



## AN EXAMINATION OF THE BENEFITS AND BARRIERS OF E-COMMERCE ADOPTION ACTIVITIES AMONG YEMENI SMES

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### Abstract

Yemeni small and medium sized enterprises (SMEs) are at the early stages of e-commerce adoption and their owners and managers need to be supported to gain an understanding of the benefits that their commerce can achieve from adopting e-commerce. Yemeni SMEs are at the early stages of e-commerce adoption. The delay in adopting more advanced e-commerce solutions are due to factors including the comparatively low level of technology usage within the organization, lack of qualified staff available to develop, implement and support firms' websites, and limited financial resources. A lack of computer software and hardware resources appears to have a detrimental effect on e-commerce adoption among Yemeni SMEs.

**Keywords:** E-commerce, Information System, Management, Adoption, Performance

### 1. INTRODUCTION

Increasingly, in both developed and developing countries, small and medium size enterprises (SMEs) are becoming even more important to national economies due to their strategic significance in developing different industrial sectors worldwide (Maad & Liedholm, 2008). Therefore, it may be argued that SMEs play a major role in an economy by significantly contributing to the enhancement of the countries' gross domestic product and its labor force by creating more job opportunities and developing skilled labor. The integration of information and communication technology (ICT) can have a significant impact within such organizations and their employees with improved productivity, and subsequent lowering of unit costs (Andam, Programme, & Force, 2003). Further, it is considered that one of the most important strategies that can effectively help SMEs to enhance their business performance is the utilization of ICT (Pickernell et al., 2013; Tan, Chong, Lin, & Eze, 2009). ICT can provide SMEs with several competitive advantages such as integrating supply chain partners, organizational functions, and offering critical information at the right time (Sharma & Sheth, 2010). The adoption of ICT and e-commerce may offer organizations more efficient resource management as well as making firms' communication faster (OECD, 2004). However, there are barriers for SMEs adopting e-commerce such as cost, size, and skilled labor (Middleton, 2011). The development of the worldwide economy and increase of e-commerce activity has led it to become an important component of commerce strategy and economic development (Al-Marti, 2008). Indeed, rapid development has been witnessed in the world within different aspects of life, especially the technological revolution such as e-commerce. For instance, there is widespread use of the internet in every aspect and phase of commerce (Al-Marti, 2008).

The Yemen e-commerce sector has witnessed rapid growth and has exceeded expectations, and become a new way of shopping compared with previous years (Almotamar, 2014). In the last year, the first electronic store website was established called the Warzan company and became arguably the best e-commerce site in Yemen (Almotamar, 2014). Although there are many individuals using Facebook pages to promote their products, those pages do not have sufficient confidence for transactions to take place due to not being considered an entity and not officially registered compared to the Warzan Company which is a registered company and has earned the confidence of consumers (Almotamar, 2014). This study develops an evolution



measurement model based on the e-adoption ladder model. The e-adoption model has been used by a number of researchers and this approach is a “step by step” process which starts with email communication then with basic website, e-commerce, e-commerce until the point of the transformed organization (Hoque, 2000; Jones, Hecker, & Holland, 2003; Parish et al., 2002; Teo & Pian, 2004; Vosloo, 2003; Willcocks & Sauer, 2000). The model developed here is an extension to the e-adoption ladder model which included new factors (social media, cloud services, and mobile application). Those added factors were gathered from the evolution of the technology which SMEs should implement through adopting e-commerce.

Despite several studies relating to e-commerce adoption, the majority of these studies focused on comparatively well developed countries such as Wales (Jones, Packham, Beynon Davies, Simmons, & Pickernell, 2014; Thomas, 2010); South Africa (Cloete, Courtney, & Fintz, 2002); New Zealand (Al-Qirim, 2007), parts of Asia (Sharma & Sheth, 2004), and the United Kingdom (Simpson & Docherty, 2004). However, comparatively few studies have concentrated on the adoption of e-commerce in a developing economy (Li et al., 2010). Furthermore, empirical studies into e-commerce adoption in SMEs in developing countries are also under represented in the literature. This is especially the case in Middle East countries. In addition, most previous studies focused on a broad and generic view of e-commerce adoption in SMEs’ (Aladwani, 2003, Zolait, Abdul, & Ahmad, 2010, Al-Marti, 2008, Almotamar, 2014). This study conducted in a cross country context; considered SMEs’ adoption of e-commerce from the perspective of the level of adoption.

Although there are many individuals using Facebook pages to promote their products, those pages do not have sufficient confidence for transactions to take place due to not being considered an entity and not officially registered compared to the Warzan Company which is a registered company and has earned the confidence of consumers.

This study focuses on SMEs and the sectors of manufacturing, services, and retail. Its main aim is to measure e-commerce adoption activities in Yemeni SMEs as well as investigate the benefit and barriers of using e-commerce in SMEs in developing countries such as Yemen. The study aims to answer the following research questions:

- To what extent are Yemeni SMEs engaging in e-commerce activity?
- What may deter Yemeni SMEs from adopting e-commerce?
- What are the benefits of e-commerce adoption for Yemeni SMEs?

## 2. LITERATURE REVIEW

The definition of an SME varies from country to country. To define whether a company is an SME, there is a need to identify the number of employees, annual turnover, and balance sheet data of the company. In Europe, the medium sized enterprise is typically defined as a firm having employees between (50 and 249), and an annual turnover less or equal to 50 million Euros. A small sized enterprise is a firm with employees between (10 and 49), and annual turnover less or equal to 10 million Euros (EC, 2005). Whereas, the Yemen Government defines SMEs as: a medium sized enterprise is a firm having employees between 10 and 50 and small sized enterprise is a firm with employees between four and nine (YMIT, 2014). The Yemeni Ministry of Industry and Trade (YMIT, 2014) states that the number of SMEs in Yemen is about 27,796 companies in the manufacturing sector (Table 1).

