

COVID-19 IMPACT ON E-COMMERCE USAGE: AN EMPIRICAL EVIDENCE FROM MALAYSIAN HEALTHCARE INDUSTRY

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Article History: Received on 4th April 2020, Revised on 19th May 2020, Published on 31st May 2020

Abstract

Purpose of the study: The purpose of the study is to investigate the COVID-19 impact on e-commerce usage in the Malaysian healthcare industry through the Technological, Organizational, and Environmental (TOE) model.

Methodology: This is a quantitative online survey-based research. The questionnaires are distributed among 100 samples from a healthcare provider, namely doctors, hospital management, medical assistant nurses, and medical supplier, particularly in Peninsular Malaysia. The sample comprised 45% male and 55% female. The data were analyzed by using SPSS 25 and PLS-SEM 3.0 to examine the relationship between variables and to test the hypotheses.

Main Findings: The finding reveals that organization readiness, e-commerce knowledge, and supply chain integration have a significant positive impact. In contrast, IT infrastructure and external pressure have an insignificant effect on e-commerce usage.

Applications of the Study: The benefits obtained from this study can be used to empower e-commerce usage in the healthcare industry of Malaysia. Also, it will enhance the quality of services hence advancing the healthcare services and operations.

Novelty/Originality of the Study: The combined effect of the TOE and DOI theory on e-commerce usage for the healthcare industry to contribute to the literature.

Keywords: E-Commerce, Healthcare, Technological, Organizational, Environmental, COVID-19.

INTRODUCTION

In the current pandemic situation, COVID-19 has changed the purchasing habits for the world within a month (Shahzad, Chin, Altaf, & Bajwa, 2020). The effects of coronavirus across the globe are uncontrolled and unstoppable (Cohen, 2020). Most of the countries on lockdown, cruise ships, shopped closed, worldwide education universities lockdown, airline industry more than 90% stopped operation, and major tech companies calling off events and instructing employees to work from home (Today, 2020). Due to that, the expeditious growth of internet usage has been a vital possession for all the organizations, and it has been dramatically changing the way business is being conducted. In a competitive environment, companies have to put their focus on the fast-growing trends in information technology for cost efficiency and self-survival (Abebe, 2014). Likewise, the use of e-commerce has created a vast opportunity for both existing and new business ventures for the efficient delivery of products and services. Indeed, the implementation of e-commerce has altered the contemporary business operation, which accelerates the quality of services being offered to the customers/clients, particularly in the healthcare industry (Boore, James, & Iraki, 2017).

In the recent decade, the escalating healthcare expenditures and increasing numbers of aging people, the use of e-commerce are practically challenging. Moreover, the existence of e-commerce in the healthcare industry seems to reshape the industry's performance and direction. According to News Straits Times, December 21, 2017, the healthcare industry is fast growing and is one of the world's largest industries, which then recognized as one of the key drivers of economic growth.

Similarly, the healthcare industry of Malaysia has a significant contribution to the economy. The healthcare industry in Malaysia contributes 10 % to the gross domestic product (GDP). However, the Malaysian Investment Development Authority (MIDA), indicates that Malaysia has become one of the healthcare travel destination offering the quality of healthcare services with rigorous regulations for healthcare safety. The healthcare sector in Malaysia is providing service through both the public and private infrastructure. Moreover, the healthcare industry has tremendously developed to enhance the quality of life, better treatment, life expectancy, and efficiency to deliver excellent services (Udayai & Kumar, 2013).

However, global internet usage has been accelerating e-commerce growth in every industry. Similarly, in Healthcare, e-commerce also has its significance to meet with the high expectations of patients, and to deliver quality healthcare services with cost efficiency in maternal clinics, hospitals, and other healthcare centers. Over time, the healthcare industry in Malaysia is moving forward with fast-growing technology to improve the healthcare status of the people (Onn, 2015). According to export.gov, a website that assists US businesses, the total expenditure for Public Healthcare in the

Malaysian healthcare industry in 2019 is RM29 billion for Public Healthcare, which is almost 10% of the national budget. Therefore, it was anticipated that the industry experienced the most significant boost in e-commerce from 6.1% off all transactions to 33.3% by the year 2000, which shows the increment of 546% (Enright, G., 1998).

In addition, with state-of-the-art technologies embedded in the healthcare industry, this attracts clients to maximizing the usage of e-commerce, assuring the quality of overall management, effectiveness, and valuable cost. Based on Statista.com, e-commerce market revenue in Malaysia for 2019 is US\$3,681m, and this number will expect to increase to 11.8% by the year 2023. Meanwhile, 62.3% of the user being penetrated by the e-commerce market, and the number is expected to increase to 64.3% in 2023. Besides, e-commerce usage had to change the healthcare industry business strategy, which provides a clear path to increase organizational revenues. According to Shin (2001), the quality of the hospital and healthcare products will be improved with optimization of the medical cost. Similarly, initiating new business and commercialize it, e-commerce emerges the market in the various distribution channel as a source of economic growth and sustainability (Smith & Bailey, 2000). However, the rise of e-commerce in the healthcare industry forced IT personnel to move beyond infrastructure design and maintenance to consider numerous customer-facing aspects, such as consumer data privacy and security. The utilization of e-commerce in Healthcare is very massive. The advancement of technology helps the caregiver to treat and save patients.

Moreover, it offers an opportunity for new business progression. Thus, the objective of this study is to examine the influencing factors that affect e-commerce usage in the healthcare industry, which let the industry accomplish well in promoting healthcare services, thus satisfying patients. The primary research objective is to investigate the related organizational factors such as organization readiness and e-commerce knowledge with e-commerce usage, technological factors like IT infrastructure, and environmental factors such as external pressure and supply chain integration on e-commerce usage.

LITERATURE REVIEW

Overview of Healthcare

The healthcare industry has boom rapidly due to public awareness of the importance of maintaining the body's health. The awareness is due to the demographic shifts, an increasing number of life expectancy, an aging population, and a total of non-communicable diseases (Udayai & Kumar, 2013). According to Mosby's Medical Dictionary, 8th Edition, (2009), Elsevier, the healthcare industry can be interpreted as a complex of preventive, remedial and therapeutic services which provide by the hospital or institution, care provider and medical practitioner, nurses, admin and management, regulatory government agencies, non-governmental organizations, non-institutional care facilities, medical equipment manufacturer and pharmaceutical manufacturer to the patients. The evolution of the healthcare industry had been drastically changed, driven by domestic consumption of healthcare products and services.

