The Relationship between the Frequency of Technology Use and Electronic Commerce Adoption among Small and Medium-Sized Enterprises in Kuwait

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ABSTRACT

Manuscript type: Research paper
Research aims: This study aims to investigate the determinants of SMEs' e-commerce adoption as well as technological, organisational, and environmental characteristics in Kuwait. Moreover, it aims to study the effect of the frequency of technology use as a moderator in SMEs' e-commerce adoption.
Design/Methodology/Approach: A questionnaire-based survey was conducted among 259 SMEs.
Research findings: The results demonstrate a positive relationship between relative advantage, competitive pressure, and e-commerce adoption. Analysis of the level of technology use as a moderator reveals a significant difference in terms of the impact of compatibility, complexity, and supplier or customer pressure on e-commerce adoption.
Theoretical contribution/originality: This study may be the first to assess the moderating role of the frequency of technology use in the context of SMEs' e-commerce adoption.

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Research limitation/implications: The paper contributes to e-commerce adoption research by highlighting the main influencing factors, identifying several important interactions based on the frequency of technology use, and recognising many practical implications for SME managers.

Keywords: E-commerce adoption, Frequency of technology use, Kuwait, SMEs, TOE
JEL classification: M10, M15, M31

1. Introduction

In recent years, e-commerce has been one of the most popular trends in business due to its potential benefits, in particular for SMEs businesses. The use of e-commerce offers many opportunities for enterprises to make critical contribution to the overall improvement of performance through the reduction of costs and improvement of operational efficiency in the delivery of products and services (Khoo et al., 2018). E-commerce also supports profitable business relationships, increases the interaction between customers and suppliers, improves the internal business efficiency, encourages the emergence of new products and services, enhances customers' satisfaction, enables fast processing of transactions, and increases sales performance (Choshin & Ghaffari, 2017; Grandón & Ramírez-Correa, 2018; Voola et al., 2012).

Moreover, the emergence of the current COVID-19 pandemic has resulted in many businesses including SMEs ceasing operations and declaring bankruptcy, as consumers remain at home and economies shut down (Tucker, 2020). As a result of the shutdowns, there is a drastic increase in Internet and social media use (Donthu & Gustafsson, 2020). During the COVID-19 pandemic, consumer purchasing behaviour and the demand for e-commerce activities have changed dramatically (Hasanat et al., 2020). Due to the unavailability of products and services in various outlets and stores, customers have become mainly dependent on e-commerce platforms to meet the basic needs necessary for survival and it is expected that many will continue to buy through digital markets even after the restrictions cease (Hasanat et al, 2020). This development in customer buying habits has added momentum to the importance of e-commerce technology to enhance business operations of SMEs and create a significant opportunity to efficiently deliver products and services where direct communication is difficult or restricted, such as

during the spread of COVID-19 (Akpan et al., 2020). The COVID-19 outbreak has provided an opportunity for SMEs to innovate new ways of doing business through the use of e-commerce technology that will help them generate new revenues and profits.

Despite the comparative advantage of the e-commerce system, the adoption of e-commerce among SMEs in developing countries remains limited (Hamad et al., 2018). This is due to the many challenges that confront SMEs in developing countries compared to developed countries, such as limited financial resources, lack of infrastructure, lack of basic information technology (IT) knowledge and skills among people, and pressure from competition (Verdugo, 2019; Arawwawala & Gunawardena, 2017). Other issues that account for e-commerce resistance among owners of SMEs include incompatibility between e-commerce and current work and complexity involved in the adoption of e-commerce technology (Abualrob & Kang, 2016). Coherently, this may affect SMEs in their competitiveness and eventual survival of these countries. While focusing on these factors may be useful for comparing SMEs in developing and developed countries, the reliance of SMEs on e-commerce in developing countries differs significantly from that of developed countries, and the results cannot be generalised (Govinnage & Sachitra, 2019).

Kuwait is considered as one of the first countries to permit the use and enable public access to the Internet, and a top mover in the Networked Readiness Index according to the World Economic Forum (2016). According to the Kuwaiti Central Agency for Information Technology (CAIT), 83 per cent of companies have used the Internet (32% have used Internet business over the last 12 months). About 45 per cent of companies use mobile broadband to access the Internet and 32 per cent use ADSL or DSL services. The Kuwaiti government can proffer national initiatives to motivate the owners or managers of SMEs to embrace technology by building a powerful financial system to help and promote long-term economic diversification in Kuwait (World Bank, 2016). However, despite these efforts, the adoption of e-commerce as a medium for doing business is minimal and they still use traditional and/or outdated low-level technology in managing their business transactions (International Trade Administration, 2017).

In a study by Al-Fadhli (2011), only 28 per cent of the firms in Kuwait use the Internet as a tool for conducting business operations. Issues such as the lack of knowledge and awareness about how

to invest in e-commerce and the benefits of such a system to their business, and also the lack of technical infrastructure in the IT systems are related to the use and adoption of e-commerce practices in SMEs in Kuwait (Al-Alawi & Al-Ali, 2015). Therefore, addressing these issues is crucial in Kuwait. In addition, the crucial factors that affect the adoption of e-commerce by SMEs appear to be unclear in this part of the world until now. Hence, there is the need for further investigation in this field of research (Al-Alawi & Al-Ali, 2015).

Therefore, this paper aims to study the factors that may affect the adoption of e-commerce in SMEs in Kuwait. Identifying the factors that affect the adoption of e-commerce among SMEs in Kuwait will not only allow the prediction of the use of e-commerce but also allow assessment of their future growth. Perhaps, defining the technological features of e-commerce, the organisational and environmental (TOE) characteristics of SMEs as well as the influence of the frequency of technology use as a moderator may lead to the successful adoption and use of e-commerce by SMEs, and thus implicitly, boost the economic growth in Kuwait. While the prevailing body of literature indicates that successful e-commerce adoption depends not only on the technology and organisational resources of the organisations, this effect depends on the extent to which the technology is used (Ilin et al., 2017; Rahayu & Day, 2015; Lip-Sam & Hock-Eam, 2011; Venkatesh et al., 2012). It has been found that SMEs with experienced managers who use computers frequently which represents their confidence in IT technology are more likely to embrace high usage of e-commerce (Lip-Sam & Hock-Eam, 2011). Likewise, managers or owners who use less technology tend to be less likely to adopt e-commerce and thus, fewer positive perceptions about the impact of TOE factors on the adoption decision. Ramayah et al. (2016) claimed that organisational, technological, and environmental characteristics can promote the SMEs' website's continuance intention depending on the use of the existing website. Based on the above, the researchers in the present study argue that the effect of TOE characteristics on e-commerce adoption will be moderated by the frequency of technology use. The main goal of investigating the moderating effect of the frequency of technology use is to develop greater understanding of whether various levels of technology use influence the proposed relationships. To the researchers' knowledge, no studies have been conducted on the adoption of e-commerce among SMEs based on levels of technology use as a moderator variable.

