



E-Commerce Performance, Digital Marketing Capability and Supply Chain Capability within E-Commerce Platform: Longitudinal Study Before and After COVID-19

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Abstract. The Corona Virus Disease (COVID)-19 pandemic has disrupted the business and industry landscape and changed consumers' behavior. The purpose of this paper was to explore how the behavior of online shoppers and sellers changed because of the COVID-19 outbreak. The originality of this paper lies in combining four main constructs: digital promotion capability, supply chain capability, customer experience, and performance of the e-commerce platform. It incorporates intervening factors like seasonal pricing and logistics outsourcing in the context of COVID 19. The main findings were that, before the pandemic, customer review ratings had a significant positive effect on the performance of the e-commerce platform, but not after the outbreak. Meanwhile, logistics outsourcing does not intervene in the relationship between perceived supply chain capability and (relative) e-commerce platform performance, unlike before the pandemic. This research is a longitudinal study before and after the COVID 19 pandemic, with a call-back sample size of 88 end customer respondents and 55 seller respondents. Data gathered from previous and current e-commerce research were processed by multivariate regression using SPSS software.

Keywords: COVID-19; Customer review rating; Digital marketing, E-commerce performance; Supply chain capability

1. Introduction

The COVID-19 outbreak in 2020 disrupted many sectors of business and industry around the world. According to the World Health Organization (WHO), as of April 12, 2020, this virus had infected 1,654,247 people globally and caused as many as 102,193 deaths. The implementation by authorities of social/physical distancing and self-quarantine as public policy to handle COVID-19 has created a business slowdown. The COVID-19 outbreak has changed where and how people buy goods, and it has accelerated structural changes in industry that are felt by everyone (Accenture, 2020b). This also affected consumer channels, how retailers engage with each other (business-to-business relationships), and how firms work with their direct suppliers, wholesalers, and distributors. Another impact has been price gouging caused by low inventory levels and hoarding (Accenture, 2020a).

As so many people were living in quarantined, there was a significant increase in online shopping transactions. According to Nielsen (2020), 50% of respondents said that they

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doi: [10.14716/ijtech.v12i2.4122](https://doi.org/10.14716/ijtech.v12i2.4122)

visited malls and engaged in entertainment activities less often, followed by 46% who said they ate out less often, and 48% who hung out in cafes less often. COVID-19 is also seen as creating a worldwide economic disaster and uncertainty (Accenture, 2020b). The virus has created breaking points in the value chain, changed consumer patterns, and raised issues of fast cross-functional style assessment (Accenture, 2020a).

In Indonesia, confirmed cases of COVID-19 as of April 12, 2020, were as many as 4,241 people, with 373 deaths. On April 10, 2020, the Greater Area of Jakarta started to implement large-scale social restrictions (known as PSSB), and other provinces soon followed. The growth in demand for processed/canned foods and pharmaceutical products has increased since the first case of COVID-19 in Indonesia appeared (Nielsen, 2020). This is also in line with the finding of Berawi et al. (2020) on the managing multi-impact of COVID-19, Whulanza et al. (2020) and Tunjung et al. (2020) on the innovation of COVID-19 pharmaceutical/healthcare products.

Before the pandemic, this researcher conducted a study of the e-commerce platform ecosystem. It included digital promotion capability, supply chain capability, customer experience, and the effects of seasonal discount pricing and logistics outsourcing. The objects of that study included both sellers and end customers on the e-commerce platform. COVID-19 has created a longitudinal point of view, so the updated research in this paper is expected to provide important insights, especially in the context of Indonesia as the country with the fourth biggest population and one of the fastest growing sources of e-commerce in the world.

This method was adapted from Karjaluoto et al. (2015), that focused on how a digital marketing channel increases a firm's performance. This is integrated with the work of Zhou et al. (2018), who set Internet trading platforms and made it possible to trade online between customers and suppliers anytime and anywhere despite being in different areas. The approaches of these two groups of researchers contributed to information processing theory and transaction cost economics theory, especially in how digital marketing influences consumer decision making and the buying process. Those approaches also provided support in determining how pricing strategy influences consumer decision making and the buying process. The result is hypotheses H1 and H1a:

H1: Perceived digital promotion capability has correlation with (relative) e-commerce platform performance.