**Table 1: Number of SMEs in Yemen**

		Percentages
Enterprise	Large	0.51
	Medium	1.91
	Small	19.15
	Micro	78.43
Location	Sana'a	18.06
	Taiz	13.93
	Rest of the cities	68.01
Type of enterprises	Food products and beverage	43.75
	Fabricated metal products	14.78
	Nonmetallic mineral products	11.02
	Apparel products	10.80
	Other (services, retail)	19.65

Table 1 illustrates the number of enterprises in terms of size, location, and type which include 0.51% of enterprises as a large company, 1.91% as medium sized, 19.15% as small, and 78.43% as micro. In addition, the report mentions that most SMEs are located in Sana'a with 18.06%, Taiz with 13.93% and 68.01%, and are distributed amongst the rest of the cities in the country. Most SMEs are in the field of food products and beverages with 43.75%, fabricated metal products with 14.78%, nonmetallic mineral products with 11.02%, apparel products with 10.80%, and other activities, services, and retails with 19.65%.

Yemen's telecom sector is representative of the growth opportunities that abound in such a developing market. Fixed lines subscriptions are increasing, with a penetration rate of less than 5% indicating significant room for growth. Given that over 60% of the population lives in rural areas a significant amount of fixed line investment has been in the form of wireless local loops based on a variety of technologies.

In addition, the telecom sector has invested in core and transmission network infrastructure to expand bandwidth and to support the ability to offer new products and services (BuddeComm, 2012). Mobile telecoms continue to be the big success story in Yemen. Steady growth has seen penetration rates rise to over 40% (BuddeComm, 2012). Competition is healthy with four mobile network operators offering services. Foreign investors include regional mobile operators Batelco of Bahrain and MTN of South Africa. Attracting investment is Yemen's low mobile penetration, the lowest in the Middle East. Yemen's mobile data market is also in the nascent stages of development, with mobile messaging and mobile Internet access offered. The latter has the potential to develop into a significant market given the lack of competition in the fixed broadband market and low PC penetration (BuddeComm, 2012).

The authors believe that Internet and online activity will progress everywhere in the world. However, given the present low penetration figures of Internet usage, lower than average (in the region) per capita income, a relatively small and middle class and a large uneducated and illiterate population, political instability, high (youth) unemployment, it will take some time before online activity and subsequently e-commerce will really breakthrough in Yemen.

Al-Madhagy (2013) argues that every country has its own ICT policy and Yemen as one of them has its own policy, even though Yemen does not arguably have clear ICT policies. There has been a comparatively large investment by the Yemeni government toward ICT in the desire to achieve greater productivity. Most government organizations have computers used in their daily work life to expedite work. In addition, to improve information systems and implement a good infrastructure the Yemeni government has established IT departments in most of its ministries and governorates. The private sectors in Yemen have an influence on



ICT policy through their investment to improve ICT resources. For example, to reduce computer illiteracy, a number of computer institutes have established courses for learners to learn using computers. Furthermore, the telecom sectors have increased since 2000 to four telecom operators with both technology Global System for Mobiles (GSM) and Code Division Multiple Access (CDMA). But the Yemen government is still the only Internet provider in the country.

According to the Social Research & Development Center (SRDC, 2013) survey the number of mobile subscribers in the country has increased to almost half the Yemeni population with the increase of WiMAX and mobile Internet use. Al-Wazir and Zheng (2012) state that the Telecommunication Corporation (yemen.net.ye) and Teleyemen (y.net.ye) are the only two Internet services providers in the country which belong to the Yemen government. Al-Wazir and Zheng (2012) argue Yemen is one of the countries in the region which has low ranking in telecommunication infrastructure.

According to the ITU (2012) report, the Yemen Ministry of Communications and Information Technology aims to provide, develop and expand the spread of telecommunications and postal services in the Republic to meet the needs of economic and social development and to encourage investment in these areas in accordance with the constitution and state public policy, laws, and regulations in force. The 3G network coverage is limited to some cities in Yemen using the technology called EV-DO Rev A. Yemen commercial broadband technology includes: Fixed (wired) broadband technology, and three technology wireless broadband technologies (CDMA EVDO, WiMAX and another Terrestrial Fixed Wireless Broadband Technology).

As part of ICT infrastructure development, next generation networks are one of the new developments which were installed in two location Aden and Mukalla in Yemen. In addition, fiber optic paths with a length of 1,187 km were installed and implemented. In the beginning of 2006, MTIT launched wireless Internet services (Wi-Fi). The number of sites hosted by the Internet portal of Yemen (Yemen- Portal.net) increased from 185 sites in 2005 to 915 sites in 2007. Additionally, the number of Internet cafés in Yemen increased from 50 cafés in 2000 to 925 in 2007. Several Yemeni ministries have their own websites which contain ministry information and news. Internet cafés are the most common places available to the Yemeni citizen for Internet access due to their cheap cost which is around 60 Yemeni riyal per hour (equivalent to 17 pence in the UK) (United Nations, 2009).

There are some improvements in Yemeni schools; computer and Internet services were installed in some universities and schools as part of an ICT infrastructure improvement. Additionally, computer courses were introduced to students in secondary schools. In the beginning of 2008 about 5,800 training courses in the area of ICT were carried out to train teachers and staff. Furthermore, many of the ministries' staff were trained in a variety of ICT fields such as CISCO, Microsoft, and ICDL (United Nations, 2009).