The remaining study is organised as follows. Section 2 reviews the relevant literature, whilst Section 3 explains on the conceptual

model. Section 4 discusses the research methodology used, and the justifications for this method. Section 5 and 6 present the findings and discuss the results. Section 7 highlights the implications of this study towards theory and practice.

2. Literature Review

2.1 Theoretical Background

The TOE framework and Diffusion of Innovation (DOI) theory have been widely used as frameworks in studying e-commerce adoption in different countries and have found consistent empirical support (Allbabidi, 2021; Huy et al., 2012; Ilin et al., 2017;). Specifically, these theories have been used in prior empirical research due to their popularity in literature and they have been found to provide a broad understanding of the adoption of new technology such as e-commerce (Qashou & Saleh, 2018; Khoo et al., 2018). Voola et al. (2012) conceptualised e-commerce adoption as a complex and pervasive technology that includes the transmission of information, goods, services, and payments. The DOI model visualises factors that inhibit and/or reinforce personal factors, the characteristics of innovation (such as relative advantage, compatibility, observability, and trialability, complexity), and contextual factors that share similarities with the TOE framework (Rogers, 1995; Walker et al., 2016). The TOE framework provides a suitable starting point for studying the adoption and usage of technology (Rahayu & Day, 2015). Several researchers have advocated combining more than one theory to understand and explain the adoption of new technological innovation (Ghobakhloo et al.,2010; Huy et al., 2012; Kurnia et al., 2015). Hence, the TOE framework complies with DOI because it focuses on the internal and external characteristics of the organisation, as well as technical characteristics as drivers for the adoption of new technology (Ahmad et al., 2014; Ghobakhloo et al., 2010; Huy et al., 2012; Ilin et al., 2017).

The TOE identifies and categorises factors intervening in the adoption based on three categories: the technological, the organisational, and the environmental contexts. All these three contexts influence the way by which technological innovation is adopted and implemented (Sanchez-Torres & Juarez-Acosta, 2019; Walker et al., 2016). The technological context describes the technology adoption factors as intended for today's use, and future use by organisations (Alrousan & Jones, 2016). Specifically,

competitive advantage, compatibility, and complexity were the top predictors for e-commerce adoption in several studies (Ahmed et al., 2014; Ghobakhloo et al., 2010; Hamad et al., 2018; Huy et al., 2012).

The organisational context describes the internal factors of an organisation that influence the adoption of technology such as the size of the company, the availability of information and communications technology (ICT), financial resources, innovativeness, awareness, and the attitude towards the use of technology (Alrousan & Jones, 2016; Rahayu & Day, 2015). Among all these organisational factors, organisational readiness and IT knowledge are widely validated as the key determinants for e-commerce adoption (Al-Bakri & Katsioloudes, 2015; Garg & Choeu, 2015; Ramayah et al., 2016).

The environmental context refers to the environment in which an organisation does business, competitors, government support, suppliers, and customers (Alrousan & Jones, 2016). It describes the factors outside the firm that can affect its business such as competitors. Pressure from the competitors and customers or suppliers are valid examples of these environmental variables that influence the adoption of e-commerce in SMEs (Ahmad et al., 2014; Ghobakhloo et al., 2010; Sanchez-Torres & Juarez-Acosta, 2019).

3. Research Model and Hypotheses

An integrative research model is shown in Figure 1. Based on the relevant empirical studies discussed above, this study assumes that SMEs are likely to consider many factors when considering adopting e-commerce. The proposed model combines the features of both theories (DOI and TOE) and includes three related contexts: (1) technological characteristics, (2) organisational characteristics, and (3) environmental characteristics. The research model is a function of seven independent variables (perceived relative advantages, perceived compatibility, and perceived complexity), organisational characteristics (organisational readiness and IT knowledge), and environmental context (supplier or customer pressure and competitive pressure), all of which are assumed to influence the same dependent variable which is the SMEs' adoption of e-commerce in Kuwait.

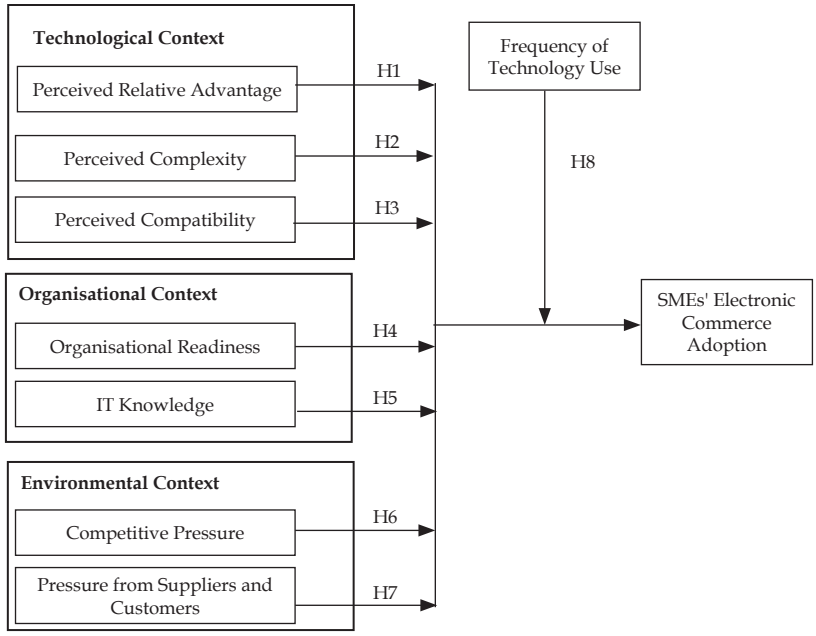

Figure 1: Research Model

3.1 *Technological Context*

3.1.1 Perceived Relative Advantage

The relative advantage reflects the expected benefits and the value that e-commerce applications can provide to a firm or an SME in comparison to other applications. Wanyoike et al. (2012) found that the advantages of employing e-commerce systems are the simplification of function, reliable connection, new goods, and services, increased productivity, reduced costs, and improved customer satisfaction. Relative advantage is one of the technical characteristics most used in e-commerce adoption studies in various contexts (Ghobakhloo & Tang, 2013; Sin et al., 2016; Ahmad et al., 2014). Alam et al. (2014), Sin et al. (2016), and Ekong et al. (2012) found that relative advantage has a significant positive effect on the adoption of e-commerce. Ghobakhloo et al. (2010) suggested that the higher the perceived benefits of e-commerce, the more likely an SME will adopt it. Consequently, this study is more interested in how the awareness of the benefits of the e-commerce system leads to a greater possibility for its adoption by SMEs, it is then hypothesised that:

H_1: Perceived relative advantage is positively related to the adoption of e-commerce by Kuwaiti SMEs.