The evolution of the healthcare industry had been drastically changed, driven by domestic consumption of healthcare products and services. Moving forward, the healthcare industry in Malaysia has developed due to the high demand for healthcare services and life expectancy, thus act as one of the engines of economic growth. Moreover, Malaysia had expanded the industry to become one of the medical tourism hubs, which then gain assurance from patients. Malaysian life expectancy had been increasing rapidly due to extensive healthcare services provided by the government and private sector. According to the statistic by the Department of Statistics, Malaysia's population for the second quarter 2019 was estimated at 35.8 million peoples, which increase by 0.6% compared to the second quarter 2018 with a total of 32.38 million.

Healthcare Services in e-commerce perspective

The global internet penetration changes the way of conducting business. Regardless of any business, rapid technology with fast-changing trends influences consumer's needs. Most organizations depend on information and communication technologies (ICT) to conduct business and marketing strategies. The function of e-commerce in the healthcare industry is vast and broad. A lot of resources in technology had been invested in improving healthcare services, but yet, not all ICT integration succeeded (Lee, Nam, Lee, & Son, 2016).

Usually, the e-commerce platform is used to transmit patient information from one medical department to another for ease of tracking and keep electronic medical records. The connectivity not only beneficial to patients, doctors, and pharmacies but may improvise the relationship among hospitals, suppliers, and patients. It helps to strengthen each other's dependencies simultaneously. Apart from that, it also acts as a support system whereby doctors can communicate with each other to share problems, knowledge, and expertise in a cost-effective way (Monem, 2016). In this study, the TOE model is used to identify the impact of e-commerce usage in the Malaysian healthcare industry. It described the process of technology innovation implementation by the organizations and too determined factors by which the technology usage influenced and its likelihood in organizational, technological, and environmental perspectives (Depietro, Wiarda, & Fleischer, 1990).

Organizational Perspective

Organizational Readiness

Organizational readiness to implement information technology in the firms determines the next change before the adoption of e-commerce. Readiness can be explained as to how an individual in a firm is prepared to bring innovation ([Aremu, Shahzad, & Hassan, 2019](#)). This includes the organizational culture, process orientation, and business size ([Ahmer, 2013](#)). It is agreeable with the idea by ([Haque, Sadeghzadeh, & Khatibi, 2006](#)) that stated the adoption of information technology is a weapon for healthcare organizations to improve efficiency without compromising the quality. Likewise, According to [Jehangir, Dominic, Naseebullah, and Khan \(2011\)](#) Stated that the growth of the Malaysian economy is due to the government conceived the importance of ICT as a characteristic that drives economic performance. Pertaining to that, many organizations try to maximize the opportunity to enhance their business activities effectively. This is in line with the 8th Malaysian plan to enter the age of digitalization, particularly in the healthcare industry.

E-commerce Knowledge

Traditionally, business happened through interaction and business agreement between supplier and buyers by face to face communication. As when time flies, the business transaction becomes much more comprehensive, more comfortable, and globally connected by the adoption of technology, which dramatically changes the conventional way of the business process. It is essential to enhance e-commerce usage in the organization by having skillful employees who are good at computers and technology. The expertise will determine the organizational direction in e-commerce usage. According to ([Teo, Ranganathan, & Dhaliwal, 2006](#)), e-commerce knowledge has a significant positive effect on e-commerce adoption in business. Besides, [Chang and Wong \(2004\)](#) stated that organizations with competence experts tend to have better business performance compared to organizations that do not have technical competent in IT.

Technology Perspective

IT Infrastructure

Infrastructure comprises both human and technical knowledge of the employees. It consists of software, hardware, and telecommunication that will operate the system. Before this, organizations had limited access to technology due to cost and management budgetary. Today, the cost of having it much cheaper due to the rapid evolution of technology. According to [Luong and Wang \(2019\)](#), IT infrastructure had become a potent weapon in determining e-commerce usage as it is a basis where all the initiative started. The use of e-commerce infrastructures such as electronic data interchange (EDI) and web-based provide a platform that supports the interaction ubiquitous vastly with dedicated network and cost-effective. Comprising of business process, in the short term, it affects the process of ordering, while in long terms, it affects what will be ordered ([Aggarwal & Travers, 2001](#)). Besides, communication infrastructure builds to support programming such as expert systems, ASPs, and data security seems to be prominent in connecting the internet to support high populations of patients, thus promising to quality of care. Apart, security and privacy are vital cognition that needs to ruminate during transactions to assure important information did not fall to spammers and scammer hands.

Environmental Perspective

External Pressure

[Tornatzky and Flesichher \(1990\)](#) stated that environment perspectives are the area where organizations conduct the business industry, rivalry, and dealing with government. Also, [Baker and Solak \(2011\)](#) emphasize that regardless of the existence of technology and service providers and regulatory in the environment. Similarly, competitive pressure is also considered as an essential variable that can motivate companies to invest in their business operations ([Sheikh, Rana, Inam, Shahzad, & Awan, 2018](#)). likewise, pressure from customers and the need to be relevant in the new revolutions put organizations and care providers to be one step further to improve their performance by embracing e-commerce in the organization ([Hashim, 2006](#)). This means that businesses are relying on the connectivity of the network to communicate virtually. Yet, the Malaysian government did encourage private sectors to participate in the evolution process. Despite this, MCMC also opens doors in supporting the adoption of e-commerce business in terms of regulations, economy supports, and even technological infrastructure. Besides, the Multimedia Super Corridor (MSC) and other related schemes also create awareness on e-commerce usage in global businesses ([Hassan, R., & Marimuthu, M. 2018](#)).