The Yemen e-commerce sector is witnessing rapid growth which has exceeded expectations, and has become a new way of shopping compared with previous years (Almotamar, 2014). Whereas United Nations (2007) reports that e-commerce in Yemen almost did not exist due to the lack of legal provisions governing this aspect, even though some banks in Yemen have their own websites with content including only bank information and news and they use limited electronic payment systems (United Nations, 2009).

Further, Al-Marti (2008) argues that e-commerce concepts are still comparatively unknown and untrusted amongst Yemen SMEs and its population and the use of the Internet is still for specific purposes. According to the Almotamar (2014), newspaper, there is increasing



reliance on the e-commerce sector and the goods that enter into Yemen via e-commerce to the tune of millions of dollars annually. The Warzan website and mail was established as the first Yemeni site to offer free online sales and attract tens of thousands of monthly visitors who are looking for a unique shopping experience and convenient delivery service, direct and free, and provided by Warzan (Almotamar, 2014).

There are a number of different interpretations of the terms e-commerce and e-business. For example, Chaffey (2011, p.12) argues that e-commerce is a subset of e-business. IBM defined e-business back in 1997 as “the transformation of key business processes through the use of Internet technologies” (Chaffey, 2011; p.12). Parazoglou (2006) and Turban (2010) argue that e-business is more than buying and selling products and services, it is all about customer services, collaborating with business suppliers and partners as well as making transactions electronically inside the organization.

Turban (2010) defines e-commerce as an external activity of buying and selling products and services online. While Parazoglou (2006) defines e-business as the integration of internal and external organizational processes and the connection between the organization and their suppliers and partners as well as customer scarification. However, Fillis, Johannson, and Wagner (2004) state e-business as companies that employ ICT in their business operations, but exclude sending and receiving text based e-mail messages. Many researchers (Chaffey, 2011; Fillis et al., 2004; Parazoglou, 2006; Turban, 2010), state that e-business and e-commerce are similar in terms of selling and buying products on the Internet and others define e-business and e-commerce as distinct.

ICT is one of the key roles of tackling economic problems in developing countries (Parliamentary Office of Science and Technology, 2006). It can solve many challenges to achieve Millennium Development goals (Parliamentary Office of Science and Technology, 2006). ICT can be defined as a technology that gives the ability to connect more effectively and electronically and it is the transmission of information (Parliamentary Office of Science and Technology, 2006). One of the key strategies that can effectively assist SMEs to enhance their business performance is the utilisation of ICT (Tan et al., 2009). ICT can provide SMEs with several competitive advantages such as integrating supply chain partners, organizational functions and offering critical information at the right time (Bhagwat & Sharma, 2007).

However, the characteristics of SMEs, such as structure, resource constraints and size, generate several challenges and difficulties toward the adoption of ICT. According to MacGregor and Vrazalic (2005), despite the rapid growth of ICT within SMEs, the level of ICT adoption by SMEs remained low. The lack of financial resources required ICT development and maintenance which is one of the main reasons preventing SMEs from adopting ICT (Parida, Johansson, Ylinenpää, & Baunerhjelm, 2010). According to Ghobakhloo, Hong, Sabouri, and Zulkifli (2012), SMEs have less tolerance in accepting cost and risk associated with adopting new technologies. Furthermore, the lack of ICT literacy among owners and employees is another barrier that inhibits effective ICT deployment within SMEs (Mehrtens, Cragg, & Mills, 2001).

For the last 5 years the Arab countries have witnessed fast developing ICT especially in the area of mobile cellular. Using a 3G network has an influence on increasing the number of Internet users as well as mobile-broadband subscribers (ITU, 2012). The investment made by the private sector has made a change in the repaid development of ICT. These investments were predominantly in the field of mobile cellular services; an increase in the number of call centers and Internet cafes, software companies, etc. (United Nations, 2009).

There is no doubt that e-commerce has spread quickly around the world for purchasing



services or products. The number of users of the Internet in the beginning of the 1990s was about three million users and there was no form of e-commerce for buying or selling. Nine years later the number of Internet users increased to about 300 million users, and only comparatively few of the Internet users used it for purchasing products and services from e-commerce sites for an estimated 110 billion dollars. In 2013, products and services purchased by commerce to consumer were estimated at about 1.25 trillion dollars (WOT, 2013). E-commerce has provided many benefits to developing countries. It has reduced the cost of all sales transactions and increased international trade which may result in economic development (Noda & Collis, 2001).

The Middle East is characterized by one of the fastest growing penetrations of the market by e-commerce, which is in a good position to adopt the new retail environment. The UAE was near the top of the list of the largest in the Middle East market of e-commerce revenues, which currently stands at 2.9 billion U.S. dollars and 32% of the total e-commerce market in the Middle East, is expected to reach 5.1 billion U.S. dollars in 2015. It has also been noted that 2012 saw significant changes in the field of e-commerce in the Middle East (PayPal, 2013).

E-commerce has provided many benefits to developing countries. It has reduced the cost of all sales transactions and increased international trade which may result in economic development. PayPal (2013) predicted that the e-commerce market in the Middle East will achieve up to 15 billion U.S. dollars in 2015, the growth achieved in this year shows the market is on track to achieve predicted growth figures. This growth is due to an increase in the large number of e-commerce users, as well as the growth in the number of local retailers who adopted e-commerce and started offering customers products not available locally. The report indicated that the main reasons which drive consumers to use e-commerce and purchase online are convenience by 26%, lower prices by 18%, and the diversity of products and offers (PayPal, 2013).