3.1.2 Perceived Compatibility

Compatibility is the degree to which e-commerce is perceived as being consistent with the existing technology infrastructure, culture, values, and preferred work practices of the firm (Ahmad et al., 2014). Kurnia et al (2015) and Saffu et al. (2012) found that compatibility has a significant positive effect on the adoption of e-commerce. Thus, the greater the alignment of e-commerce with the values, needs, and past experiences of potential adopters of SMEs, the higher the adoption rate. With this, it is posited that:

H_2: Perceived compatibility is positively related to the adoption of e-commerce by Kuwaiti SMEs.

3.1.3 Perceived Complexity

Perceived complexity is seen as difficult to understand and to use e-commerce by SMEs', which in turn adversely impacts its adoption decision. The complexity of e-commerce adoption is a factor that mainly depends on the level of technological development in one country over another (Sanchez-Torres & Juarez-Acosta, 2019). Huy et al. (2012) and Alam et al. (2011) found that perceived complexity has a significantly negative effect on e-commerce adoption. As such, if managers see e-commerce technology as too complex and implementing it a big challenge, then they may not be inclined to embrace it (Luqman & Abdullah, 2011). The following hypothesis is:

H_3: Perceived complexity is negatively related to the adoption of e-commerce by Kuwaiti SMEs.

3.2 Organisational Context

3.2.1 Organizational Readiness

Organisational readiness reflects the necessary resources for e-commerce adoption and thus, the willingness of organisations to adopt e-commerce technologically and financially is vital. Moreover, organisational readiness was greatly affected by SMEs' adoption of e-commerce (Al-Bakri & Katsioloudes, 2015). Studies were conducted in different countries such as Indonesia, Iran, Vietnam, and Malaysia,

which showed that the organisational readiness is a critical factor for adopting e-commerce (Deriani & Kusuma, 2019; Ghobakhloo et al., 2010; Huy et al., 2012; Lim et al., 2016). As such in this research, it is expected that SMEs are more likely to adopt an e-commerce system when their organisational readiness is seen as being ready and it is then hypothesised that:

H_4: Organisational readiness is positively related to the adoption of e-commerce by Kuwaiti SMEs.

3.2.2 IT Knowledge

IT knowledge refers to a set of knowledge, skills, and capabilities of individuals, whether from internal IT or non-IT users (Ramayah et al., 2016). Specifically, SMEs with staff that possess IT expertise and skills are more likely to accept innovations. Garg and Choeu (2015) and AlBar and Hoque (2017) reported the lack of the level of ICT knowledge acts as a barrier to adopt e-commerce and doing business via the Internet. Ahmad et al. (2014) and Ramayah et al. (2016) claimed that the IT knowledge of managers plays an extremely critical role in the successful adoption of innovative practices. Consequently, this study expects that IT knowledge for managers and owners could positively influence the e-commerce adoption by SMEs and the following hypothesis is posited:

H_5: IT knowledge is positively related to the adoption of e-commerce by Kuwaiti SMEs.

3.3 Environmental Context

3.3.1 Competitive Pressure

Competitive pressure refers to the pressure in an organisation's environment that arises from threats from peers such as loss of customers to competitors as well as reduced market share (Ghobakhloo et al., 2010). As such, when competitors are already using the technology better, the company must strive to catch up with technology similar to or better than that of competitors. Several studies in different developing countries found that competitive pressure is a significant predictive factor to adopt e-commerce (Ajao et al., 2018; Al-Bakri & Katsioloudes, 2015; Lim et al., 2016; Walker et al., 2016). Kurnia et al. (2015) and AlBar and Hoque (2017) and Sin et al. (2016) also found that competitive pressure positively affects the

adoption of e-commerce by SMEs and thus, the following hypothesis is posited:

H_6: Competitive pressure is positively related to the adoption of e-commerce by Kuwaiti SMEs.

3.3.2 Pressure from Suppliers or Customers

Pressure from suppliers and customers refers to the degree to which a company or SME is pressured to adapt e-commerce due to the awareness and the culture of its customers or suppliers (Rahayu & Day, 2015) and their demand for the implementation of e-commerce in doing business (Ekong et al., 2012). In the other words, SMEs may adopt e-commerce technology due to pressure from their customers or suppliers (Sin et al., 2016; Olatokun & Kebonye, 2010). Companies may have to adopt e-commerce technology to satisfy the expectations of their customers or suppliers. Thus, pressure from customers or suppliers is expected to be positively related to the e-commerce adoption by SMEs and thus, the following hypothesis is proposed:

H_7: Pressure from suppliers or customers is positively related to the adoption of e-commerce by Kuwaiti SMEs.

3.4 The Moderating Frequency of Technology Use

The nature of the impact of TOE determinants on e-commerce adoption is likely to vary according to the frequency of technology use. Previous researchers (Davis, 1989; Grandon & Pearson, 2004) have suggested that the use of technology is an important variable that has a direct bearing on technology adoption and acceptance. Recent evidence has stated that the use of technology, especially the Internet, is the main component of e-commerce adoption (Rahayu & Day, 2015). The frequency of Internet use has had a significant and positive impact on the perceived usefulness of the technology resulting in high rates of adoption and usage (Muriithi et al., 2016). Sarosa and Zowghi (2003) and Ghobakhloo et al. (2010) suggested that a higher level of IT use by SMEs would assist in implementing new technology.

From an information system (IS) perspective, SMEs with high levels of outside expertise in the field of IS enable them to implement higher levels of technology effectively (Thong et al., 1997). Likewise, managers with higher levels of computing skills are more satisfied with implementing IS rather than those with low skills (Palvia, &

Palvia, 1997). From another point of view, SMEs with innovative owners or managers will have a better attitude towards new IT adoption (Ghobakhloo et al., 2012). As such, SMEs with high technology use is likely to embrace e-commerce compared with those SMEs with a low level of technology use. Hence, it is expected that high levels of frequency of technology use could positively amplify the possibility of e-commerce adoption among SMEs.

Building on the expanded unified theory of acceptance and use of technology, Venkatesh et al. (2012) suggested three moderators' variables for the behavioural intent of adoption of technology, which is related to ICT, such as age, gender, and experience in using the Internet. Venkatesh et al. (2003) postulated that the context of the acceptance and use of ICT differs significantly from the organisational situation, as researchers are allowed to add and remove determinants and moderator variables to suit different conditions (Munyoka & Maharaj, 2017). Ilin et al. (2017) further supported this view that managers tend to have different perceptions about the use and benefits of e-business technology; that is, the advantages of e-business technology are perceived by the adopting companies rather than not. Based on previous arguments, it suggests that there are differences between frequent technology use among firms and e-commerce adoption.