Supply chain Integration

From simple e-mails and websites to attract consumers, healthcare providers had been improvising the way it communicates to each other from different hierarchy, namely from medical assistants, nurses, suppliers, hospital management, physicians to end-users. Likewise, saving patients' life is a priority by making sure the procedure of treatment runs smoothly without any delay. Due to the progression of technology advancement in the healthcare industry, the rapid evolution in e-commerce helps in managing business strategies as well as managing patients wisely, accurately, and quickly. IT implementation also seems useful in the healthcare industry, whereby it can improve asset

utilization and maintenance, patient safety through drug distribution, and automatically create itemization billing for ease of managing workflow (Chee & Yazdanifard, 2011). The user of the Enterprise Resource Planning (ERP) system, for example, is beneficial to improve service provided to patients and contribute to the modernization of the supply chain process through the intelligence reporting system.

TOE Model

Established in the year 1990, the TOE model was developed by Tornatzky and Fleischer, which emphasizes three main perspectives affecting innovation and technology implementation. Three perspectives being highlighted are organizational, technological, and environmental perspectives. Organizational perspectives explain how the organization and management may accept e-commerce usage in the organization itself. Restrictions such as organizational readiness in terms of cost of installation and maintenance and lack of expertise in e-commerce knowledge will be discussed in this study. Apart from technological perspectives, IT infrastructure is being considered. The large organization with well-equipped infrastructure may seem to help in reducing the cost of operation. Moreover, it helps to increase efficiency by enhancing the business process, compared to the small organization. On the other hand, environmental perspectives, denoted the association of e-commerce by which it is facing external pressure such as government laws and regulation and competitors in the market. Besides, it indicates the execution of supply chain integration in the industries.

DOI theory

In technology adoption studies, the most common theories are TPB by Ajzen (1991), technology acceptance model (TAM) as one of the most frequently used model, a theory of reasoned actions by Fishbein and Ajzen (1980), Unified Theory of Acceptance and Use of Technology (UTAT), and TAM2 by Vankatesh (2003). However, among others, the more popular theory related to technology adoption is the diffusion of innovation (DOI) (Sila, 2013; Villa, Ruiz, Valencia, & Picón, 2018). Likewise, in the present study, the DOI theory by Roger is applied. According to Roger (2003), innovation and technology as interchangeable, and he defines innovation as "an idea, practice, and project that is perceived as new by individuals and other units of the adoption." In previous studies, DOI theory has been applied to many technology adoption studies like e-commerce usage within internationalization (Luong & Wang, 2019), utilization of web 2.0 for knowledge sharing (Amin, Almunawar, Hasnan, & Besar, 2020), e-government adoption (Al-Refaie & Ramadna, 2020), usage of an ERP system and implementation (Behera & Dhal, 2020). In the current study, the researcher has adopted e-commerce usage as technology adoption through DOI understanding of pertaining studies.

Research Framework

In Figure 1, shown below, the research framework is proposed to represent the hypotheses relationship among variables. The research framework contains five independent variables, which categorize into three primary perspectives: organizational, technological, and environmental. These align with the TOE model (Technology-Organization-Environment), which was widely used in research. E-commerce usage is the dependent variable being a study in this research. Based on the indicated variables, the research framework was connecting the independent variables and dependent variables, as illustrated below.

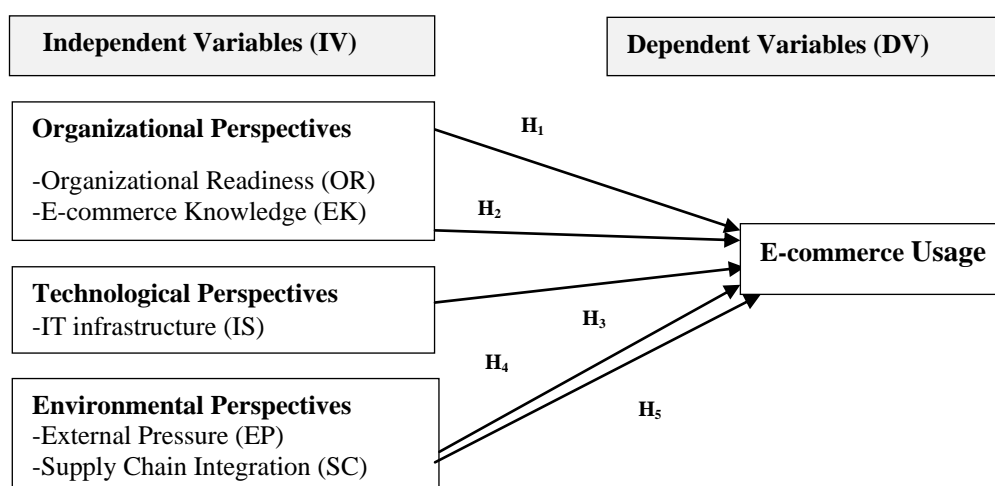


Figure 1: Theoretical Framework Propose and Hypotheses Relationship

The hypotheses regarding the proposed framework can be developed to examine the relationship between independent variables and dependent variables. The hypotheses extract from three perspectives, namely, organizational, technological, and environmental perspectives, are elaborated below.

H₁: Organizational readiness has a significant positive impact on e-commerce usage.

H₂: E-commerce knowledge has a significant positive impact on e-commerce usage.

H₃: IT infrastructure has a significant positive impact on e-commerce usage.

H₄: The external pressure has a significant positive impact on e-commerce usage.

H₅: Supply chain integration has a significant positive impact on e-commerce usage.

METHODOLOGY

Data Collection

The data were constructed from a total of 100 respondents who participated in the surveys for this study. The questionnaires were distributed around healthcare industry players in Peninsular Malaysia, namely doctors, management, medical assistants, nurses, and also medical suppliers, by using Google Forms format. The demographic segregation based on gender, age range, education level, and position in the healthcare industry ([Saulat, Zeeshan, Hussain, & Rehman](#)). The questionnaire response is using five Likert Scales to determine respondent's feedback on the questions given, particularly the impact of e-commerce usage in the Malaysian healthcare industry. From 100 respondents, 55 of them are female while the remaining 45 are male. The largest age range of respondent who took part in this survey is from age 20-29 years old with 35 respondents. Meanwhile, the smallest age range of respondents is 60 years and above. Based on the education level, most respondents are degree holders, with 36% of respondents followed by diploma holders, with 28% of respondents. From 100 respondents, 55 of them are female while the remaining 45 are male. The largest age range of respondent who took part in this survey is from age 20-29 years old with 35 respondents. Meanwhile, the smallest age range of respondents is 60 years and above. Based on the education level, most respondents are degree holders, with 36% of respondents followed by diploma holders, with 28% of respondents.