### **E-Commerce Activities**

In the current global economy e-commerce has increased and become an important component of commerce strategy and economic development (Kumar & Kumar, 2014). Indeed, one of the most important strategies that can effectively assist SMEs to enhance their commerce performance is the utilisation of ICT (Tan et al., 2009). ICT can provide SMEs with several competitive advantages such as integrating supply chain partners, organizational functions, and offering time critical information (Sharma & Sheth, 2010). The adoption of ICT and e-commerce can offer SMEs a wide range of benefits for their commerce process (OECD, 2004). For example, adopting ICT and its application offers organizations more efficient resource management as well as making communication faster. E-commerce and the Internet can provide SMEs with significant benefits such as reducing transaction costs, and increasing the speed and reliability of the transaction (OECD, 2004).

However, the characteristics of SMEs, such as structure, resource constraints, and size, generate several challenges and difficulties in relation to the adoption of ICT. According to MacGregor and Vrazalic (2005), despite the rapid growth of ICT within SMEs, the level of ICT adoption by small and medium enterprises remained comparatively low. The lack of financial resources required for ICT development and maintenance is one of the main reasons preventing SMEs from adopting ICT (Parida et al., 2010). Indeed, as stated by Ghobakhloo et al. (2012), SMEs have less tolerance in accepting cost and risk associated with adopting new technologies. Furthermore, the lack of ICT literacy among owners and employees is another barrier that inhibits effective ICT deployment within SMEs (Mehrtens et al., 2001). Prior



research has shown that e-commerce offers solutions for businesses to meet the challenges of a changing environment, even though studies related to SMEs in developing countries reveal a delay or failure of SMEs in adopting e-commerce. Numerous studies have reported many barriers for e-commerce adoption in SMEs such as Kaynak, Tatoglu, and Kula (2005) who state that it is difficult to find and retrain employees with the required skills and knowledge. While, Bolongkikit, Obit, Asing, and Tanakinjal (2006) reported there is a need for a high degree of human collaboration in SME markets. Hamed, Ball, Berger, and Cleary (2008) stated it was difficult for many SMEs to obtain the levels of e-commerce skills to benefit from IT investment in e-commerce, which was a result of a lack of investment in IT and e-commerce.

Parazoglou (2006) argues the main challenge that may impact on the adoption of e-commerce is company size. Further, uncertainty of the financial benefits, lack of a clear e-commerce strategy, technological concerns, security concerns, privacy and legal issues, suspicion regarding new partnership loyalties, and the high cost of computing technology are the main barriers that deter firms from implementing e-commerce solutions (Parazoglou, 2006). Thus, Pahladsingh (2006) mentioned other e-commerce issues that influence the adoption of e-commerce and these include personal computers which can be the opportunity for them to be online. Pahladsingh (2006) also reported that ICT infrastructure, Internet connection speed and cost, the cost of hardware and software services, government policies, credit card interest, regulation, security, country's culture, language, and e-commerce ethics are the main barriers to the adoption of e-commerce.

The OECD (2012) reports that even though, 94% of SMEs in OECD countries have a high speed Internet connection, only 35% are using online purchasing and 18% are selling products and services online. However, Li and Xie (2012) mentioned some barriers that prevent SMEs from adopting e-commerce and these include institutional environment, legal system, proactive government policy, ICT infrastructure, tax policy for online transactions, national e-commerce strategy, government e-commerce use, and e-commerce training. Al-Madhagy (2013) argues the main barriers that lead a country to not benefit from communication and information systems are a difficult topography, scattered population group with low density and a low level of distribution networks in cities and rural areas. While, Middleton (2011) presented the barriers affecting e-commerce adoption and these include cost, technology, SMEs' education and skills sets, lack of skilled labor and access to trusted advisors and consultants, red tape and bureaucracy, lack of time and resistance to growth. Berthon, Pitt, Berthon, Campbell, and Thwaites (2008; p. 86) argues that corruption has a strong effect on e-commerce adoption and development in the Yemen.

Although there are differences between developing countries regarding e-commerce adoption, they have similar barriers for the adoption of e-commerce such as lack of infrastructure, financial problems, and so on (Jones, Beynon-Davies, & Muir, 2003b). Therefore, many studies have focused on the adoption of e-commerce barriers and drivers in developing countries and they reported that most developing countries face many challenges in terms of adopting an e-commerce model such as: lack of awareness, the absence of trust, weak income, poor economy, purchases made online, online payment services, regulation, cost, technology, and suitable infrastructure (Hamed et al., 2008; Ntoko, 2008; Zolait et al., 2010). The main drivers and barriers are technology, cost, infrastructure, time, information, and regulation. The main reasons behind delaying adopting e-commerce were cost and infrastructure (Hamed et al., 2008). However, PayPal (2013) reported that in the Middle East security is a concern to all e-commerce shoppers, these concerns are online payment fraud and nondelivery of products. Further, the report argues that most online purchases were not

paid through electronic payment which makes a high cost for the e-commerce ecosystem (Pay-Pal, 2013). Al-Marti (2008) reported there are many challenges for the adoption of e-commerce in Yemen such as a weak spread of Internet connections and infrastructure. Tables 2 and 3 illustrate the benefits and barriers respectively.