H1a: Seasonal discount pricing has a mediating effect on the relationship between perceived digital promotion and (relative) e-commerce platform performance.

Meanwhile, Bakker et al. (2008) found that supply chain capabilities within an e-commerce platform have a positive correlation with internal readiness in contrast to external pressure from the e-commerce supply chain. This is related to the study from Pentina and Hasty (2009) who found that a higher degree of inter-channel coordination increased retailers' online sales. While Yu et al. (2017) explain that outsourcing is more important than self-supported operational activities for raising profitability and/or lowering costs in e-commerce. The following hypotheses concern the differences of e-commerce supply chain approaches:

H2: Perceived supply chain capabilities have a positive correlation with e-commerce platform capability.

H2a: Logistics outsourcing has a mediating effect on the relationship between perceived logistics capability and (relative) e-commerce platform performance.

On the other hand, Gudigantala et al. (2016) proposed a theory based on their review of e-commerce literature concerning the point of view of e-commerce firms about web satisfaction, conversion rates, and purchase intention. They also explained that every unit

rise in a website satisfaction score is predicted to raise average monthly revenue of \$14.26 million, based on the model for an average e-commerce retailer. This leads to three hypotheses (H3, H4, and H4a) considered within an approach called multi-attribute utility theory (MAUT). The first of these is hypothesis H3:

H3: Customer experience (review rating) has a positive correlation with (relative) e-commerce platform performance.

Meanwhile, in the context of marketing, different (digital) communication strategies must be managed for consumers in polychronic and monochronic countries. Polychronic culture (multitasking culture where people like to do many tasks concurrently, i.e., French and Americans) and high context culture are more convenient for adopting and distributing through Internet retailing and on adopting Business-to-Consumer e-commerce (Gong, 2009). One study found seven factors for how marketing communication increases the purchasing desire of online consumers (Sahney et al., 2013): economic motivation (competitive pricing), social motivation (supportive social environment), product motivation (product availability), pragmatic motivation (convenience, perceived norms (family/friend influence), situational motivation (time pressure, lack of mobility, geographical distance, need for special items), service excellence motivation (value based perception), and demographic motivation (demographic parameters). The hypotheses below contribute to MAUT on how the consumer decision-making process wanders on e-commerce platforms. They also reflect information processing theories on how digital marketing influences the consumer decision making and buying process; they are:

H4: Perceived digital promotion capability has a positive correlation with customer experience (review ratings).

H4a: Seasonal discount pricing has a mediating effect on the relationship between perceived digital promotion and customer experience (review ratings).

Hartmann and Herb (2014) conceptually explain how social capital between partner firms and service buyers in a service triad affects the risk from the service buyer's opportunism concerning the supplier's behavior in order to reduce the risk. There are two main e-commerce logistic models that were classified by Yu et al. (2017). The first is a self-support model. It is more effective in executing and controlling strategy, but it has a higher cost. The second is an outsourcing model. It costs less, but it also provides less control of business operations. This model is also important in e-commerce logistics. Hypotheses H5, H5a, and H6 concern explaining the triad impact approaches form (Hartmann and Herb, 2014). They are also contributing to multi-attribute utility theory, especially on how the consumer decision-making process wanders in e-commerce platforms, and also an information processing theory on how the digital marketing process influences the consumer decision-making buying process, which are:

H5: Perceived supply chain capability has a positive correlation with customer experience (review ratings).

H5a: Logistics outsourcing has a mediating effect on the relationship between perceived logistics capability and customer experience (review ratings).

H6: Perceived digital promotion capability has an unknown correlation with perceived supply chain capability.

The whole hypotheses, research variables relations and main measurements are illustrated in Figure 1.

