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E-commerce Adoption of Small and Medium-Sized Enterprises During COVID-19 Pandemic: Evidence from South Asian Countries

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Abstract

COVID-19 has spread across the world in the last two years, confining people to their homes and shutting down businesses and markets. The world is currently experiencing a catastrophic economic and social crisis. To benefit people and to protect them, industries invented new products. These products were made by small and medium-sized businesses across the globe. In South Asia, there was also a rigorous lockdown, people were laid off, and SMEs adopted E-commerce to assist clients and customers. Therefore, the study aims to analyze the impact of the COVID-19 pandemic on E-commerce adoption through open innovation strategies in South Asian countries. 500 respondents were selected through an online questionnaire to collect data from different countries of South Asia. The prominent countries are; India, Pakistan, and Bangladesh. The results of the study show that perceived compatibility and complexity have a positive influence on E-commerce adoption. In normal circumstances, however, the open innovation model is feasible. Knowledge and experience sharing and management attitude have a moderate impact on E-commerce adoption. These results are beneficial for researchers and SME managers in South Asia to overcome the challenges of the COVID-19 pandemic and increase the number of skilled people employed. This study suggests that SMEs should hire skilled workers to upgrade their systems.

Keywords: E-commerce Adoption, SMEs, South Asia, Open Innovation, COVID-19 Pandemic

JEL Classification Code: L25, O33, O36, L81, O53

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1. Introduction

The impact of the coronavirus pandemic is long-term on E-commerce development and growth. This impact can be positive or negative in terms of E-commerce adoption for the small businesses that have less attraction to adopt it. The general public considers E-commerce or e-business as a mere form of selling and buying products and services online. E-commerce has a diversity of developments in it, and its varieties from system to process. The three forms of E-commerce or e-business are business-to-consumer selling (B2C), another is business-to-business selling (B2B), and the third type is business Government selling (B2G) (Schneider et al., 2010). Numerous types of e-business have been introduced to the emerging economic market. With each passing day, the Internet facility is reaching everyone. In the areas where access to the internet was not possible a few years back, have access to 3G and 4G technology. In several South Asian countries, E-commerce progress is slow, and it cannot compete with the rest of the world. The major countries in South Asia have limited access to the Internet

in several regions (Kussusanti et al., 2019). That is why the technology fails to fulfill the basic demands of the customers.

Although the coronavirus is not the same in every country, the virus changes its shape and inner phenomenon. In Saudi Arabic, MERS (Middle East respiratory syndrome) is the obsolete form of Coronavirus variants (Singer, 2020). In South Asian countries, several new industries started their business at the time of the pandemic. These SMEs were selling products that include the face-masks, sanitizers, and other safety products. However, without adopting E-commerce, SMEs cannot compete with modern trends and needs.

E-commerce adoption, especially the application of ICT in business processes, can link social and economic progress between SMEs and their customers to increase the potential for business continuity of SMEs (Wicaksono et al., 2021). There is a need to implement the easy-to-use process for online shopping with utmost importance to 'customer satisfaction. The development of information technology (IT) has been driven changes in various fields, one of which is in marketing. The use of IT in marketing will not be separated from The Internet, where e-commerce services have now emerged allows businesses to conduct face-to-face transactions by removing barriers related to distance in interacting with customers.

2. Literature Review and Hypotheses

2.1. E-commerce Adoption in SMEs

E-commerce has become an important aspect of the industry on a global scale. E-commerce is a direct result of IT (information technology), and it necessitates IT at all times. The use of information technology has risen in emerging countries as well (Bozer& Jones, 2018).

2.2. Perceived Relative Advantage

Perceived relative advantage (PRA) and Perceived usefulness (PU) are considered similar and interchangeable in many studies accredited to the study of IT adoption. However, several studies do not mention it as interchangeable and consider it as two different approaches. The perceived relative advantage introduced by Rogers (2002) examines the superior level of innovation in a broader sense. It is defined as; the perception of innovation to which it exerts better sense than its idea. The relative advantage is a not unidimensional construct (Deventer & Dye, 2018). E-commerce adoption has three basic sub-dimensions (1) Trust, (2) convenience, and (3) efficacy of information. The majority of the research defined it in general, and this study also considered the Relative advantage as a general approach.