Theoretically, frequent use of technology may modify the relationship between determinants of the TOE and e-commerce adoption in several ways. First, the more frequent use of technology may be able to help users to reduce the effort spent in using different technologies, the maximum perceived benefits, and the less complex use, making them more open to embracing technology (Murrithi et al., 2016). Second, it is expected that the frequent use of technology will moderate the relationship between the organisational determinants and the adoption of e-commerce because the frequent use of technology increases the manager's knowledge of IT, knowledge management, innovation, and profitability of the SME (Valdez-Juárez et al., 2018). More so, the greater use of technology by organisations will improve the efficiency and effectiveness of their operations as well as transform existing business models (Jones et al., 2014). Furthermore, the frequency of technology use may be able to adapt to the environment toward e-commerce adoption because the frequent use of technology makes SMEs a viable response to competition and builds direct links between business, customers as well as suppliers.

Very few studies empirically examined the moderating effect of the frequent use of technology. Williams et al. (2016) found a greater understanding of the how-to effort expectancy, social impact, ease of anxiety, conditions for anticipating performance, attitude, and behavioural intentions affecting adoption of electronic government systems by including the frequency of Internet use as a moderator. Hence, in this study, it is assumed that the frequency of technology use will moderate the relationship between SMEs' adoption of e-commerce and its determinants. With this, it is posited that:

H_{8a}: The relationship between perceived relative advantage and e-commerce adoption is moderated positively by the frequency of technology used.

H_{8b}: The relationship between compatibility and e-commerce adoption is moderated positively by the frequency of technology used.

H_{8c}: The relationship between complexity and e-commerce adoption is moderated negatively by the frequency of technology used.

H_{8d}: The relationship between organisational readiness and e-commerce adoption is moderated positively by the frequency of technology used.

H_{8e}: The relationship between IT knowledge and e-commerce adoption is moderated positively by the frequency of technology used.

H_{8f}: The relationship between competitive pressure and e-commerce adoption is moderated positively by the frequency of technology used.

H_{8g}: The relationship between pressure from suppliers or customers and e-commerce adoption is moderated positively by the frequency of technology used.

4. Data and Methodology

4.1 Data Collection Procedure and Sample

The target population consists of the entire SME sector in Kuwait to enable generalisation of results across all SMEs in Kuwait. The target respondents were owners or managers of Kuwaiti SMEs who wield the ultimate decision-making authority on issues related to

e-commerce adoption and the success of the adoption depends largely on their position. Thus, the manager could be the owner or owner's representative when the owner is not directly involved in the main decision making of the day-to-day activities of the SME. The population frame was around 33,000 across different sectors, particularly in trading and services obtained from the database of the World Bank (2015). From this population, based on Krejcie and Morgan (1970), the sample size of 384 was increased to 800 samples. Then, a total of 800 surveys were sent to SME owners or managers via face-to-face interactions and online self-completion for those who have email addresses or via WhatsApp between June and October 2019. To achieve high response rates, several follow-up contacts were sent via phone calls or WhatsApp messages to respondents who did not complete their questionnaires after two weeks. Therefore, the outcome of these attempts yielded 272 returned questionnaires out of 800 questionnaires that were distributed to the target respondents. Of these 272 questionnaires, 259 were unusable for analysis.

Harman's Single-Factor Test (Podsakoff et al., 2003) was performed to confirm that there was no common method (CMB) bias in the questionnaire. The results of the analysis of non-rotated factors yielded seven distinguishing factors, explaining a cumulative of 38.83% of the variance; with the first (largest) was below the 50% threshold level, indicating the absence of the CMB in this study. About 109 (42.1%) of the SMEs engaged in the service business while 103 (39.8 %) are engaged in the retail trading business. Owners and managers manage the majority of the SMEs (40.09%). Regarding the education level, 135 (52.1%) have bachelor's degrees, followed by diplomas with a frequency of 43 (16.6%). In terms of work experience, 87 of the participants have experienced less than 5 years (33.6%). In addition, about 30.5 per cent of the SMEs have entrepreneurial experience between 5 and 10 years. In terms of firm age, 27.8 per cent of SMEs are less than 5 years old followed by 70 SMEs (27%) have a company's life above 15 years. In terms of firm size, about 121 (37.1 %) of the SMEs have an employee range of 11 and 100 while 96 of SMEs (37.1 percent) have employees less than 10. In terms of technology use, 57.9 per cent of SMEs always or often use technology in their business operations while 109 (42.7%) stated that they rarely or rarely use technology, and only 60 (23.2%) stated that they sometimes use technology. Table 1 shows the results of respondents' background information.

Table: 1 Respondents' Background Information

Demographic variable		Frequency	Percent
Business sector	Trading business	35	13.5
	Services business	109	42.1
	Manufacturing business	103	39.8
	Constructions	7	2.7
	Agriculture	5	1.9
Education qualification	Less than high school	2	0.8
	High school	24	9.3
	Diploma	43	16.6
	Bachelor's degree	135	52.1
	Postgraduate	55	21.2
Work experience	Less than 5 years	87	33.6
	5-10 years	79	30.5
	11-15 years	47	18.1
	16-20 years	19	7.3
	Above 20 years	27	10.4
SME age	Less than 5 years	72	27.8
	5-10 years	61	23.6
	11-15 years	56	21.6
	Above 15 years	70	27.0
SME size	Less than 10 employees	96	37.1
	10 to 100 employees	121	46.7
	Above 100 employees	42	16.2

4.2 Measurements

The study adopted measurements based on the previous studies relevant to the current research in the context of e-commerce adoption and the variables that affect its adoption. All the items were measured on a five-point Likert-scale, ranging from (1) strongly disagree to (5) strongly agree. Perceived relative advantage (PRA) refers to the expected benefits e-commerce applications can provide to an SME such as improvement of customer satisfaction, provision of new business opportunities or increase in revenues. PRA was measured using a 5-item statement from Wanyoike et al. (2012) and Ifinedo (2011). Perceived compatibility (PCO) refers

to the e-commerce applications that have to fit the organisational context of SMEs to enable its adoption and was measured by a 5-item statement adapted from Ekong et al. (2012) and Kurnia et al. (2015). Perceived complexity (PCX) refers to the degree to which an SME perceives the adoption of e-commerce would be complicated which was measured by PCX 4-item statement adapted from Ekong et al. (2012) and AlBar and Hoque (2017). Organisational readiness (ORD) refers to the availability of IT and organisational resources to support the e-commerce adoption in SMEs which was measured by 4-item statement adopted from Huy et al. (2012) and Kurnia et al. (2015). IT knowledge (ITK) was measured by 4-item statement which includes skills and knowledge in using e-commerce, systems implementation, and training of employees adapted from Garg and Choeu (2015) and Ekong et al. (2012). Competition pressure (COP) indicates the extent to which SMEs find themselves threatened by their counterparts within their industry or environment which was measured by with a 4-item statement, adapted from Garg and Choeu (2015) and AlBar and Hoque (2017). Supplier or customer pressure (SCP) was measured with a 4-item statement from Ekong et al. (2012) and Huy et al. (2012). E-commerce adoption (ECA) refers to the SMEs' acceptance application of the e-commerce system as modern technology which includes the provision of products, services, general information, customer order system, and payment system via website or e-mail services. ECA was measured by a 7-item statement and adapted from Voola et al. (2012).