**Table 2: Benefit of e-commerce adoption**

Benefit	Key authors
Improve productivity Reduce the cost of products	(Andam et al., 2003).
Integration of supply chain partner Organization function Offering critical information at the right time	(Sharma & Sheth, 2010).
Efficient resource management Faster communication Reducing transaction costs Increasing the speed and reliability of the transaction	(OECD, 2004).
Enhance commerce performance	(Tan et al., 2009).
Sales increase New market penetration Cost reduction	(Zhu & Kraemer, 2002; Zhu et al., 2004)

**Table 3: Barriers to e-commerce adoption**

Barriers	Key authors
Lack of employees with required skills and knowledge	(Bolongkikit et al., 2006; Hamed et al., 2008; Kaynak et al., 2005; Middleton, 2011; OECD, 2012)
Lack of IT investment in e-commerce	(Hamed et al., 2008)
Company size Uncertainty of the financial benefits Technological concerns Privacy and legal issues Suspicion regarding new partnership loyalties.	(Parazoglou, 2006)
High cost of computing technology Security concerns.	Middleton (2011); Pahladsingh, (2006); Parazoglou (2006)
Internet connection speed Internet connection cost Cost of hardware and software services Credit card interest Regulation Country culture Language E-commerce ethics.	Pahladsingh (2006)
Institutional environment legal system Tax policy for online transactions.	(OECD, 2012)
Lack of awareness Absence of trust Weak income Poor economy purchases made online online payment service Regulation Cost technology Suitable infrastructure.	(Hamed et al., 2008; Ntoko, 2008; Zolait et al., 2010)
Lack of clear e-commerce strategy Government policies ICT infrastructure	(OECD, 2012; Pahladsingh, 2006)





Security concerns Online payments fraud Delivery of products Electronic payment Systems.	(PayPal, 2013)
Corruption	(Berthon et al, 2008)
Difficult topography Scattered population group with low density Low level of distribution networks in cities and rural areas	(Al-Madhagy, 2013)

### Theoretical Framework

The e-adoption model used by a number of researchers is typically a ‘step by step’ indicator which starts with email communication then with basic website, e-commerce, e-commerce until the point of the transformed organization (Hoque, 2000; Jones et al. 2000, 2003; Parish et al., 2002; Teo & Pian, 2004, Vosloo, 2003; Willcocks & Sauer, 2000). Furthermore, many researchers have developed similar frameworks based on organizational, environmental and innovation factors to describe the differences in the adoption of e-commerce (Kshetri, 2007; Molla & Licker, 2005; Soliman & Janz, 2004; Tan et al., 2007). Several studies have outlined and highlighted theoretical and conceptual frameworks for e-business and e-commerce adoption in developing Arab countries (Dali, Harun, Khalid, & Hamid, 2003; Hamed et al., 2008; Nathan, 2009; Zolait et al., 2010) (see Table 4). This research contributes to the existing literature in e-commerce adoption by outlining the factors involved with e-commerce adoption in SMEs in the Yemen. Measurement Evolution model based on the contribution of existing literature and the e-adoption ladder model. This is because organizations may differ in their level of e-commerce adoption, varying from the very simple use of emails to a more complex collaborative platform used to deliver services to employees, partners and customers (Table 4). The literature highlights the benefits and barriers SMEs face when making changes in their strategy toward adopting e-commerce such as cost, technology, and skills. These challenges may or may not apply to Yemeni SMEs. Also, Yemeni SMEs could face other problems. Therefore, in view of the literature and from the basis of the e-business measurement evolution model; this study has formulated the following hypotheses:

**Table 4: Stage Models**

E-Adoption ladder models	Description	Reference
E-commerce stairway Six Stages	Six Stages Step 0 (no started) Step 6 (advanced E-commerce)	(Thomas, Miller, Packham, & Simmons, 2009)
E-commerce adoption ladder Five steps	Five steps Step 0 (no started) Step 5 (transformed organization)	(Thomas, Williams, Thompson, & Packham, 2013)
Organization level of e-commerce adoption	Five stages Stage 0 (no online capability) Stage 5 (integrated web)	(Al-Somali & Clegg, 2015)
E-business adoption ladder	Six stages, stage 1 (email), stage 6 (digital ecosystem)	(Mpofu, Milne, & Watkins-Mathys, 2013)
Moving to e-business	Four stages Stage 1 (commerce) Stage 4 (e-business)	(Levy & Powell, 2003)
Ladder of connectivity	Six stages Stage 0 (no started) Stage 6 (advanced e-commerce)	(Murphy & Symonds, 2004)
Stages of the e-commerce adoption	Six stages	(Beynon-Davies, 2010)

ladder	Stage 0 (have not started yet) Stage 6 (use advanced e-commerce)
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**Table 5: E-commerce measurement evolution description**

Stages	Description
Stage 0	Business does not have Internet access
Stage 1	(Email), Business does not have a website but accesses information and services on the Internet and uses email for communications
Stage 2	(Social Media), Business has pages on social networks such as Facebook and uses these pages to advertise their products and services as well as to include information about the business and contact details
Stage 3	(Websites), Business has its own websites which only include very basic information about the business; relies on customers initializing contact for further information.
Stage 4	(E-commerce), Customers can access more detailed information about products/services and customers can buy and pay for products/services from the website, but the website is not linked to internal systems and orders are processed manually
Stage 5	(Mobile Apps), Business has developed mobile apps which include their product and services and the consumer is able to purchase goods and services through the app. The mobile app is linked to internal systems and orders are processed automatically.
Stage 6	(Cloud Service), Business uses cloud services to store their files, software and applications services. The business will be able to access the applications and services across a range of devices and networks from anywhere.
Stage 7	(E-business), On line “store” is integrated with other business systems, e.g. order processing, fulfillment, accounts and/or marketing.
Stage 8	(Transformed Organization), Internet technology drives the business internally and externally, and is used to manage all processes end-to end more effectively and efficiently.

**Hypothesis 1:** There is a significant relationship between size of SMEs and the level of e-commerce adoption.

**Hypothesis 2:** There is a significant relationship between age of SMEs and the level of e-commerce adoption.

**Hypothesis 3:** There is a significant relationship between the adoption benefits factor on the level of e-commerce adoption.