2.3. Perceived Complexity

The definition of perceived complexity is; the extent to which an innovation is hard to understand or difficult to understand. Deventer and Dye (2018)defined complexity as the degree to which an individual uses his power to comprehend the innovation. Teo et al. (2004) found that complexity can limit E-commerce adoption. However, using a change agent, it is possible to overcome the complexity of E-commerce solutions.

2.4. Perceived Compatibility

Organizational processes and strategies must be followed while implementing e-commerce. When E-commerce adoption is not aligned with organizational strategy, according to Mohd Zain et al. (2020), the solution becomes inhibited. There are opposing viewpoints on the interoperability of E-commerce applications and solutions (Ghobakhloo et al., 2011). The degree to which it aligns itself with the company's demands is another facet of compatibility (Ghobakhloo et al., 2011).

2.5. Management Attitude

Attitude has a significant impact on E-commerce adoption and the improvement of SMEs. A study conducted by Rebeka and Indra Devi (2015) on the manufacturing industry showed skill development among employees for the adoption of E-commerce. In addition, it showed that management attitude has a strong positive impact on the performance of the SMEs and E-commerce adoption.

2.6. Knowledge and Experience Sharing

The most significant part of any organization's implementation of E-commerce is knowledge sharing. Customers' worth is best defined in terms of 'knowledge source,' with knowledge sharing considered the most important activity (Tepeh & Rahgozar, 2008). In E-commerce, knowledge and experience sharing is not a one-way path; rather, the customer or consumer, as well as the seller or business, exchange their knowledge and experience. Knowledge and experience sharing also enhances customer satisfaction and improves the consumer's buying behavior (Daugherty & Biocca, 2005). Customer satisfaction is inextricably linked to knowledge sharing about the products and the services.

2.7. Open Innovation Strategy of SMEs

While early explanations of innovation were limited to the linear commercialization of knowledge from within the

firm, there has been growing recognition that innovation occurs as part of a system of knowledge and technology that crosses organizational boundaries (Chaffey et al., 2019). According to Hutajulu et al. (2021), open innovation recognizes knowledge flows in and out of the firm to combine firm capabilities and resources with those from external stakeholders. It is a distributed innovation process based on purposively managed knowledge flow across organizational boundaries using pecuniary and non-pecuniary mechanisms in line with the organization's business model. The open innovation (OI) literature investigates how firms bridge traditional boundaries to allow outside-in and inside-out knowledge flows and whether they adopt a pecuniary or non-pecuniary approach to these transactions, resulting in four types of OI: revealing, selling, acquiring, and sourcing (Faraoni et al., 2019)

2.8. Hypothesis Development

As per the literature review and considerable previous studies, the hypothesis is developed;

The difference between an 'idea' and an 'innovation' is significant. The relative advantage's role is to evaluate innovation by comparing its idea to others. If a product is based on a better idea, but the product is more capable than the idea, it has a better chance of being adopted. The perceived relative advantage increases in this instance. Several types of research have examined the case of innovation advantage. In these studies, the relative advantage is positively related to the E-commerce adoption among business firms and organizations through open innovation strategy (Chaffey et al., 2019).

H1: *The influence of Perceived Relative advantage on E-commerce adoption will be moderated by Open innovation strategy.*

Each innovation has its own set of values, and compatibility refers to how a product or innovation is viewed in relation to those values. The experiences and basic needs associated with the innovation are also included in these values (Deventer & Dye, 2018). In various studies, compatibility has a negative relationship with E-commerce adoption through the open innovation method (McPhillips, 2020).

H2: *The influence of Perceived Compatibility on E-commerce adoption will be moderated by Open innovation strategy.*

The degree of complexity in a product or innovation determines its difficulty of understanding or referring to it (Gkikaet al., 2020). If innovation is complex and not easy to understand for the adopter, it will be rejected. In that manner, each innovation needs to be adopter-friendly. If it is not, then, its scope will be limited. Perceived complexity has two different perspectives on its link with E-commerce adoption: it has a positive relationship with E-commerce adoption and it has a negative relationship with E-commerce adoption (Mohamad et al., 2020). According to Chaffey et al. (2019), complexity has no relationship with E-commerce adoption because easy-to-use business applications are more prone to facilitate adopters than complex ones.