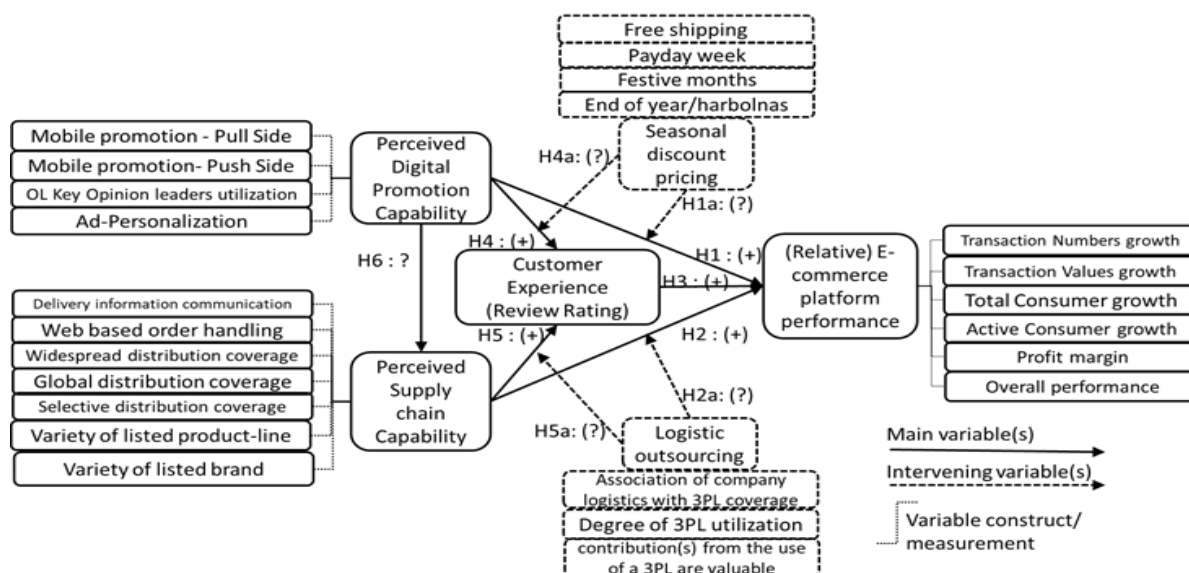


Figure 1 Conceptual framework (Agus et al., 2020)

2. Methods

This study is a longitudinal analysis of online consumers' purchase behavior on e-commerce platforms before and after the COVID-19 pandemic in Indonesia by using four data set. The first dataset is e-commerce platform consumer end customers. The second dataset comes from end consumer those who replied recalling process during the second phase of the research (after the outbreak). The third dataset on e-commerce platform sellers. The fourth dataset were sellers whose replied during the second phase of the research (after the outbreak). The only variables obtained in the second phase are (relative) e-commerce platform performance, logistics outsourcing, and seasonal pricing.

The data in the first datasets (before COVID-19) were collected through a survey questionnaire and a literature review, so their validity and reliability are higher. In that phase of the research, the first step was a questionnaire development process based on a literature review conducted during previous research. The questionnaire was distributed to respondents by using snowballing sample collection from a combination of clusters. As the data were being collected, the researcher conducted pilot and reliability testing of the questionnaire.

The data were analyzed with SPSS software because of its emphasis on statistical data analysis. The software was a very powerful tool for decomposing survey data. It automatically organizes and imports designated variable names, types, tiles, and value labels. SPSS software made the data processing more practical, flexible, and fast.

3. Results and Discussion

Results From the first phase (before the COVID-19 outbreak) of collecting the research data from October to December 2019, there were 1288 end customers who filled out the questionnaire. From that total of 1288 respondents, 88 respondents filled out the questionnaire in the second phase (after the COVID-19 outbreak) in march 2020. For the seller respondents, in the first phase from January to the first week of March 2020 (before the COVID-19 outbreak), there were 308 respondents who filled out the questionnaire. In

the second phase (after the COVID-19 outbreak) on the third week of March 2020 to April 2020, from 308 respondents, 55 of them continued to fill out the second questionnaire.