The frequency of technology use (FTU) was based on five categories; level 0 (never use), level 1 (rare use), level 2 (sometimes), level 3 (often), and level 4 (always), which was supported by Ho et al. (2017). For the analysis, the technology use frequency was based on two levels: owners or managers of SMEs who described their level of technology use as 'always' or 'often' were classified as high technology use (level 0-2), and those who described their use of technology as 'sometimes' or 'rare use' are classified as low technology use (Level 3-4).

5. Results and Data Analysis

5.1 Assessment of Measurement Model

This paper used a structural equation model (SEM) with the PLS technique via SmartPLS 3 program for measurement analysis and the structural model. Initially, correlative viability was examined

based on the factor loadings, average variance extraction (AVE), and composite reliability (CR). By following the basic rule of retention for items with loads of 0.70 (Hair et al., 2017), it was discovered that 4 items (ECA2, PCO5, PCX4, and SCP2) were omitted because they presented loads below the threshold of 0.70 (Table 1). As shown in Table 2, the composite reliability of each latent constructs ranged from 0.854 to 0.923, with each exceeding the minimum acceptable level of 0.70. The range of AVE values, 0.614 and 0.762, showed high loads (>.50) on their constructs, indicating sufficient convergent viability.

Table 2: The Results of the Measurement Model

	Items	Factor loading	CR	AVE
Competitive pressure	COP1	0.830	0.904	0.702
	COP2	0.817		
	COP3	0.860		
	COP4	0.842		
E-commerce adoption	ECA1	0.808	0.905	0.614
	ECA3	0.796		
	ECA4	0.834		
	ECA5	0.812		
	ECA6	0.720		
	ECA7	0.725		
Frequency of technology use	FTU	1.000	SIM	SIM
IT knowledge	ITK1	0.787	0.885	0.658
	ITK2	0.867		
	ITK3	0.830		
	ITK4	0.758		
Organisational readiness	OGR1	0.880	0.923	0.750
	OGR2	0.911		
	OGR3	0.846		
	OGR4	0.825		
	PCO1	0.851		
Compatibility	PCO2	0.871	0.898	0.689
	PCO3	0.863		
	PCO4	0.727		

	Items	Factor loading	CR	AVE
Complexity	PCX1	0.785	0.854	0.660
	PCX2	0.831		
	PCX3	0.821		
Relative advantage	PRA1	0.795	0.916	0.687
	PRA2	0.82		
	PRA3	0.844		
	PRA4	0.849		
	PRA5	0.834		
Pressure from	SCP1	0.957	0.905	0.762
Suppliers or customers	SCP3	0.723		
	SCP4	0.921		

Notes: SIM = single item measure, AVE = average variance extracted, CR = composite reliability

In the present study, discriminant validity was evaluated using the heterotrait monotrait ratio (HTMT) standard, as suggested by Henseler et al. (2015). As indicated in Table 3, all values of HTMT range passed HTMT0.90 and HTMT0.85m, suggesting adequate discriminant validity (Henseler et al., 2015).

Table 3: The Results of Discriminant Validity Analysis (HTMT)

	COP	ECA	TCU	ITK	OGR	PCO	PCX	PRA	SCP	VIF
COP										2.703
ECA	0.801									
FTU	0.474	0.752								1.366
ITK	0.708	0.548	0.320							2.229
OGR	0.849	0.694	0.419	0.792						3.346
PCO	0.661	0.588	0.393	0.604	0.668					1.781
PCX	0.765	0.622	0.357	0.738	0.749	0.654				1.994
PRA	0.73	0.778	0.502	0.618	0.79	0.613	0.663			2.308
SCP	0.131	0.098	0.029	0.123	0.126	0.257	0.302	0.117		1.090

5.2 Descriptive Statistics of the Latent Constructs

Descriptive statistics were calculated in the form of means and standard deviations of the latent variables. Table 4 shows that the

overall mean of the eight latent variables ranged from 2.121 to 4.133 and standard deviations from 0.706 to 1,039 on the 5-point Likert scale. Table 4 also indicates pressure from customer or supplier scored the highest average of 4.13, while complexity showed the lowest average value at 2.12, indicating that the respondents perceived the level of pressure of customer or supplier as a high. The descriptive statistics also showed a medium to high score for e-commerce adoption (mean = 3.565; standard deviation = 1.039).

Table 4 Descriptive statistics for latent variables

	Number of items	mean	Std. deviation
PRA	5	3.812	.990
PCO	4	4.106	.754
PCX	3	2.121	.706
OGR	4	3.865	.924
ITK	4	3.953	.835
COP	4	3.921	.887
SCP	3	4.133	.812
ECA	6	3.565	1.039

5.3 Assessment of Structural Model

The primary criterion for evaluating a structural model in PLS-SEM is the R-squared value, also known as the coefficient of determination. The R-squared value represents the variance ratio of the dependent variable and explains the predictive accuracy of the structure model (Hair et al., 2018). The results show that the research model explains 0.736% of the total variance in e-commerce adoption. This suggests that the three sets of exogenous latent variables (technological, environmental, and organisational factors) collectively explain 73.6% of the variance of the e-commerce adoption. Hence, following Hair et al. (2018) the endogenous latent variable (dependent variable) showed the acceptable levels of R-squared value, which were considered as slightly high. The standard bootstrapping method (resampling = 1000) was performed to assess the statistical significance of the path coefficients (Hair et al., 2018).

The results in Table 5 revealed that among the technological factors, relative advantage had a positive relationship with e-commerce adoption with $\beta = 0.181$, $p<0.01$. Thus, H_1 is supported. However, the direct effects of compatibility ($\beta = 0.053$, $p>0.05$)

and complexity (β = -0.009, p>0.05) on e-commerce adoption was insignificant. Thus, H_2 and H_3 are not supported.

Regarding the influence of organisational factors on e-commerce adoption, the result (Table 4) indicated that organisational readiness (β = 0.012, p>0.05) and IT knowledge (β = -0.014, p>0.05) were insignificant. Hence, Hypotheses 4 and 5 are not fully supported. Regarding environmental factors, the result indicated that competitive pressure had a positive relationship with e-commerce adoption with β = 0.255 and was significant at p<0.01. Thus, H6 is supported. Concerning Hypothesis 7 on the influence of pressure from suppliers and customers on e-commerce adoption, results (Table 5) showed no significant positive relationship between pressure from suppliers and customers norm and e-commerce adoption (β = 0.016, p>0.05).

5.4 Moderating Effect

The frequency of technology use was assumed as a moderator of the relationship between the TOE determinants and the adoption of e-commerce for SMEs. The researchers created the product terms between the seven TOE determinants and e-commerce adoption and these product terms were used as indicators of the interaction term in the structural model. The results showed that when the interaction effects were entered into the model, the R^2 increased to 0.763, giving an R2 change of 4.4% (0.763-0.719). The interaction effect of the frequent use of technology was significant (β = 0.464, p<0.01).