H3: *The influence of Perceived Complexity on E-commerce adoption will be moderated by Open innovation strategy.*

Management attitude is reflected in managers' active engagement with the top management. According to Schniederjans et al.(2013),the most important predictor of E-commerce adoption in terms of innovation is managerial attitude. Several prior studies have revealed a direct link between management attitude and e-commerce adoption (Tan et al., 2009).

H4: *The influence of Management Attitude on E-commerce adoption will be moderated by Open innovation strategy.*

To evaluate a new product or innovation and adopt new technology, all businesses need experts with knowledge and information in the field (Guzman et al., 2018). Knowledge and experience exchange have a significant impact on open innovation strategy (Tan et al., 2009).

H5: *The influence of Knowledge and Experience on E-commerce adoption will be moderated by Open innovation strategy.*

Open innovation has a negative impact on managerial activities, cognitive and financial costs, and the exchange of knowledge. Open innovation is a business management model for innovation that promotes collaboration with people and organizations outside the company. In an open innovation environment, collaboration among companies can result in developing a product that may benefit one, but not the other, or the cost for one company may be acceptable, but not for the other. In this situation, open innovation has a detrimental impact on E-commerce adoption (Rebeka & Indra Devi, 2015; Wicaksono et al., 2021).

H6: *Open innovation strategy will have a direct impact on E-commerce adoption.*

3. Research Materials and Methods

This is quantitative research; the data has been collected with a questionnaire. The constructs of the questionnaire are designed with the help of previous research (Ahmad et al., 2015). The reliability of the scale is .843. This survey uses a seven-point Likert scale. Participants are middle-level managers from South Asian countries' Small and Medium-sized Enterprises (SMEs). The causal relationship between the variables is examined through the Structural Modeling Partial Least Square (PLS-SEM). It has two types of variables; observed variables, also known as indicator variables, and unobserved variables known as Latent variables. The latent variable is the unobserved variable and is further divided into two types, (1) exogenous latent variable, and (2) endogenous latent variable. Latent variables of the study are; (1) Perceived relative advantage, (2) Perceived Complexity, (3) Perceived Compatibility, (4) Management Attitude, (5) Knowledge and Experience, (6) E-commerce Adoption.

The exogenous variables are those whose values have an impact on the endogenous variable and the value is determined in the constructed model. The exogenous variables are also known as independent variables of the study, and include (1) Perceived relative advantage, (2) Perceived Complexity, (3) Perceived Compatibility, (4) Management Attitude, (5) Knowledge and Experience. The Endogenous variable, also known as the dependent variable of the study, is E-commerce adoption. Meanwhile, the moderating latent variable is 'Open innovation strategy of SMEs'. The method used in the study is a simple random sampling method. The overall population of the research is all the SMEs in South Asian countries. The sample of the research is drawn through the Taro Yamane equation. Due to COVID-19, physically visiting the SMEs and collecting data was not possible. When the research was conducted, South Asian SMEs were observing strict lockdown. In the meantime, an online questionnaire was distributed to the SMEs. The sample of the research is 500 SMEs.

4. Results

Three steps were used to get at the results. The PLS algorithm was used to calculate the first step. Collinearity cannot be found using SmartPLS 3.3.3. As a result, the "Latent Variable Scores (unstandardized)" were entered into the statistical software SPSS version 15 to identify values below 5, and no collinearity problems were observed. If the Tolerance value is less than 0.20 and the VIF value is greater than or equal to 5, collinearity may be an issue (Hair et al., 2011). The latent variables were separated into two groups for this purpose, each with its own set of Independent and Dependent Variables. The strength of the coefficient path that connects two constructs of interest determines the validity of the formative indicator set. The magnitude between the paths of the formative and reflective constructs (latent variables) should be a maximum of 0.90 and a minimum of 0.80 (Chin, 2001). *R* Square values must be more than 0.64.

The demographic information (Table 1) shows the results of Gender, Age, Industry, and position of the respondent in the industry. Male respondents made up 77.8% of the total respondents, while female respondents made up 22.2 percent. Senior managers hold 39 percent of the posts, junior managers 19 percent, and workers 40 percent. Workers made up the majority of the respondents. Industries were separated into many sectors, with the commercial industry accounting for 16.8%, the manufacturing sector 48%, and others accounting 34%. According to the statistics, the manufacturing sector plays a significant role in providing data for research.