**Hypothesis 4:** There is a significant relationship between the adoption barriers on the level of e-commerce adoption.

### 3. METHOD

The aim of this study is to measure the e-commerce adoption activities in Yemeni SMEs as well as investigate the benefit and barriers of using e-commerce in SMEs in developing countries such as Yemen. To achieve this, the current study employed a mixed method case approach. The study integrated different methods in order to facilitate a deep understanding of the adoption level of e-commerce in SMEs in Yemen. Following a sequential exploratory design (Creswell, 2013), this study comprised two stages and employed two separate data collections methods that include: semistructured interviews and survey questionnaires. In exploratory design, qualitative data has the priority over quantitative results (Johnson & Onwuegbuzie, 2004). The exploratory mixed methods design (Creswell, 2013) was used “to explore a phenomenon, and then [collect] quantitative data to explain the relationships found in the qualitative results” (Creswell, 2013). Johnson and Onwuegbuzie (2004) argue that a mixed methods approach is a good method to support and provide in depth investigation of the research problem.



In the first stage, a series of semi structured interviews was conducted with SMEs' managers and owners in order to further explore their understanding of e-commerce in their enterprises. As a consequence, the first stage will be expected to offer in depth views of the factors on the impact of the implementation of e-commerce by SMEs in Yemen. The results of the first stage helped in informing the design of the questionnaire. In the second stage, a survey questionnaire was used to generalize and verify the findings from stage 1 to the SMEs' population. Additionally, Bell and Waters (2014) pointed out that "a study making use of questionnaires will inevitably be quantitative, but it may also have qualitative features." Although there were some practical difficulties with the primary research these were mitigated in the research design through the research being undertaken before the current political situation in Yemen fully developed.

For this study the SMEs' contact details were sourced from the Ministry of Trade in Yemen. The Ministry provided valuable information about SMEs from several sectors (i.e. manufacturing, retailing, services) in Yemen and particularly in Taiz and Sana'a. The Ministry has a directory of such organizations including contact numbers and commerce activities.

A total of four interviews were conducted with owners and managers. The interviews were conducted through Skype and recorded. A qualitative content analysis was used to identify e-commerce activities and the factors that positively and negatively influence SMEs to adopt e-commerce. The SMEs' survey characteristics include: 1–0 employees, location: Taiz and Sana'a in Yemen and commerce activities: retailer, wholesale, manufacturing, other services. An SME is a firm that employs not more than 50 employees based on the Yemeni SME definition (YMIT, 2014). A total of 300 questionnaires were distributed randomly to managers and owners in 150 SMEs in Yemen and the return was 102 questionnaires, giving a response rate of around 34%.

The data collected was analyzed using the Statistical Package for the Social Sciences (SPSS) software. An independent sample t test was used to find the differences in the size and age of the SMEs as well as the significant relationship between the size and age of SMEs on the level of e-commerce adoption. Linear regression examined the relationship between the predictor variables on the level of e-commerce adoption.

A high percentage of the SMEs surveyed in the study were business services (41.2%) and wholesale and retail (31.4%). Some 23.5% of SMEs have employees between 1 and 76.5% of SMEs have employees between 10 and 49, therefore the majority of them were medium sized firms. In addition, about 51% of the SMEs have been established for 10 years and below, and 49% were above 10 years.

#### **4. FINDINGS**

The benefit of e-commerce adoption was measured through 12 questions using the Mean scores of a Likert scale (strongly disagree, disagree, neutral, agree and strongly agree) as shown in Table 6. The result of the reliability shows a Cronbach's score of 0.865 which mean the construct (benefit of e-commerce adoption) are reliable for data analysis. The barriers of e-commerce adoption were measured through 15 questions using the Mean scores of Likert scale as shown in Table 6. The result of the reliability shows a Cronbach's score of .829, which means the construct (barriers of e-commerce adoption) is reliable for data analysis.

The analysis of the questionnaires considers the current state of e-commerce adoption in Yemen SMEs via the e-commerce measurement evolution model as explained in Figure 1, only 20% of the SMEs are on the "not started" stage with 80% at the "email stage" and they

use the emails for communicating with their suppliers and customers. However, 68% of the businesses that participated in this study have social media and used advertising for their goods and services. An interesting score was that most of the SMEs have their own website and only 33% use e-commerce for purposes such as to receive orders and process them manually and receive the payment either by bank transfer or cash. Alternatively, none of the respondents have any experience of using mobile apps, cloud computing, e-commerce, and transformed organization.

The results showed that 68% of SMEs adopted the second stage (social media) which is less than the third stage (website). Therefore, social media should be in the third stage and website should be in the second stage to confirm that the e-commerce measurement evolution model adequately captures a linear evolution from stage 1 to stage 8.

**Table 6: Benefits of e-commerce adoption result**

Benefit of e-commerce adoption	Mean	Ranking
Reduce cost of commerce operations	4.57	1
Easy and fast exchange of documents and information	4.20	5
Improve customer service	4.33	2
Providing the customer with a more satisfying business experience	4.08	7
Increase the availability of products/service to customers	3.84	11
Improve accessibility to more customers	4.22	4
Support linkage with suppliers	4.08	6
Increase ability to compete	4.31	3
Providing managers better access to information	4.04	8
Support strategic decisions of managers	3.96	9
Support cooperative partnership in the industry	3.45	12
Save time	3.90	10
Cronbach's $\alpha$ .865 for N(12)		