Data Analysis

There are five independent variables items together, namely, organization readiness, e-commerce knowledge, IT infrastructure, external pressure, and supply chain integration. The dependent variables are the e-commerce usage. The impact of e-commerce usage in the healthcare industry has been analyzed on three perspectives, which are the organizational, technological, and environmental, which practically uses the TOE model. The data is analyzed using SmartPLS 3.0 software. It aims to test the PLS-SEM Path Model due to e-commerce usage. The correlation technique is used to investigate the relationship between two quantitative and continuous variables to evaluate the hypotheses. Statistical methods of analysis were used to provide an essential contribution to the impact of e-commerce usage in the Malaysian healthcare industry. One hundred respondents from various organizations working in the healthcare industry in Peninsular Malaysia are taking part in this survey. Statistical Package for Social Sciences 25 (SPSS 25) and SmartPLS 3.0 software used to analyze the survey data. The discussion of research findings will be based on research objectives and hypotheses that been identified earlier. The questionnaire response is using five Likert Scales to determine respondent's feedback on the questions given, particularly the impact of e-commerce usage in the Malaysian healthcare industry.

Assessment of PLS-SEM Path Model Results

In this study, multivariate techniques comprising confirmatory factors analysis and multiple regression were used through the application of Partial Least Square and Structural Equation Modeling (PLS-SEM). This is done through the use of SmartPLS 3.0 software ([Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014](#)). Thus, the two-step process was adopted in the current study to examine and report the results finding from PLS-SEM as being suggested by ([Hair Jr et al., 2014](#)). Figure 3 shows a two-step process, which includes the assessment of the measurement model as the first step and the assessment of the structural model as the second step of analysis ([Hair Jr et al., 2014](#)). The outer model was used to measure the reliability and validity of the construct ([Altaf & Shahzad, 2018](#)). After the data being screened, then both the outer model (measurement model) and the inner model (structural model) have been assessed using PLS-SEM 3.0 ([Jr, Hult, Ringle, & Sarstedt, 2016](#)). Before analysis takes place, the model is configured to be reflective. This is essential as testing of the reflective model is different from the formative measurement model ([Jr et al., 2016](#)).

Assessment of Measurement Model

In analyzing the data using the PLS-SEM model, the first criteria that need to be taken care of are assessing the measurement model it is also called an outer model. The measurement model indicates how the item been load theoretically and associated with the respective constructs. Hence, it ensures the reliability and validity of constructs. The outer model can be measured in two terms, such as evaluating the reliability of individual items, either by indicator reliability using composite reliability (CR) or by internal consistency and using average variance extracted (AVE) discriminant validity using outer indicator loadings a Fornell Larcker criterion.

The Individual Items Reliability

In the evaluation model, the model of measurement starts by analyzing the reliability of individual items. Hence, the cross-loading of all construct items in the variables is examined to identify any problems which serve as a pre-requisite for the measurement model. As of that, the validity and reliability of the measurement model are interpreted. Besides, [Vinzi et al. \(2010\)](#) indicate that the average variance extracted (AVE) should be more than 0.50. Items with a value of less than 0.50 should be deleted to improve data quality ([Hair et al., 2014](#)). In this study, the AVE values for each construct items are

above 0.5. E-commerce usage indicates a value of 0.522. The value of e-commerce knowledge is 0.541; the external pressure is 0.578, the IT infrastructure is 0.663, the supply chain integration is 0.572, and the organizational readiness is 0.622.

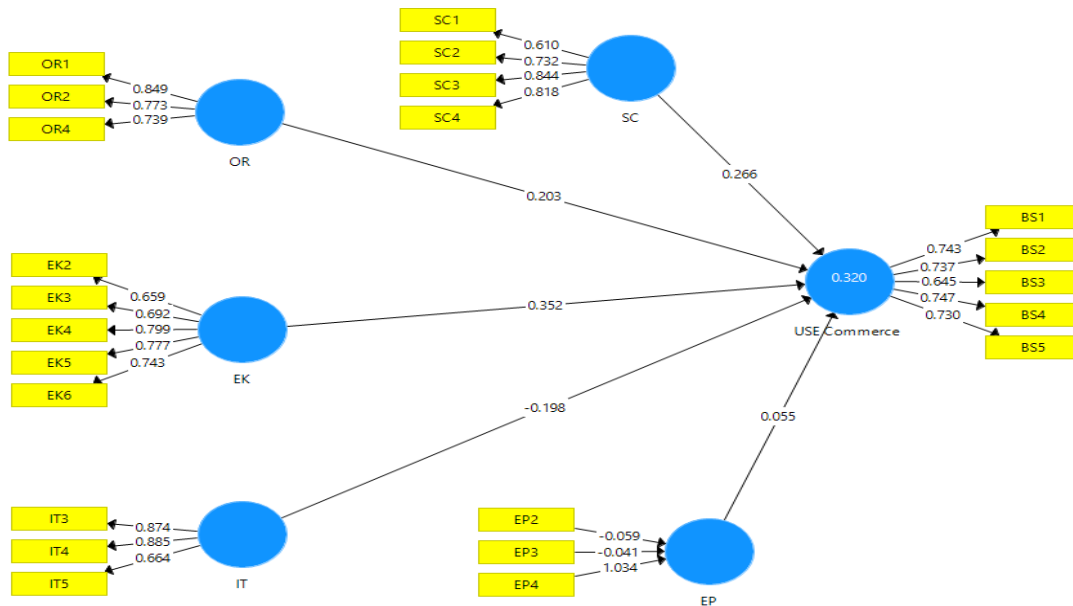


Figure 2: The Assessment Measurements

Table 1: Indicator Loadings, Internal Consistency Reliability, and Convergent Validity