The results in Table 5 revealed the significance of the frequency of technology use on the relationship between compatibility and SMEs' e-commerce adoption (β = 0.069, p<0.05, f=0.09). Hence, H_{8b} is supported. The effect size f^2 was 0.09 as suggested by Cohen (1988) which is considered small. Information from the path coefficients was used to plot the moderating effect of the frequency of technology use on the relationship between compatibility and adoption of e-commerce, following the procedures recommended by Dawson (2014).

Figure 2 shows that the relationship between compatibility and e-commerce adoption was stronger when the frequency of technology use was higher, whereas the frequency of technology use had no impact on the compatibility and e-commerce adoption relationship.

Table 5: The Results of Structural Model

Hypotheses	Relationship	Main effect	Interaction effect			Supported	f^2	Effect size
		Beta	Beta	SE	*t*			
H_1	PRA -> ECA	0.251	0.181***	0.056	3.200	Yes	0.046	
H_2	PCO -> ECA	0.026	0.053	0.043	1.229	No	0.004	
H_3	PCX-> ECA	-0.034	-0.009	0.047	0.195	No	0.000	
H_4	ORG -> ECA	0.010	0.012	0.059	0.203	No	0.000	
H_5	ITK -> ECA	-0.003	-0.014	0.063	0.217	No	0.000	
H_6	COP -> PPD	0.307	0.255***	0.052	4.889	Yes	0.072	
H_7	SCP-> ECA	-0.001	0.016	0.043	0.365	No	0.001	
	FTU-> ECA	0.425	0.464***	0.047	9.979	-	-	
H_{8a}	FTU * PRA -> ECA		-0.057	0.059	0.973	No	0.005	-
H_{8b}	FTU * PCO -> ECA		0.069**	0.039	1.779	Yes	0.009	Small
H_{8c}	FTU * PCX -> ECA		0.078*	0.054	1.458	Yes	0.011	Small
H_{8d}	FTU * ORG ->ECA		0.015	0.062	0.238	No	0.000	-
H_{8e}	FTU * ITK ->ECA		-0.086	0.069	1.240	No	0.013	-
H_{8f}	FTU * COP -> ECA		-0.018	0.051	0.347	No	0.000	-
H_{8g}	FTU * SCP -> ECA		0.066**	0.039	1.674	Yes	0.014	Small
	R^2 Change	0.719	0.763					
	R^2 Change	0.763	0.763					

Note: ***significant at 0.01 (1-tailed), **significant at 0.05 (1-tailed), *significant at 0.1 (1-tailed)

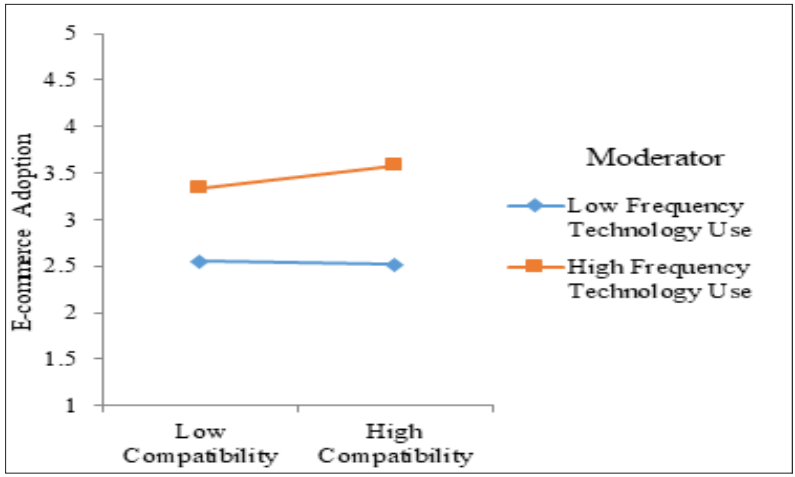

Figure 2: Interaction plot of compatibility and frequency of technology use

Similarly, the results in Table 5, Figure 3 support H_{8c}, which stated that the frequency of technology use moderates the relationship between complexity and e-commerce adoption, such that the relationship is stronger (i.e., less negative) for SMEs with high frequency of technology use than it is for SMEs with frequency of technology use ($\beta = 0.080$, $p<0.1$, $f = 0.011$).

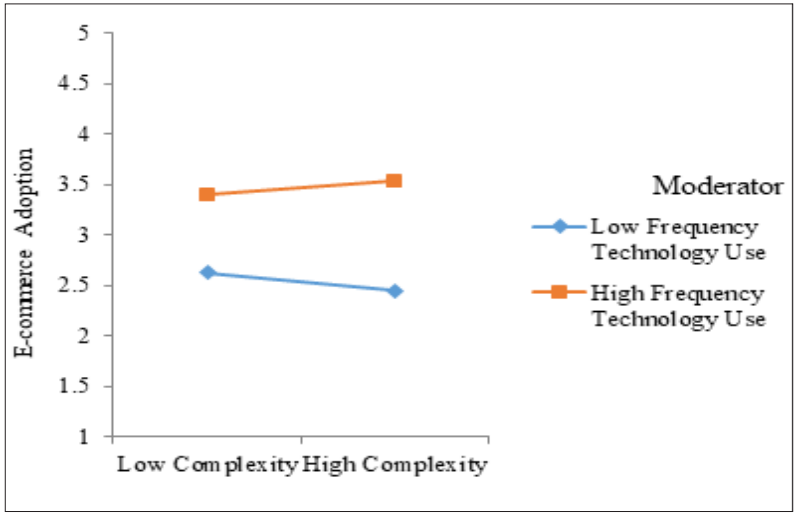

Figure 3: Interaction plot of complexity and frequency of technology use

On the other hand, the results shown in Table 4, Figure 4 support H8g, which posited that the frequency of technology use moderates the relationship between pressure from customer or supplier and SMEs' e-commerce adoption. Specifically, Figure 5 shows that the relationship is stronger (i.e., more positive) for SMEs with a high frequency of technology use than it is for SMEs with frequency of technology use ($\beta = 0.066$, $p < 0.05$, $f=0.014$).