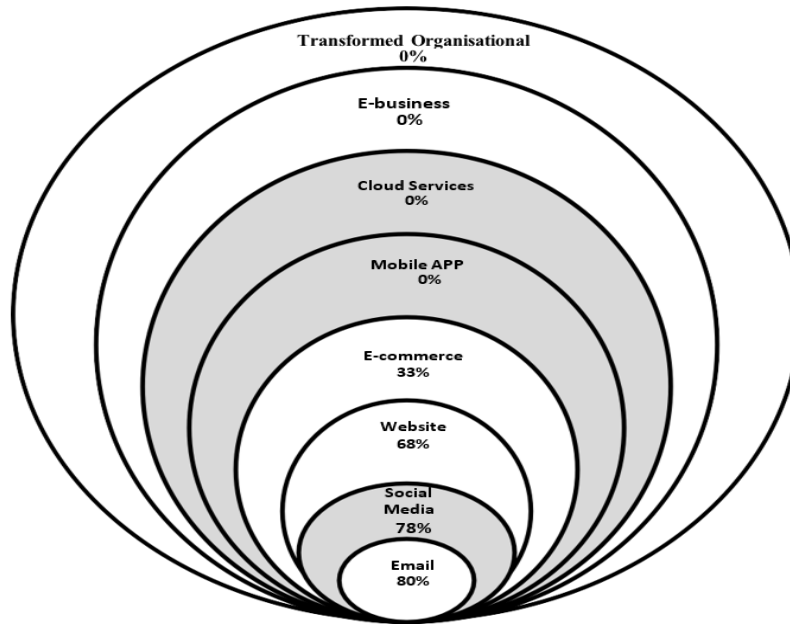
**Table 7: Barriers of e-commerce adoption result**

Barriers of e-commerce adoption	Mean	Ranking
Low level of technology usage within the organization	4.02	6
Low level of literacy among SME owners	4.12	4
Unconvincing benefit to the organization	3.69	9
Lack of qualified staff to develop, implement and support websites	3.63	10
Limited resources in terms of finance, computers software and hardware	3.31	14
High cost of Internet connectivity and website	3.27	15
Inadequate transportation and delivery network	3.45	12
Inadequate telecommunication infrastructure such as poor Internet connectivity	3.33	13
Lack of online payment process	3.57	11
Limited availability of online banking services	3.84	8
Lack of developed legal and regulatory systems	4.04	5
Lack of government support	3.92	7
Lack of popularity for online business transactions	4.45	2
Lack of electricity	4.31	3
Corruption	4.59	1
Cronbach's $\alpha$ .829 for N(15)		

## Hypotheses Testing

**Hypothesis 1:** There is a significant relationship between size of SMEs and the level of e-commerce adoption

**Figure 1: E-commerce Measurement Evolution Description**



**Table 8: Relationship between size of SMEs and the level of e-commerce adoption**

Level of e-commerce adoption	N	Mean	Std. Dev	t	df	p
No. Employee (1-9)	24	.3380	.19239			
No. Employee (≥10)	78	.4174	.16035	-2.022	100	.046

Results in Table 8 indicate there is a significant relationship in the level of e-commerce adoption of the businesses whose size was 1- and those with size ≥0 ( $t = -2.022$ ,  $df = 100$ ,  $p > .05$  level of significance). The hypothesis was accepted.

**Hypothesis 2:** There is a significant relationship between age of SMEs and the level of e-commerce adoption.

**Table 9: Relationship between age of organization and the level of e-commerce adoption**

Level of e-commerce adoption	N	Mean	Std.Dev	T	df	p
Age of organization (1-5)	52	.4338	.13249			
Age of organization (>5)	50	.3622	.19801	2.136	85	.036

Results in Table 9 indicate there is a significant relationship in the level of e-commerce adoption of the businesses that were 1- years old and those >5 years old ( $t = 2.136$ ,  $df = 85$ ,  $p > .05$  level of significance). The hypothesis was accepted.

Table 10 indicated the linear regression established the combination effect of benefit and barriers factors on e-commerce adoption was not significant  $F(3,98) = 24.007$ ;  $R = .651$ ;  $R^2 = .424$ ; adjusted  $R^2 = .406$ ,  $p > .05$ ).

**Table 10: Regression analysis**

Model	Sum of squares	df	Mean square	F	Sig.
Regression	1.248	3	.416	24.007	.000
Residual	1.699	98	.17		
Total	2.947	101			

**Hypotheses 3 and 4:** There is a significant relationship between barriers and benefits factors on the level of e-commerce adoption.

Table 11 shows the various relative contributions and level of significance of the independent variables. Barriers ( $\beta = -.036$ ,  $p > .05$ ) and benefits ( $\beta = .132$ ,  $p > .05$ ). The results indicate the barriers and benefits factor was not significant (Table 12).

**Table 11: Regression analysis**

Model	Unstandardized Coefficients B	Std. error	Standardized Coefficients Beta ( $\beta$ )	T	Sig.
(Constant)	-.097	.092		-1.053	.295
Barriers	-.009	.019	-.036	-.452	.652
Benefits	.030	.020	.132	1.525	.130

**Table 12: Hypothesis Testing**

Hypotheses	Variable	Sig.
Hypotheses 1	There is significant relationship between age of SMEs and the level of e-commerce adoption.	Accepted
Hypotheses 2	There is significant relationship between size of SMEs and the level of e-commerce adoption.	Accepted
Hypotheses 3	There is significant relationship between benefits factors on the level of e-commerce adoption.	Rejected
Hypotheses 4	There is significant relationship between barriers on the level of e-commerce adoption.	Rejected

## 5. DISCUSSION

The interview study concludes that most of the SMEs have a basic ICT infrastructure such as computer networked Internet connections. This can be attributed to the fact that most of the SMEs' owners and managers describe their understanding of e-commerce as an important technology for SMEs to grow. Also, they mentioned that e-commerce is the main aspect for selling and buying over the Internet as well as product advertisement.