Table 1 Demographics of the respondents

	Profile	Frequency (EC)	% (EC)	Frequency (sellers)	% (sellers)
Gender	Male	11	12	17	31
	Female	77	88	38	69
Age cohort	Baby Boomers	0	0	1	2
	Gen X	0	0	2	4
	Xennials	0	0	2	4
	Early Millennial	1	1	12	22
	Late Millennial	31	35	26	47
	Gen Z	56	64	12	22

A valid respondent is one who had experience with one of the top 20 Indonesian e-commerce leaders (Alfacart, Aliexpress, Bhinneka, Blanja, Blibli, Bukalapak, Elevenia, Fabelio, Ilotte, Jakarta Notebook, JDID, Laku6, Lazada, Orami, Ralali, Shopee, Shopie Paris, Sociolla, Tokopedia, Zalora). The most-used e-commerce platform, for both end customers and sellers, is Shopee. It was used by 84% of end customers and 60% of sellers.

In the end customer and seller data, several items were deleted if the component matrix result ≤ 0.5 (Malhotra, 2019). The items in the end customer data are: DPC 1, DPC 2, DPC 3, DPC 4, CRR 4, CRR 5, SP 1, and SP 2. The items in seller data are CRR 4 and CRR 5. After the invalid data are deleted, the validity of the remaining construct items is shown in Table 2. All the remaining construct items are declared as valid and reliable, as the component matrix ≥ 0.5 , Kaiser–Meyer–Olkin (KMO) ≥ 0.5 , and Cronbach's Alpha ≥ 0.6 (Malhotra, 2019).

Table 2 Validity of construct items

Perceived Digital Promotion Capability (DPC)				
	EC before COVID	EC after COVID	Seller before COVID	Seller after COVID
KMO	0.701		0.786	
Item	Component Matrix	Component Matrix	Component Matrix	Component Matrix
DPC 1			0.819	
DPC 2			0.790	
DPC 3			0.848	
DPC 4			0.743	
DPC 5	0.849		0.721	
DPC 6	0.909		0.605	
DPC 7	0.863		0.809	
DPC 8	0.794		0.876	
Perceived Supply Chain Capability (SCC)				
	EC before COVID	EC after COVID	Seller before COVID	Seller after COVID
KMO	0.741		0.826	
Item	Component Matrix	Component Matrix	Component Matrix	Component Matrix
SCC 1	0.683		0.787	
SCC 2	0.697		0.847	
SCC 3	0.758		0.836	
SCC 4	0.556		0.746	
SCC 5	0.608		0.752	
SCC 6	0.762		0.884	
SCC 7	0.622		0.853	
Customer Experience Review Rating (CRR)				
	EC before COVID	EC after COVID	Seller before COVID	Seller after COVID

KMO	0.677		0.751	
Item	Component Matrix	Component Matrix	Component Matrix	Component Matrix
CRR 1	0.781		0.924	
CRR 2	0.853		0.949	
CRR 3	0.881		0.923	
Relative E-commerce Platform Performance (REP)				
	EC before COVID	EC after COVID	Seller before COVID	Seller after COVID
KMO	0.777		0.657	
Item	Component Matrix	Component Matrix	Component Matrix	Component Matrix
REP 1	0.559		0.607	
REP 2	0.633		0.612	
REP 3	0.838		0.779	
REP 4	0.858		0.817	
REP 5	0.795		0.656	
REP 6	0.740		0.728	
Logistics Outsourcing (LO)				
	EC before COVID	EC after COVID	Seller before COVID	Seller after COVID
KMO	0.654		0.714	
Item	Component Matrix	Component Matrix	Component Matrix	Component Matrix
LO 1	0.804		0.887	
LO 2	0.809		0.859	
LO 3	0.731		0.920	
Seasonal Discount Pricing (SP)				
	EC before COVID	EC after COVID	Seller before COVID	Seller after COVID
KMO	0.774		0.788	
Item	Component Matrix	Component Matrix	Component Matrix	Component Matrix
SP 1			0.807	
SP 2			0.805	
SP 3	0.902		0.885	
SP 4	0.899		0.932	
SP 5	0.897		0.909	
SP 6	0.935		0.936	
SP 7	0.849		0.848	
SP 8	0.907		0.863	