Table 1: Demographic Information

		Frequency	%	Valid %	Cumulative %
Gender	Male	389	77.8	77.8	77.8
	Female	111	22.2	22.2	100.0
Age	18–30 Years	80	16.0	16.0	16.0
	31–45 Years	247	49.4	49.4	65.4
	46+ Years	173	34.6	34.6	100.0
Position	Senior Manager	197	39.4	39.4	39.4
	Junior Manager	99	19.8	19.8	59.2
	Employee	204	40.8	40.8	100.0
Industry Type	Commercial	84	16.8	16.8	16.8
	Industrial	242	48.4	48.4	65.2
	Others	174	34.8	34.8	100.0

With a value of 0.841, the indicator eCom2 (Outer loading: 0.566) has the lowest reliability. With a value of 0.870, the indicator Mat3 (outer loading: 0.978) has the highest reliability. The outer loading values of the reflective indicators KE, MA, OI, PC, PCX, PRA, and eCom are above the threshold value of 0.70. As a result, all of the indicators meet the reflective construct's minimum requirements (Table 2).

The composite reliability values of 0.80 (KE), 0.873 (MA), 0.881 (OI), 0.782 (PC), 0.830 (PCX), 0.812 (PRA) and 0.841 (eCom) shows that all the constructs have the highest level of internal consistency and reliability. The convergent validity assessment values based on AVE are KE (0.571), MA (0.699), OI (0.788), PC (0.545), PCX (0.533), PRA (0.604), and eCom (0.525). All values are above the minimum required value of 0.50. Thus, all reflective constructs have the highest level of convergent validity. The average variance checks the convergent validity of the model. In this case, the AVE of all the indicators is above 0.50 which shows that all the variables explain 50% of the variance in all items.

Perceived Complexity has a positive impact on Open innovation (Beta = –0.280, $p < 0.001$) which shows that 28%

Table 2: Convergent Validity, Reliability Assessment

Latent Variable	Indicators	Convergent Validity		Internal Consistency Reliability	
		Loading	AVE	Composite Reliability	Cronbach's Alpha
		<0.70	>0.50	0.60–0.90	0.60–0.90
Knowledge and Experience	KE1	0.769	0.571	0.80	0.637
	KE2	0.757			
	KE3	0.727			
	KE4	0.782			
Management Attitude	MA1	0.751	0.699	0.873	0.780
	MA2	0.760			
	MA3	0.978			
Open innovation	OI1	0.862	0.788	0.881	0.734
	OI2	0.912			
Perceived Compatibility	PC1	0.784	0.545	0.782	0.628
	PC2	0.710			
	PC3	0.719			
Perceived Complexity	PCX1	0.848	0.533	0.830	0.730
	PCX2	0.647			
	PCX3	0.788			
	PCX4	0.671			
Perceived relative advantage	PRA1	0.871	0.604	0.812	0.644
	PRA2	0.821			
	PRA3	0.714			
	PRA4	0.934			
E-commerce	e-Com 1	0.756	0.525	0.841	0.770
	e-Com 2	0.566			
	e-Com 3	0.811			
	e-Com 4	0.903			
	e-Com 5	0.708			

Note: All the reflective constructs have discriminant validity.

Table 3: Hypothesis Testing Results

	B	STDEV	*T*-statistics	*P*-values	2.50%	97.50%
KE → e-Com	0.589	0.148	3.975	0.000	0.319	0.886
MA → e-Com	0.104	0.053	1.959	0.051	–0.008	0.204
OI → e-Com	–0.280	0.137	2.046	0.041	–0.577	–0.014
PC → e-Com	0.081	0.038	2.136	0.033	0.011	0.161
PCX → e-Com	0.293	0.067	4.34	0.000	0.154	0.411
PRA → e-Com	0.030	0.04	0.769	0.442	–0.042	0.108
	R^2	Q^2				
eCom	0.517	0.245				

