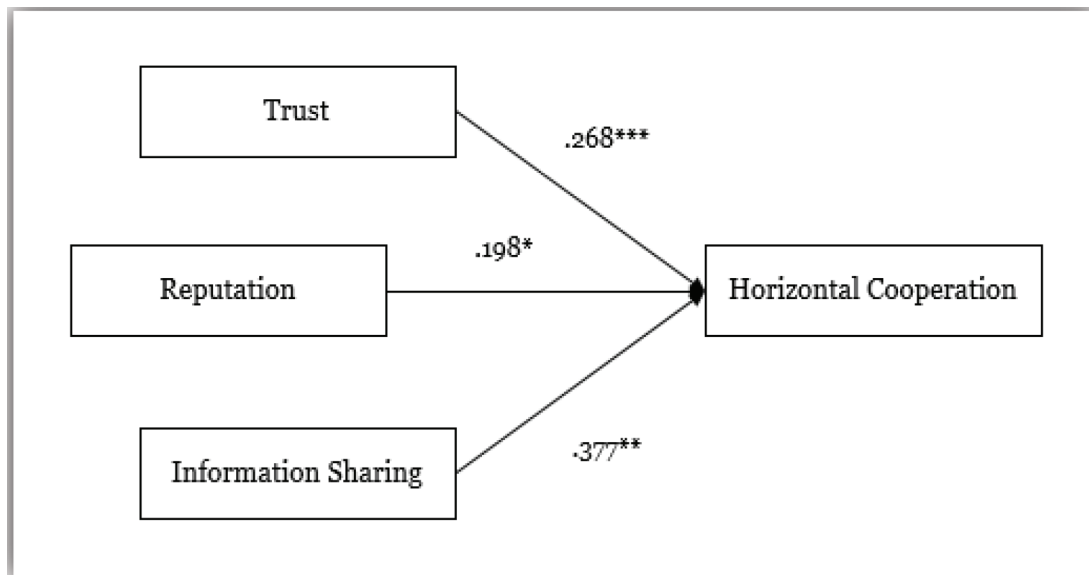


Figure 1: The Standardized Path Coefficient of the Hypothesized Model

the findings indicated that trust in partners, reputation, and information sharing were antecedents of the decision of horizontal cooperation among supply chain providers. This study reported that information sharing play the most significant factor in predicting the horizontal cooperation ($r = 0.377, p < 0.01$), followed by trust in partner ($r = 0.268, p < 0.001$) and reputation ($r = 0.198, p < 0.05$), respectively.

One possible explanation for the significant relationship between information sharing and horizontal cooperation might be that capital and technology are not enough to achieve high performance if there is no knowledge and information sharing. For example, the study of Wei et al. (2013) about the role of information sharing in firms' performance stated that people who have exact guidance and information sharing from their leader can achieve better results than those who receive less information sharing. Supporting this idea, Lim et al. (2013) confirmed that beyond investment, adoption, and usage of big data, optimum knowledge, and information sharing play a key role in enhancing business performance.

Our findings demonstrated that trust amongst supply chain partners in cooperation groups is an essential feature to build successful cooperation, which is consistent with the previous studies (Pomponi et al., 2015). Trust in partners plays the role that not only decreases conflict and opportunistic behaviors but also promotes interaction between parties in collaborations (Halldorsson et al., 2007). Finally, the current research confirmed the effect of reputation on the possibility of collaboration (Wu et al., 2016) and tested the hypothesis that reputation predicts horizontal cooperation amongst supply chain firms. Our findings revealed that selecting

partners based on their reputation significantly increased the level of horizontal cooperation.

5.1. Theoretical and Practical Contributions

Our study is the first research that investigates the predicting role of trust, reputations, and information sharing on horizontal cooperation, which has been unexplored in the literature of collaboration. Particularly, this research examines the factors influencing the possibility of SMEs' collaboration to enhance the supply chain performance as well as their competitive advantage. Another significant contribution of this study is to point out the most important factor in horizontal cooperation between parties such as information sharing. The high level of information sharing seems to increase the possibility of cooperation among the same type of supply chain firms. This provides invaluable insights for managers and researchers on how to cooperate with another firm and increase the level of collaboration.

Our research assists SME managers in understanding what factor they should focus on when they decide to join in horizontal cooperation. Our findings suggest to SME managers should concern about their information sharing, their reputation as well as their trust in partners if they would be invited in cooperation with another firm to increase service quality, performance, and competitive advantage. Mutual trust and information sharing among partners seem to be essential conditions to reduce the risk of opportunistic behavior and increase the interaction and transactions (Semeijn et al., 2006). "Trust is the soul and foundation of supply chain management" and "it is also the key factor to

maintain long-term cooperation” (Zhou et al., 2016, p. 1). Our findings showed managers know how to keep the long-term cooperation with partners.

5.2. Limitations and Future Research Directions

The current study has a number of limitations. The first limitation of the study is that supply chain firms are small and mediums firms. Thus, the future research direction is to investigate the proposed model with all kinds of companies, consisting of the small, medium, and large companies to test the generalizability of this research. Secondly, the possible limitation of this study is its cross-sectional design. Although the author collects the study data at two different time points, the variables were measured with the same source. Tehseen et al. (2017) explained common method variance (CMV) as the systematic error variance that happens when the variables are measured with the same source or method (Richardson et al., 2009). As such there may be a bias that is caused by the systematic error variance. In particular, the estimated relationship among variables can be inflated or deflated due to respondents giving consistent answers to all survey questions (Richardson et al., 2009; Tehseen et al., 2017). Therefore, future researchers can collect data from different sources or different methods to avoid the systematic error variance.

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