The regression output from using SPSS on the constructed research model is shown in Figure 2 and Figure 3:

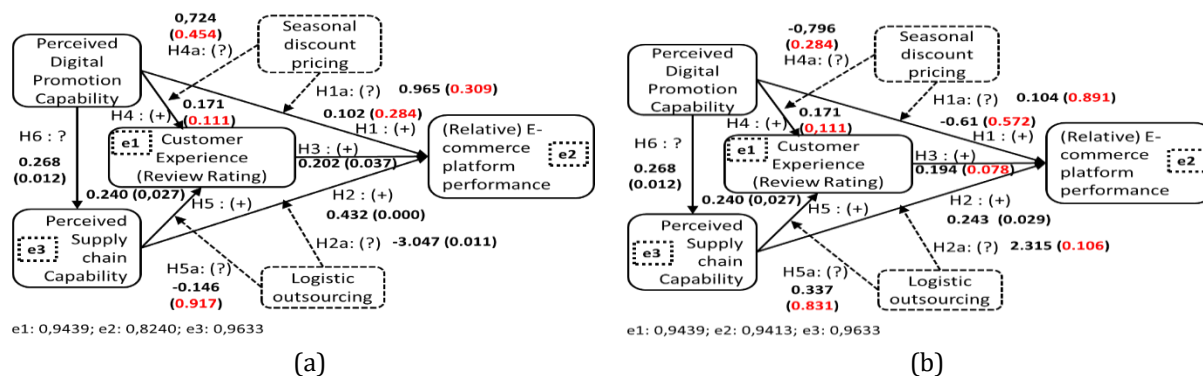


Figure 2 Beta and sign output of end customer data: (a) before COVID-19; (b) after COVID-19

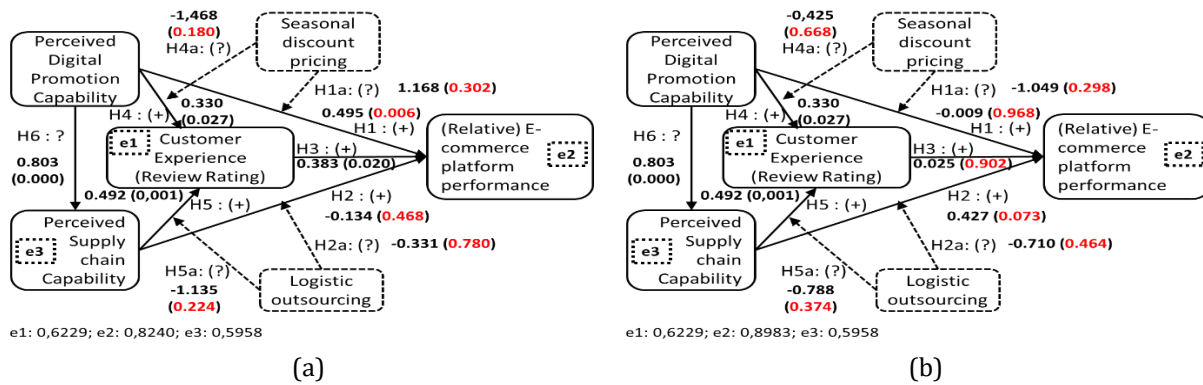


Figure 3 Beta and sign. Output of Seller data: (a) before COVID-19; (b) after COVID-19

The regression output shows that several hypotheses are rejected, as they do not have significant effects. There are also several differences between the data before and after the COVID-19 pandemic in Indonesia. The analysis that addresses the problem formulation is in the following sections.