Table 4: Hypothesis, Findings, and Conclusion

Hypothesis	Findings	Conclusion	
H1: The influence of Perceived Relative advantage on E-commerce adoption will be moderated by Open innovation strategy.	NO, (β = 0.030, P = 0.442)	Insignificant	Not Supported
H2: The influence of Perceived Compatibility on E-commerce adoption will be moderated by Open innovation strategy.	Yes, (β = 0.081, P = 0.033)	Significant	Supported
H3: The influence of Perceived Complexity on E-commerce adoption will be moderated by Open innovation strategy.	Yes, (β = 0.293, P = 0.000)	Significant	Supported
H4: The influence of Management Attitude on E-commerce adoption will be moderated by Open innovation strategy.	Yes, (β = 0.104, P = 0.051)	Significant	Supported
H5: The influence of Knowledge and Experience on E-commerce adoption will be moderated by Open innovation strategy.	Yes, (β = 0.589, P = 0.000)	Significant	Supported
H6: Open innovation strategy will have a direct impact on E-commerce adoption.	Yes, (β = –0.280, P = 0.041)	Significant	Supported

of Open innovation is explained by E-commerce adoption (Table 3). Knowledge and experience sharing (KE) has a significant positive impact on E-commerce adoption (Beta = 0.589, $p < 0.0001$), explaining 58.9% of E-commerce adoption. Management attitude (MA) has a weak influence on E-commerce adoption (Beta = 0.104, $p = 0.05$), explaining 10.4% of E-commerce adoption. The relative advantage (PRA) has an insignificant impact on E-commerce adoption, accounting for about 3% of the variation. Perceived complexity has a significant positive impact on E-commerce adoption (Beta = 0.293, $p < 0.0001$), explaining 29.3% of E-commerce adoption.

Table 4 shows the Hypothesis Conclusions. The value of Q square (0.245) above zero shows that model is well constructed and has better predictive relevance. The value of the F square is not mentioned in the table because no endogenous variable is removed from the model. However, the value of R square (0.517) shows that all the variables have a moderate impact on E-commerce adoption. As per research results, H1, perceived relative advantage is insignificant for the adoption of E-commerce. H2, Perceived compatibility is significant with E-commerce adoption. H3, perceived complexity has a significant influence on E-commerce adoption. H4, Management attitude has a significant influence on E-commerce adoption. H5, Knowledge and experience have a significant influence on E-commerce adoption. H6, Open innovation has a direct positive and significant impact on E-commerce adoption.

5. Discussion

The goal of this research is to determine the influence of the COVID-19 epidemic on E-commerce adoption in South Asia using an innovative technique. Open innovation, which is seen to have a significant impact on E-commerce adoption, plays a mediating role. The study shows that the hypothesis section does not support perceived relative advantage. Relative advantage—the degree to which an

innovation is perceived as better than the idea it supersedes. The higher the perceived relative advantage, the more likely the innovation will be adopted. The majority of small and medium-sized businesses in South Asia have already implemented E-commerce; however, many businesses are hesitant to upgrade their business systems (Tran, 2021). The open innovation strategy is a major factor in the study. Open innovation has been found to have a significant negative impact on the adoption process.

According to Priambodo et al. (2021), open innovation strategy has a direct influence on E-commerce adoption. During the COVID-19 pandemic, industries interested in open innovation, ready to share information and knowledge with other organizations (Bhatti et al., 2020). In Tunisia, the digital platform introduced by the government in the COVID-19 lockdown and the lifting of taxes and duties positively impacted several sectors. In Tuvalu, the government supported and facilitated employees by giving loans. The Bangladeshi government, on the other hand, has taken no action in COVID-19 to encourage the use of E-commerce (Alfonso et al., 2021; Mohamad et al., 2020).

6. Conclusion

When a new product or idea enters into the market, the relative advantage is the first thing to consider (Priambodo et al., 2021). During a pandemic, the entire focus shifts to 'business survival. Results show that perceived compatibility has a positive impact on E-commerce in COVID-19. Similar results have been observed in a previous study (Alhaimer, 2021). The reasoning behind this is that in the event of a pandemic, consumers place a high value on compatibility. It reveals that perceived complexity remained high, and that complexity had a major impact on E-commerce adoption, as indicated in the results. Because the producer has little time to market a product or present it as a second edition of a previous product,the relative advantage had lost its value. Similar results have been drawn in the study of Bhatti et al. (2020). To lead the workers in the new situation, management had to adopt new trends. The management was taking daily decisions to provide the 'products on demand'. The adoption of E-commerce was aided by the open innovation strategy, which had a significant positive impact—a similar study came to the same conclusion (Guzman et al., 2018). Knowledge and experience sharing has a strong positive influence on E-commerce adoption; it also profoundly impacts open innovation. Knowledge and experience sharing were found to be significant predictors of E-commerce adoption in South Asia.

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