Construct	Item	Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
USE Ecommerce	BS1	0.934	0.845	0.522
	BS2	0.938		
	BS3	0.943		
	BS4	0.940		
	BS5	0.925		
EK	EK2	0.923	0.854	0.541
	EK3	0.872		
	EK4	0.894		
	EK5	0.897		
	EK6	0.944		
EP	EP2	0.922	0.798	0.578
	EP3	0.947		
	EP4	0.942		
IT	IT3	0.913	0.853	0.663
	IT4	0.838		
	IT5	0.914		
OR	OR1	0.928	0.831	0.622
	OR2	0.925		
	OR4	0.875		
SC	SC1	0.840	0.841	0.572
	SC2	0.866		
	SC3	0.946		
	SC4	0.889		

Discriminant Validity

The discriminant validity being measure by using AVE as predicted by [Fornell and Larcker \(1981\)](#) to verify the external consistency of the model. The discriminant validity can be calculated by having a correlation comparison between latent variables and the square root of AVE. It was recommended that the value of discriminant validity, which is a square root of AVE greater than the latent variables, indicates. The value of the average variance extracted should be within the score value of 0.50 or more ([Fornell and Larcker, 1981](#)). In this study, the discriminant validity matrix for EK is 0.736; EP is 0.760, IT is 0.814, OR is 0.788, SC is 0.756 while the value of USE Commerce is 0.722. This indicates how important the

discriminant validity matrix for this study. In Table 2 and Table 3: showed the result of the discriminant validity matrix and cross-loadings.

Table 2: Discriminant Validity Matrix

	EK	EP	IT	OR	SC	USE Commerce
EK	0.736					
EP	0.392	0.760				
IT	0.538	0.514	0.814			
OR	0.289	0.258	0.399	0.788		
SC	0.493	0.524	0.510	0.429	0.756	
USE Commerce	0.452	0.225	0.234	0.352	0.448	0.722

Table 3: Cross Loadings

Item	USE Commerce	EK	EP	IT	OR	SC
BS1	0.73	0.387	0.303	0.094	0.307	0.382
BS2	0.738	0.232	0.142	0.189	0.229	0.342
BS3	0.647	0.216	0.081	0.079	0.205	0.240
BS4	0.753	0.482	0.171	0.301	0.290	0.316
BS5	0.74	0.216	0.029	0.161	0.199	0.311
EK2	0.323	0.659	0.304	0.336	0.256	0.370
EK3	0.267	0.692	0.181	0.405	0.169	0.396
EK4	0.402	0.799	0.319	0.440	0.343	0.457
EK5	0.359	0.777	0.292	0.369	0.133	0.308
EK6	0.283	0.743	0.334	0.437	0.125	0.270
EP2	0.058	0.221	0.559	0.275	0.104	0.277
EP3	0.108	0.307	0.751	0.451	0.178	0.473
EP4	0.25	0.357	0.925	0.450	0.256	0.455
IT3	0.223	0.496	0.436	0.874	0.447	0.511
IT4	0.212	0.434	0.502	0.884	0.376	0.395
IT5	0.104	0.385	0.271	0.665	0.008	0.316
OR1	0.321	0.397	0.308	0.397	0.848	0.414
OR2	0.253	0.115	0.049	0.217	0.775	0.273
OR4	0.25	0.128	0.229	0.314	0.738	0.312
SC1	0.185	0.275	0.381	0.496	0.389	0.610
SC2	0.266	0.361	0.362	0.505	0.389	0.732
SC3	0.421	0.371	0.468	0.366	0.228	0.844
SC4	0.403	0.463	0.387	0.313	0.382	0.818

Assessment of Structural Model

An assessment of the structural model (inner model) is evaluated on a direct relationship model. The analysis of the structural equation using PLS gives the value of path coefficients and t-values. When the value of the t-value is greater than 1.64, it can be signified as significant, which can be used for hypothesis proposing. Out of the five hypotheses proposed in this study through a direct relationship, two of them were not supported. The Figure below indicates the generated results which were run by using SmartPLS 3.2.6. Figure 3 illustrates the p-value path, t-value, coefficient value, and the standard errors.

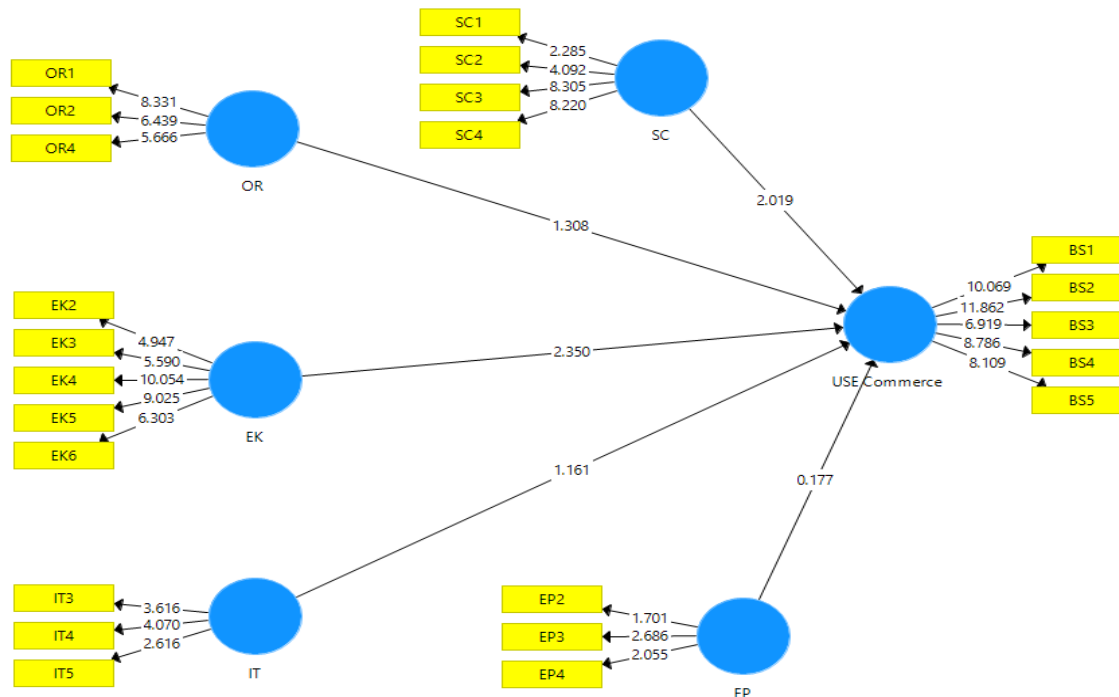


Figure 3: Results of Hypotheses Testing (Direct Effects)