3.1. Perceived Digital Promotion Capability & E-Commerce Platform Performance (H1 & H1a)

The results from the data on end customers and sellers before and after the COVID-19 outbreak show that H1 is rejected. This means that the perceived digital promotion capability has not significantly affected (relative) e-commerce platform performance. Other results show that seasonal discount pricing has not moderated the relationship between perceived digital promotion and (relative) e-commerce platform performance. This applies to both end customers and sellers both before and after the COVID-19 outbreak.

In consumers' decision-making process from problem recognition to post-purchase evaluation, marketer activities such as digital promotion may appear in the phase of problem recognition because of internal stimulus (such as being out of stock, dissatisfaction, new needs/wants, and related products/purchases) or external stimulus (such as advertisement and sales promotion) (Belch and Belch, 2009). It is assumed that the respondent samples in this study may buy some things on an e-commerce platform because of an internal stimulus and not an external one. Therefore, perceived digital promotion does not significantly affect the (relative) e-commerce platform performance. A similar result occurred with seasonal discount pricing. It does not moderate the relationship between the two, as sales promotion also is an external stimulus in the problem recognition phase. There is no significantly different result from the data before and after the COVID-19 outbreak.

3.2. Perceived Supply Chain Capability & E-Commerce Platform Performance (H2 & H2a)

The output showed that H2 is accepted in the case of end customer data before and after the COVID-19 outbreak as the sign. output ≤ 0.05 (Malhotra, 2019). This means that perceived supply chain capability has a significant positive effect on (relative) e-commerce platform performance. Data on sellers before and after the COVID-19 outbreak show that H2 is rejected as the sign. output ≥ 0.05 (Malhotra, 2019). However, logistics outsourcing does have an intervening effect between perceived supply chain capabilities and (relative) e-commerce platform performance, but only for end customers before the COVID-19 outbreak. In contrast, data on end customers after the COVID-19 outbreak show that perceived supply chain capabilities do not have an intervening effect on (relative) e-commerce platform performance. This is also the result for sellers before and after the COVID-19 outbreak.

The mediating role of logistics outsourcing is different before and after the COVID-19 outbreak for end customers. Before the outbreak, logistics outsourcing might improve supply chain capabilities and affect the e-commerce platform performance, but not after the outbreak. It is assumed that there were territorial restrictions and appeals for people to stay at home. This has made the firms implement strategies of demand sensing and flexible manufacturing close to the consumer to ensure that consumers transform their supply chain (Accenture, 2020b). For sellers both before and after the outbreak, there is no significant effect between perceived supply chain capability and e-commerce platform performance. There also is no intervening effect from logistic outsourcing. It could be that, as long as supply chain capability is satisfying the end customers' needs, that is enough for it to affect e-commerce platform performance in the end customer's mind. As an academic contribution, these results are congruent with those of Bao et al. (2016). They found that a customer's repurchase intention can be followed by meeting their requirements and making them satisfied, which could increase their trust. Meanwhile, as a practical contribution, in the case of an e-commerce platform (seller 1), if there is a moderating role of logistic outsourcing, the result is significant as it may help the seller to improve the performance of the e-platform.

3.3. Customer Review Ratings and E-commerce Platform Performance (H3)

Analysis from Figures 2a and 3a show the data for end customers and sellers before the COVID-19 outbreak. Based on those data, H3 is accepted as the sign. output ≤ 0.05 (Malhotra, 2019). Thus, it can be concluded that customer review ratings positively affect (relative) e-commerce platform performance. However, data for the end customers and sellers after the outbreak show that H3 is rejected as the sign. output ≥ 0.05 (Malhotra, 2019). Therefore, it can be concluded that customer experience does not significantly affect (relative) e-commerce platform performance.

Based on the theory of customers' decision-making process, the first stage, problem recognition, may occur because of an internal stimulus like a new need or want (Belch and Belch, 2009). After the COVID-19 outbreak, several consumers' behaviors changed, and so did their needs and wants. Consumers are more concerned about their health and the economic impact of the outbreak (Accenture, 2020a). Before the pandemic, customer review ratings might affect (relative) e-commerce platform performance, but not after the pandemic. It could be inferred that their needs and wants are changing, so they buy the things that they need most. Many sellers also respond to this, so that might be why customer review ratings do not affect (relative) e-commerce platform performance after the pandemic.