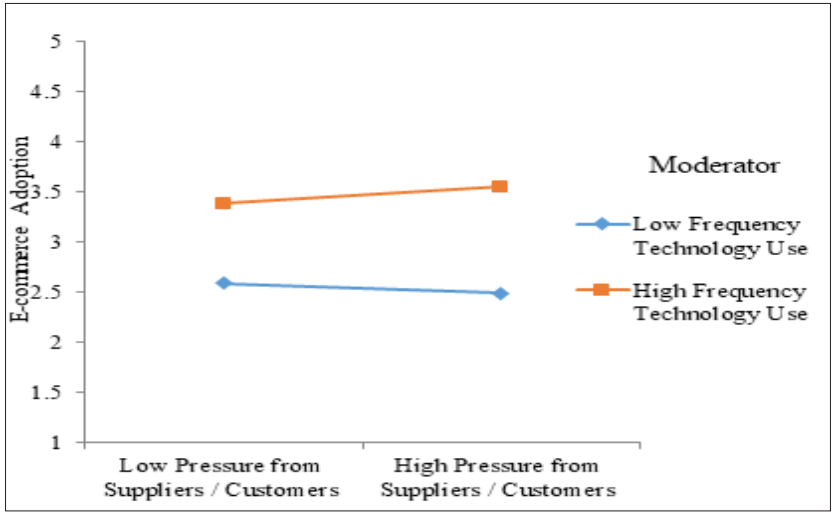

Figure 4: Interaction plot of customer/supplier pressure and frequency of technology use

However, the results revealed an insignificant interaction of the frequency of technology use and relative advantage ($\beta = 0.059$, $p>0.05$), organisational readiness ($\beta = 0.062$, $p>0.05$), IT knowledge ($\beta = 0.069$, $p>0.05$), and competitive pressure ($\beta = 0.051$, $p>0.05$) on e-commerce adoption. Thus, H_{8a}, H_{8d}, H_{8e}, and H_{8f} of this study are not supported.

5.5 Predictive Relevance (Q^2)

The present study applied Stone-Geisser's Q^2 of predictive relevance of the research model for endogenous constructs using blindfolding procedures via SmartPLS3 (Hair et al., 2017). Then, a blindfolding measure was applied because all the endogenous or dependent latent variables in the current study were reflective. In particular, a cross-validated redundancy scale (Q^2) was used to assess the

predictive significance of the research model. According to Hair et al. (2017), a research model with Q square values greater than zero is considered to have predictive relevance. The results showed that Q2 of endogenous latent variable (E-commerce adoption) was 0.406, which is greater than 0, suggesting the predictive relevance of the model.

6. Discussion

Empirical data from various SMEs in Kuwait are being used to broaden our understanding of e-commerce adoption. In total, seven factors were identified and evaluated as key determinants of e-commerce adoption. The results obtained for the sample reveal that SMEs with certain technical characteristics (perceived relative advantages) and an environmental context (competitive pressure) are more likely to embrace e-commerce. The results obtained are discussed below.

The findings demonstrate that there is a positive and significant relationship between relative advantage and SMEs' e-commerce adoption. This result tends to suggest that a higher rate of relative advantage of e-commerce will increase the rate of e-commerce adoption by SMEs. This also implies that the relative advantage of e-commerce motivates SME managers to compete in the local market, and to improve their effectiveness and service quality. This result also corroborates with those of Ghobakhloo and Tang (2013) and Ahmad et al. (2014) who suggested that relative advantage is strongly related to SMEs' e-commerce adoption. It could be concluded that SMEs that adopted and implement e-commerce technology can gain real benefits such as gain new market opportunities, reduce operations and administrative costs, enable business growth, and overcome performance problems.

Compatibility seems to have no association with the adoption of e-commerce among SMEs in Kuwait. This result indicates that SMEs in Kuwait view e-commerce as not being in line with the current regulations, culture, and value systems of business, and thus, it has no effect on their adoption. These findings are consistent with those of previous research that had supported that compatibility did not have a significant impact on the adoption of e-commerce by SMEs (Hamad et al., 2018; Ekong et al., 2012). This result also provides support for Ifinedo (2011) and Qashou and Saleh (2018) who demonstrated that compatibility does not significantly influence the acceptance and implementation of e-marketing by SMEs in Canada and Palestine.

On the one hand, although the DOI theory supports the claim that greater alignment of innovation with the values, experiences, and needs of an organisation will foster its adoption, Kuwaiti SMEs have realized that compliance is not essential to e-commerce adoption.

Complexity is found to have an insignificant effect influence on SMEs' adoption of e-commerce in Kuwait. This result is consistent with those who found no relationship between complexity and the adoption of e-commerce (Ahmad et al., 2014; Wanyoike et al., 2012; Hamad et al., 2018). This finding may be based on the assertion that owners and managers of SMEs play an important role in encouraging the growth of e-commerce because they are familiar with the characteristics and business operations of SMEs (Vidal et al., 2010). Hence, managers of SMEs must understand that they can positively affect the adoption of e-commerce by training their employees and trusting the benefits of technologies. Besides that, it may be because the complexity inherent in the e-commerce solutions does not apply to their current level of business (Ahmad et al., 2014).

Organisational readiness is found to have an insignificant influence on SMEs' adoptions and e-commerce adoption among SMEs in Kuwait. The finding is consistent with the study of Ifinedo (2011) who claimed that organisational readiness does not support SMEs' intention to adopt e-commerce. In addition, the finding is inconsistent with the study by Ghobakhloo et al. (2010) who reported a significant and positive relationship between organisational readiness and SMEs' e-commerce adoption. This discrepancy can be explained by the difference in the availability of resources at the firm level (Ahmad et al., 2014). Another possible explanation for the lack of support for this assumed relationship relates to e-commerce providers who currently offer several types of systems at competitive and cost-effective rates. Hence, owners or managers of SMEs can choose from a wide range of e-commerce providers. In this case, the adoption of e-commerce does not require large financial resources.

IT knowledge is found to have an insignificant relationship with SMEs' adoptions of e-commerce. This result indicates that more IT knowledge of SME owners or managers in Kuwait had less impact on e-commerce adoption. This result is also inconsistent with prior studies, which reported that IT knowledge is a good predictor for the adoption of e-commerce (Ahmad et al., 2014; Garg & Choeu, 2015). The plausible reason for this result is that SMEs may rely on the experience and IT skills of e-commerce service providers, and thus, SMEs tend to adopt e-commerce without depending on the IT

knowledge of owners or managers. SMEs' may not consider that adopting e-commerce technology in their business requires vast IT knowledge (Ilin et al., 2017). According to Ramayah et al. (2016), SMEs with more knowledgeable IT employees will not necessarily increase their level of confidence to continue adopting e-commerce technology.

Competitive pressure is found to have a positive influence on the SMEs' adoption of e-commerce. This implies that the level of competitive pressure faced by SMEs is positively related to their motivation to use the technology, which in turn, affects their adoption of e-commerce. This result is consistent with the findings of Rahayu and Day (2015) and Walker et al. (2016) who found that the greater the competition in any industry, the more likely firms will adopt technological innovations such as e-commerce. This finding also provides evidence that pressures from competitors can enhance the decision of SMEs to adopt e-commerce, and in turn, relate to the likelihood of SMEs' adoption of e-commerce. The supplier or customer pressure is found to have an insignificant effect on SMEs' adoption of e-commerce in Kuwait. This result suggests that higher perceived pressure from customers or suppliers will not necessarily lead to greater intent of SMEs to adopt e-commerce. The result differs from the findings of some related studies, e.g., Saprikis and Vlachopoulou (2012) and Sila and Dobni (2012) who reported that pressure from suppliers or customers impacts SMEs' adoption of e-commerce. SMEs may indicate that their business emphasizes other factors such as pressure from competition and benefits of technology that lead to the decision to implement e-commerce rather than simply customer or supplier pressure. The rationale for this result is that SMEs are not like large companies in terms of the size of suppliers and consumers that need to use advanced e-commerce technology and thus, face many restrictions to adopt it.