Hypotheses Testing Results

In this study, three hypotheses are being supported out of five hypotheses being discussed. There is organization readiness with p-value = 0.096, e-commerce knowledge with p-value = 0.009 and supply chain integration with p-value = 0.022. The supported hypotheses are H₁: Organizational readiness significantly explains the e-commerce usage as in the high literature level of organizational readiness is associated with the e-commerce adoption, and there is a significant and positive correlation between e-commerce usage and organizational readiness in Malaysian SMEs (Shah Alam, Ali, & Mohd. Jani, 2011) and H₂: E-commerce knowledge significantly explains the use of e-commerce, which is also supported by (Teo et al., 2006). The researcher explained that e-commerce knowledge has a significant positive effect on e-commerce adoption in business. Besides, Chang and Wong (2004) and Hassan, R., Marimuthu, M., & Kaur Johl, S. (2016) stated that organizations with competence experts tend to have better business performance and findings are similar to (Hassan, R., Marimuthu, M., & Kaur Johl, S. 2015; Hassan, R., Marimuthu, M., & Kaur Johl, S. 2015a). Likewise, H₃: The supply chain integration significantly explains e-commerce usage. The results are consistent as in the previous studies, the use of the Enterprise Resource Planning (ERP) system is beneficial to improve service provided to patients and contribute to the modernization of the supply chain process through the intelligence reporting system (Ygal Bendavid, 2010). In the current study, the use of e-commerce is consistent with supply chain integration significantly. The hypotheses which are not supported with e-commerce usage are IT infrastructure and external pressure with 0.123 p-values and 0.43, respectively. The possible reason for the insignificant relation of IT infrastructure with e-commerce usage is that increased technology infrastructure various complexed processes introduced like payment methods, financial transactions (Govinnage & Sachitra, 2019). Moreover, It is surprising that even in SMEs, the owner and CEO behave neutrally in terms of external pressure impact on e-commerce adoption (Lip-Sam & Hock-Eam, 2011). Similarly, the external pressure effect in the health care industry of Malaysia is not influencing significantly.

Table 4: Hypotheses Testing Results

No	Hypothesized Path	Path coefficient	Standard Error (STERR)	T Value	P-Value	Decision
1	EK → USE Commerce	0.354	0.151	2.350	0.009	Supported
2	EP → USE Commerce	-0.031	0.176	0.177	0.430	Not Supported
3	IT → USE Commerce	-0.169	0.145	1.161	0.123	Not Supported
4	OR → USE Commerce	0.201	0.154	1.308	0.096	Supported
5	SC → USE Commerce	0.290	0.143	2.019	0.022	Supported

DISCUSSION AND CONCLUSION

This division of the research discussed the outcomes of the study and also found that overall findings are aligned with the objectives. The purpose of this current study was to provide information about the impact of e-commerce usage in the Malaysian healthcare industry. In this study, the independent variables (organization readiness, e-commerce knowledge,

IT infrastructure, external pressure, and supply chain integration) are investigated with the relationship dependent variables (e-commerce usage). Upon analyzing, to determine the significant relationship between the variables using PLS-SEM 3.0, the hypotheses tested show the results of the relationship.

A total of five hypotheses were stated and been formulated according to the research questions, which developed from the problem statement. The statistical analysis was done by using SPSS and PLS-SEM 3.0 to investigate the hypotheses. The purpose of the study is to study the impact of e-commerce usage in the Malaysian healthcare industry. Five independent variables are chosen to be tested to study the effect on the dependent variables. The independent variables then, being segregated to three perspectives, following the TOE framework, which is Technological, Organizational, and Environmental Perspectives. Out of the five hypotheses tested, only three of them were supported. Precisely, the hypotheses related to IT infrastructure and external pressure was not supported. In our study, the results are contrary to what expected to pertain to external pressure ([Grandon & Pearson, 2004](#)). Also, the literature reveals that within industry pressure (competitive pressure) is a more significant relationship with e-commerce usage as compared to the external pressure of the industry.

The benefits obtained from this study can be used to empower e-commerce usage in the healthcare industry so that it will enhance the quality of services. By measuring the variables indicate in the study, it shows that the variables are beneficial in today's healthcare industry. Government, hospital management, doctors, academic researchers, entrepreneurs, and many more will benefit from the implementation of e-commerce in the healthcare industry in terms of advancing the business performance and operation.

In addition, it helps the healthcare provider to fully understand the needs of having e-commerce in the healthcare industry. Also, its benefits management and healthcare provider to utilize the supported variables such as organization readiness, electronic commerce knowledge, and supply chain integration which then supported electronic commerce usage. It is consistent with the previous literature because e-adoption is affected by supply market structure and electronic market information ([Bakker, Harland, Knight, & Zheng, 2008](#)). In the border perspective, it helps the healthcare provider to be more alert with the technology advancement, which changed the orientation of the healthcare industry. Due to the aggressiveness of e-commerce in changing the reality of the healthcare industry, management could pay extra attention to configure, allocate, and integrate the information technology systems in the organization ([Hasanat et al., 2020](#)). Additionally, the lesson learns from the findings of the current study that the adoption of new technology in the healthcare industry has an excellent opportunity in the near future. After the COVID-19, It will consider as an essential part of the process to improve efficiency and to achieve targets.

LIMITATION OF STUDY & FUTURE RECOMMENDATION

Although the descriptive research had revealed some interesting results upon the investigation on the data analysis, still, several limitations take place in this study such as the population of samples was limited to 100 random selection of respondents who are working in the healthcare industry in Peninsular Malaysia only to gather the whole scenario in e-commerce usage in the healthcare industry in Malaysia. Also, the healthcare industry in Malaysia is far advanced compared to other developing countries; not all of the peoples under the healthcare roof have full exposure to used e-commerce in their job scopes. Likewise, the advancement of technology had been helping in the healthcare industry; still, the experienced doctors or so-called veteran doctors prefer to use the conventional method to treat patients. Lastly, some of the respondents are not familiar with the design of the questionnaires proposed. The restriction time that healthcare provider has may be a reason that they answer the questions randomly and improper.