3.4. Perceived Digital Marketing Capability and Customer Review Rating (H4 & H4a)

Data for end customers before and after the COVID-19 outbreak show that H4 and H4a are not significant. That is, the perceived digital promotion capability does not significantly affect customer experience (review ratings), and there is no intervening effect of seasonal discount pricing. For the sellers, data from before and after the outbreak indicate that H4 is accepted, but H4a is not significant. This means that perceived digital promotion capability has a significant positive effect on customer experience (review ratings), but there is no intervening effect of seasonal discount pricing between the two.

The results are not different before and after the COVID-19 outbreak, but there is a small difference between the results for the end customers and the sellers. For the end customers, the perceived digital promotion capability does not significantly affect the customer experience (review ratings). However, the sellers are significantly affected. In the

sellers' opinion, this could be because a good digital promotion could have provided a stimulus to their customers' experience.

3.5. *Perceived Supply Chain Capability and Customer Review Rating (H5 & H5a)*

The regression output from end customer and seller data before and after the COVID-19 outbreak shows that H5 is accepted as the sign. output ≤ 0.05 (Malhotra, 2019), but H5a is not significant. It can be concluded that perceived supply chain capabilities have a significant positive effect on customer experience (review ratings), but logistics outsourcing is not moderating between the two.

There is no difference in the results for the end customers and the sellers either before or after the COVID-19 outbreak. Perceived supply chain capabilities may affect the customer experience (review ratings), as customers are always concerned to know when their order will arrive. Moreover, with the pandemic and government policies like territorial restriction, distribution processes have been disrupted.

3.6. *Perceived Digital Promotion Capability and Perceived Supply Chain Capability (H6)*

The regression results in Figures 2-3 show that H6 is accepted as the sign. output ≤ 0.05 (Malhotra, 2019). This means that perceived digital promotion capability is positively correlated with perceived supply chain capabilities. A marketing campaign related to the supply chain is a great tool for attracting consumers both before and after the outbreak. This is related to situational motivation, as described by Sahney et al. (2013). It comprises geographical distance, time pressure, and lack of mobility. The disruption of the supply chain after the outbreak is shifting the rules for when employees in areas such as inventory, merchandise, and retail outlets should be online (Accenture, 2020a). During the pandemic, firms created opportunities to optimize price promotions and couponing for key customers and areas to attract sales during the disrupted economics (Accenture, 2020a).

4. Conclusions

There are clear differences in the data for the end customers before and after the COVID-19 outbreak. They include: (1) Before the pandemic, customer experience (review rating) had a significant positive effect on (relative) e-commerce platform performance. However, the outbreak has changed customers' behavior to buying what they need to buy under certain conditions. In this case, past customer experience (review ratings) does not have an effect. Buying is based on what products are needed right now; (2) Before the pandemic, logistics outsourcing intervened in the relationship between perceived supply chain capability and (relative) e-commerce platform performance, but not after the outbreak. The transformation of the supply chain after the pandemic may be the reason for this, as there were territorial restrictions and appeals to stay at home. This has made the firms implement the strategies of demand sensing and flexible manufacturing close to the consumer (Accenture, 2020b).

The other results show that the correlation is the same before and after the COVID-19 outbreak. For the sellers, there is no difference in the data before and after the pandemic began. In such a situation, sellers are encouraged to supply products or run promotional campaigns on items that the customers need most. The economics are disrupted in most sectors, and customers are worried about the effects of the pandemic. Therefore, their behaviors may change (especially in the problem recognition stage of a customer's decision-making process). Customers may buy items needed to support them in this situation while they rethink and postpone buying items they want.

One limitation of this research is that there were limited numbers of respondents in the sample. A second limitation is that data were collected near the beginning of the COVID-

19 outbreak. For future research, it is suggested to increase the respondents in the sample, study the three phases of COVID-19, and process the data using structural equation modeling (SEM) to see how the results differ.

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