The findings in this study support the view that the frequency of technology use (categorised as high frequent or low frequency) moderates the relationship between compatibility and e-commerce adoption. This may not be surprising because SMEs that use technology frequently in their businesses see e-commerce systems as more compatible with their values, past experiences, and needs than those who do not use the technology or useless. In turn, SMEs that do not use any technology or use low technology feel that compatibility may impose more restrictions on the adoption of e-commerce than SMEs with high technological use that have already aligns their style

of work and culture with the e-commerce system, regardless of which compatibility problem, if any. Hence, this study provides evidence that frequent use of technology acts as a deeper buffer, as it increases the potential for e-commerce adoption resulting from compatibility.

Likewise, the results of the current study supported the prediction that SMEs with a significant use of technology tend to perceive that the e-commerce system is relatively less difficult to understand and use than those who use technology less generally. In other words, SMEs with low frequent use of technology will face an increasing level of difficulty in using and understanding e-commerce technology when adopting it. The finding is also consistent with a previous study by Ekong et al. (2012) which showed that reducing the perceived complexity of e-commerce would increase its adoption. Hence, SMEs with high frequent use of technology have a higher likelihood of adopting e-commerce, possibly because the use of technologies will lead to lower levels of complexity compared to low technology frequency.

The results also suggest a significant difference in the impact of the pressure of suppliers or customers on e-commerce adoption in terms of frequency of technology use. As such, SMEs with high frequent use of technology, supplier or customer pressure have much less impact on e-commerce adoption. This is perhaps due to that SMEs with a high level of frequent use of technology were more likely to readily refine the needs of customers or suppliers based on the IS or shared by significant others who had already adopted similar e-commerce systems than those who did not use the technology frequently. Ilin et al. (2017) suggested that companies that have adopted electronic business technology have observed far less industrial pressure than under-adopted companies. This means that the companies adopting the technology of e-commerce felt low pressure or there was no pressure from their customers or suppliers to adopt e-commerce.

However, this study failed to find support for the moderating role of frequency of technology use in the relationship between relative advantage, organisational readiness, IT knowledge, competitive pressure, and e-commerce adoption. The relative importance of these prediction variables did not decrease or increase with the change in the level of frequency of technology use. This result is consistent with the result of Ramayah et al. (2016) that the TOE determinants (e.g., perceived relative advantage, external pressure, and IT knowledge) are not influenced by the web adoption level in their effect on SMEs

website continuance intention. This is because owners-managers who see that e-commerce can offer many benefits and high knowledge of IT are more likely to adopt e-commerce regardless of the role of frequency technology use (Ahmed et al., 2014; Garg & Choeu 2015). Furthermore, it is suggested that Kuwaiti SMEs retain equal positive perceptions of the impact of competitive pressure on their adoption of e-commerce regardless of the role of frequency technology use. Competitive pressure highlights that perceived force from competitors is an active driver to adopt e-commerce (Ahmad et al., 2014; Rahayu & Day, 2015). Therefore, competitive pressure regarding the adoption of E-commerce may become more perceived by owner-managers than frequency technology use and is more likely to influence the adoption of e-commerce, as confirmed in H6.

7. Conclusion and Implications

Overall, the results reveal that e-commerce adoption by SMEs in Kuwait is driven positively by relative advantage and competitive pressure, indicating that SMEs' owners or managers who have overall positive perceptions of the benefits of e-commerce are likely to have a positive intention towards its adoption. SMEs are likely to adopt e-commerce when they are aware that their competitors are becoming innovative. Thus, this study contributes to the theories of TOE and DOI by providing empirical evidence to support the assertion that relative advantage and competitive pressure have significant positive effects on the e-commerce adoption by SMEs in Kuwait. The fact that this study demonstrates the applicability of the TOE framework (e.g., environmental context) and the DOI theory (e.g., technology characteristics) in the Kuwait context implies that the mentioned theories can fit perfectly into the study of e-commerce technology adoption among SMEs in developing countries.

This study has addressed the gap by incorporating the frequency of technology use as a moderating variable to enhance the understanding of the influence of TOE determinants and e-commerce adoption in the SMEs' context. The findings on the moderating effects indicate that the frequent use of technology is able to reinforce the positive relationship of one dimension of the technology context (i.e., compatibility), one dimension of the environmental context (supplier or customer pressure), and weaken the negative complexity effect on adopting e-commerce, and providing empirical evidence to support the TOE and DOI theories. This study has added empirical evidence to the body of knowledge in the field of SMEs' e-commerce

adoption and the research findings could be a strong basis for future research on TOE determinants as well as business attitudes toward technology acceptance.

From a practical perspective, this study indicates that the management of SMEs should focus more on relative advantage; and competitive pressure are important predictors for adopting e-commerce among SMEs. To elaborate, SMEs with managers who perceive that e-commerce could offer many benefits are more likely to adopt e-commerce. Hence, more government intervention efforts need to be done to enhance awareness regarding the benefits of e-commerce. This means that to encourage higher adoption, seminars and workshops should be intensified to educate SME managers and convince them of the benefits of using e-commerce for their business operations. Similarly, the strong influence of competitive pressure on e-commerce adoption implies that decision-makers in SMEs recognise that the competition supports e-commerce development.

Moreover, the results of the current study suggest that compatibility, complexity, and supplier or customer pressure should be taken into serious consideration in adopting e-commerce in Kuwaiti SMEs. Therefore, e-commerce system providers need to reassure SMEs that e-commerce can integrate with their practices. The system can be implemented in stages. Distributing funds according to the frequency of technology use for SMEs will be an effective way to encourage higher adoption. In particular, the results suggest that increased use of technology can minimise the complexity of e-commerce and enhance its benefits. Thus, the government of Kuwait can exploit this difference to reduce the obstacles and difficulties that prevent the adoption of e-commerce by improving the public and technical infrastructure support services available to those SMEs that have low frequency of technology use.

Finally, future research should consider expanding the model to include other TOE factors such as the characteristics of technology adoption and owners or managers providing new insights about the determinants of SMEs' adoption of e-commerce. The frequency of technology use was not found to moderate the relationship between relative advantage, organisational readiness, IT knowledge, competitive pressure, and adoption of e-commerce. Since this topic has yet to receive much interest from researchers, the study acknowledges that these limitations require further investigation. Some of the mediating effects are likely to further explain why these relationships do not have a significant moderation. Specifically,

the relationship between the relative advantage and adoption of e-commerce may be mediated by the frequency of technology use.

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