The study has been conducted using selected samples from the populations to provide glaring pictures on factors that will be impacted due to e-commerce usage in the healthcare industry. Ultimately, the study recommends investigating the factors that affect e-commerce usage in the healthcare industry. This study provides the integration of technology resources and its deployment of an e-commerce environment to achieve better outcomes.

Management plays a vital part in determining the implementation of e-commerce in the organization. This acquires the needs of an organization to be more focused on business strategy and invest in the technology itself for better outcomes. It is a concern that e-commerce not only about the transaction; it also helps in the marketing operation and business process via the internet. Thus, in the future study, it is recommended that organizations may grasp the opportunity to study the impact of the hospital e-commerce system in the business strategy.

ACKNOWLEDGMENT

We would like to pay to thank you to the reviewers for their valuable reviews of the manuscripts. The highlighted issues helped improve the quality of the paper. Also, we would like to thank UUM for the support and growing culture of the research.

AUTHORS CONTRIBUTION

Conceptualization (Nor Izani Abdullah & Arfan Shahzad); methodology (Arfan Shahzad & Rohail Hassan); software (Arfan Shahzad & Rohail Hassan); validation (Nor Izani Abdullah & Arfan Shahzad); formal analysis (Arfan Shahzad & Rohail Hassan); investigation (Nor Izani Abdullah); resources (Arfan Shahzad & Rohail Hassan); data curation (Nor Izani

Abdullah); writing—original draft preparation (Nor Izani Abdullah Arfan Shahzad & Rohail Hassan); writing—review and editing (Arsalan Hussain & Muhammad Fareed); visualization (Arsalan Hussain & Muhammad Fareed); supervision (Arfan Shahzad & Rohail Hassan); project administration (Arsalan Hussain & Muhammad Fareed); funding acquisition (Nor Izani Abdullah Arfan Shahzad & Rohail Hassan).

REFERENCES

1. Abebe, M. (2014). Electronic commerce adoption, entrepreneurial orientation and small-and medium-sized enterprise (SME) performance. *Journal of small business and enterprise development*, 21(1), 100-116. <https://doi.org/10.1108/JSBED-10-2013-0145>
2. Aggarwal, A. K., & Travers, S. (2001). E-commerce in Healthcare: changing the traditional landscape. *Technology*, 2, B2C.
3. Ahmer, Z. (2013). Adoption of human resource information systems innovation in Pakistani organizations. *Journal of Quality and Technology Management*, 9(2), 22-50.
4. Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
5. Al-Refaie, A., & Ramadna, A. M. (2020). Barriers to E-Government Adoption in Jordanian Organizations from Users' and Employees' Perspectives. In *Open Government: Concepts, Methodologies, Tools, and Applications* (pp. 2190-2210): IGI Global. <https://doi.org/10.4018/978-1-5225-9860-2.ch100>
6. Altaf, M., & Shahzad, A. (2018). "That's my job" Exploring the effect of brand empowerment towards employee brand equity: The mediating role of employee critical psychological states. *Revista Brasileira de Gestão de Negócios*, 20(4), 599-618. <https://doi.org/10.7819/rbgn.v0i0.3952>
7. Amin, N. A. N., Almunawar, M. N., Hasnan, A. S., & Besar, N. N. (2020). The Utilization of Web 2.0 for Knowledge Sharing: The Case of Tertiary Education in Brunei Darussalam. In *Handbook of Research on Managerial Practices and Disruptive Innovation in Asia* (pp. 1-25): IGI Global. <https://doi.org/10.4018/978-1-7998-0357-7.ch001>
8. Aremu, A. Y., Shahzad, A., & Hassan, S. (2019). The Empirical Evidence of Enterprise Resource Planning System Adoption and Implementation on Firm's Performance Among Medium-sized Enterprises. *Global Business Review*, 0972150919849751. <https://doi.org/10.1177/0972150919849751>
9. Baker, E., & Solak, S. (2011). Climate change and optimal energy technology R&D policy. *European Journal of Operational Research*, 213(2), 442-454. <https://doi.org/10.1016/j.ejor.2011.03.046>
10. Bakker, Harland, Knight, & Zheng. (2008). Putting e-commerce adoption in a supply chain context. *International Journal of Operations & Production Management*, 28(4), 313. <https://doi.org/10.1108/01443570810861543>
11. Behera, R. K., & Dhal, S. K. (2020). A Meta-Analysis of Impact of ERP Implementation. In *Advances in Data Science and Management* (pp. 123-135): Springer. https://doi.org/10.1007/978-981-15-0978-0_12
12. Boore, C., James, N. M., & Iraki, X. (2017). Strategic issues in e-Health implementation in developing countries: The Kenyan healthcare sector. *Global Scientific Journals*, 5(7), 50-62.
13. Chang, E. C., & Wong, S. M. (2004). Political control and performance in China's listed firms. *Journal of Comparative Economics*, 32(4), 617-636. <https://doi.org/10.1016/j.jce.2004.08.001>
14. Chee, L. F. L., & Yazdanifard, R. (2011). Ecommerce's Important Role in the Medical Sector. *Information Communication and Management--International Proceedings of Computer Science and Information Technology*.
15. Cohen, J. (2020). The coronavirus seems unstoppable. What should the world do now? Retrieved from <https://doi.org/10.1126/science.abb4604>
16. Depietro, R., Wiarda, E., & Fleischer, M. (1990). The context for change: Organization, technology and environment. *The processes of technological innovation*, 199(0), 151-175.
17. Enright, G. (1998). E-commerce expected to grow by up to 500 per cent: Study. *Computing Canada*, 24(23), 4-4.
18. Fishbein, M., & Ajzen, I. (1980). Understanding attitudes and predicting social behavior.
19. Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. <https://doi.org/10.1177/002224378101800313>
20. Govinnage, D., & Sachitra, K. (2019). Factors Affecting E-commerce Adoption of Small and Medium Enterprises in Sri Lanka: Evidence from Retail Sector. *Asian Journal of Advanced Research and Reports*, 1-10. <https://doi.org/10.9734/ajarr/2019/v6i230147>
21. Grandon, E. E., & Pearson, J. M. (2004). Electronic commerce adoption: an empirical study of small and medium US businesses. *Information & management*, 42(1), 197-216. <https://doi.org/10.1016/j.im.2003.12.010>
22. Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM). *European Business Review*. <https://doi.org/10.1108/EBR-10-2013-0128>
23. Haque, A., Sadeghzadeh, J., & Khatibi, A. (2006). Identifying potentiality online sales in Malaysia: A study on customer relationships online shopping. *Journal of Applied Business Research (JABR)*, 22(4). <https://doi.org/10.19030/jabr.v22i4.1420>
24. Hashim, N. A. (2006). E-commerce adoption issues in Malaysian SMES. <http://www.icoec.my/index.php/proceedings/9-icoec-2006-proceedings>
25. Hasanat, M. W., Hoque, A., Shikha, F. A., Anwar, M., Hamid, A. B. A., & Tat, H. H. (2020). The Impact of Coronavirus (Covid-19) on E-Business in Malaysia. *Asian Journal of Multidisciplinary Studies*, 3(1), 85-90.

26. Hassan, R., & Marimuthu, M. (2018). Contextualizing comprehensive board diversity and firm financial performance: Integrating market, management and shareholder's perspective. *Journal of Management & Organization*, 24(5), 634-678. <https://doi.org/10.1017/jmo.2018.10>
27. Hassan, R., Marimuthu, M., & Kaur Johl, S. (2016). Women on boards and market performance: An exploratory study on the listed companies. <https://doi.org/10.36478/ibm.2016.84.91>
28. Hassan, R., Marimuthu, M., & Johl, S. K. (2015, August). Demographic diversity and firm value: A review on large companies using panel data approach. In *2015 International Symposium on Technology Management and Emerging Technologies (ISTMET)* (pp. 197-201). IEEE. <https://doi.org/10.1109/ISTMET.2015.7359028>
29. Hassan, R., Marimuthu, M., & Johl, S. K. (2015a). Ethnic diversity on boards and market performance: An empirical investigation in Malaysia. *Advanced Science Letters*, 21(5), 1099-1103. <https://doi.org/10.1166/asl.2015.6036>
30. Jehangir, M., Dominic, P., Naseebullah, N., & Khan, A. (2011). Towards digital economy: the development of ICT and e-commerce in Malaysia. *Modern Applied Science*, 5(2), p171. <https://doi.org/10.5539/mas.v5n2p171>
31. Jr, H., Hult, Ringle, & Sarstedt. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*: Sage publications.
32. Lee, S., Nam, Y., Lee, S., & Son, H. (2016). Determinants of ICT innovations: A cross-country empirical study. *Technological Forecasting and Social Change*, 110, 71-77. <https://doi.org/10.1016/j.techfore.2015.11.010>
33. Lip-Sam, T., & Hock-Eam, L. (2011). Estimating the determinants of B2B e-commerce adoption among small & medium enterprises. *International Journal of Business & Society*, 12(1).
34. Luong, N. A. M., & Wang, L. (2019). Factors Influencing E-commerce Usage within Internationalisation: A study of Swedish small and medium-sized fashion retailers. In
35. Monem, A. A. (2016). An empirical study of the MIS impacts and organizational efforts on improving business performance. In *Communication, Management and Information Technology* (pp. 25-30): CRC Press.
36. Onn, L. P. (2015). What Lies Ahead for Malaysian Healthcare? <https://www.think-asia.org/handle/11540/6715>
37. Rogers, E. M. (2003). *Diffusion of Innovation*, 5th edn London. UK: Free Press.
38. Saulat, A., Zeeshan, M., Hussain, A., & Rehman, S. U. An Exploratory Study of Married Working Women, Work-Life Balance; Problems and Solutions.
39. Shah Alam, S., Ali, M. Y., & Mohd. Jani, M. F. (2011). An empirical study of factors affecting electronic commerce adoption among SMEs in Malaysia. *Journal of business economics and management*, 12(2), 375-399. <https://doi.org/10.3846/16111699.2011.576749>
40. Shahzad, A., Chin, H. K., Altaf, M., & Bajwa, F. A. (2020). Malaysian SME's performance and the use of e-commerce: A multi-group analysis of click-and-mortar and pure-play e-retailers. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 14(1), 1-33. <http://hdl.handle.net/10419/216862>
41. Sheikh, A. A., Rana, N. A., Inam, A., Shahzad, A., & Awan, H. M. (2018). Is e-marketing a source of sustainable business performance? Predicting the role of top management support with various interaction factors. *Cogent Business & Management*, 5(1), 1516487. <https://doi.org/10.1080/23311975.2018.1516487>
42. Shin, N. (2001). Strategies for competitive advantage in electronic commerce. *J. Electron. Commerce Res.*, 2(4), 164-171.
43. Sila, I. (2013). Factors affecting the adoption of B2B e-commerce technologies. *Electronic commerce research*, 13(2), 199-236. <https://doi.org/10.1007/s10660-013-9110-7>
44. Smith, M. D., & Bailey, J. (2000). Understanding Digital Markets: Review and Assessment. E. Brynjolfsson, B. Kahin, eds. *Understanding the Digital Economy*. In: MIT Press, Cambridge, MA.
45. Teo, T. S., Ranganathan, C., & Dhaliwal, J. (2006). Key dimensions of inhibitors for the deployment of web-based business-to-business electronic commerce. *IEEE Transactions on engineering management*, 53(3), 395-411. <https://doi.org/10.1109/TEM.2006.878106>
46. Today, H. L. (2020). Uncharted territory: Legal experts weigh in on the COVID-19 outbreak. Retrieved from <https://today.law.harvard.edu/roundup/uncharted-territory-legal-experts-weigh-in-on-the-covid-19-outbreak/>
47. Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). *Processes of technological innovation*. Lexington books.
48. Udayai, K., & Kumar, P. (2013). Innovation in Healthcare Marketing Strategies in India: Learning from Non Healthcare Industry. *Innovative Journal of Business and Management*, 2(1), 22-25.
49. Villa, E., Ruiz, L., Valencia, A., & Picón, E. (2018). Electronic commerce: factors involved in its adoption from a bibliometric analysis. *Journal of theoretical and applied electronic commerce research*, 13(1), 39-70. <https://doi.org/10.4067/S0718-18762018000100104>