The findings stated that Internet connections, emails, and websites were the main technologies adopted by the SMEs as those technologies were used for electronic advertising and providing firm information. For instance, emails were used for communicating with suppliers and customers, and websites were used for e-commerce purposes such as to receive orders and process them manually and receive the payments either by bank transfer or cash. Referring to the e-commerce measurement evolution model Yemeni SMEs are still at the early stages of e-business adoption and these stages are the important basis of the adoption of e-commerce. These results are similar to the findings of Fitzgerald and Alonso Mendo (2005) that early stages of electronic business adoption are usually considered by connecting to the Internet then the use of relative technologies such as email and websites.

A high percentage of SMEs used social media for electronic advertising, selling products and providing firm's information, another major service being websites that were adopted with comparatively small usage of e-commerce. Only 33% of surveyed SMEs enabled customers to purchase through either the company's social media or website. The result confirms the Almotamar (2014) report that the Yemen e-commerce sector is witnessing rapid growth and has exceeded expectations, and has become a new way of shopping compared with previous years.

Organization size has been considered as one of the drivers that promote the adoption of e-business. The findings of this study showed that most of the firms were medium enterprises with 10–9 employees. The findings showed that there is a significant relationship between the size of the company and adoption which agreed with the result of Olatokun and Kebonye (2010) which showed that the larger firm is more likely to promote Internet technology



adoption. Moreover, the results are similar to those of Ghobakhloo et al. (2012), who revealed that small enterprises have less tolerance in accepting cost and risk associated with adopting new technologies.

The e-commerce adoption benefits and barriers were measured by a regression test which showed that there are no significant relationships with the adoption of e-commerce. However, the result showed that there are benefits of adopting e-commerce by SMEs such as to reduce the cost of operations, improve customer's services and save time which confirms previous studies (OECD, 2004; Sharma & Sheth, 2010; Tan et al., 2009), adopting ICT and its application expect to offer the organizations more efficient resource management as well as to make the firm's communication faster.

## 6. CONCLUSION

E-commerce has provided many benefits to developing countries. It has reduced the cost of all sales transactions and increased international trade which may result in economic development. The Yemen e-commerce sector is witnessing rapid growth with exceeded expectations, and has become a new way of shopping compared with previous years. This article's main aim was to measure e-commerce adoption activities in Yemeni SMEs. The article employed a mixed method case approach. Further, the article integrated different methods in order to facilitate a deep understanding of the adoption level of e-commerce in SMEs. Firstly, semi structured interviews were conducted with SMEs' managers. Secondly, a survey questionnaire was used to generalize and verify the findings from stage 1 to the SMEs' population.

The findings of this study have identified the current state of e-commerce adoption in Yemeni SMEs via the e-business measurement evolution model, 20% of the SMEs are on the "not started" stage while 80% at the "email stage" and they use email for communicating with their suppliers and customers. However, 68% of the businesses that participated in this study have social media and used this for advertising their goods and services. A key finding was that most of the SMEs have their own website and only 33% use e-commerce for purposes such as to receive orders and processed them manually and receive payment either by bank transfer or cash. By contrast, none of the respondents have any use or experience of mobile apps, cloud computing, e-commerce, and transformed organization.

The main challenges that deter SMEs with the adoption of e-commerce is company size, lack of government support, lack ICT infrastructure, the high cost of the Internet, and the lack of electricity. The findings of this study confirm the barriers above and also present more barriers such as a low level of technology usage within the organization, lack of qualified staff to develop and implement and support websites, unconvincing benefit to the organization, and limited resources in terms of finance, computer software and hardware. The benefits that SMEs can gain from adopting e-commerce are reduced operation cost, and an increase in customer's confidence. This study found that there is a significant relationship between the SMEs' size and the adoption level. Furthermore, there was a significant relationship between the SMEs' age and the adoption level, while there was no significant relationship between the benefits and barriers on the adoption level. In terms of empirical contribution, the study could be considered to be a unique study in the field of e-commerce adoption in Yemeni SMEs. The literature review explained that empirical studies into e-commerce adoption in SMEs remain comparatively rare in developing countries. This is especially so in Middle East countries. In addition, most previous studies focused on a broad and generic view of e-commerce adoption in SMEs (Aladwani, 2003; Al-Marti, 2008;



Almotamar, 2014; Zolait et al., 2010). This study conducted in a cross-country context; considered SMEs' adoption of e-commerce from the perspective of the level of adoption. Therefore, it made an original theoretical contribution toward the current body of knowledge on the adoption of e-commerce through developing a specific e-commerce measurement evolution stages model based on the contribution of existing literature and the e-adoption ladder model. The e-commerce measurement evolution model along with barriers and benefits was measured on Yemeni SMEs using a mixed methods approach. A key finding was that most of the SMEs have their own website and only 33% use e-commerce for purposes such as to receive orders and processed them manually and receive payment either by bank transfer or cash. Based on the findings, the research offers the following recommendation: the owners and managers of Yemeni SMEs need to be supported to gain an understanding of the benefits that their business can achieve from adopting e-commerce especially in relation to business growth. Owners and managers should be aware of the technology and they have to keep up to date with the evolution of technology. Firms' owners should employ ICT experts to help the company identify the need for development to move the company toward the adoption of e-commerce. For instance, the e-commerce environment and infrastructure must be continuously improved to facilitate e-commerce applications such as high speed Internet, a full functionality website, and secure order processing and payment systems. Furthermore, Yemeni SME employees need to be trained to use such technology.

Further research will investigate the relationship between e-commerce strategy and the level of e-commerce, as well as to increase the study sample size. This will enable identification of the unique requirements and problems related to SMEs in adopting e-commerce and should ideally be undertaken with a longitudinal study. It should be noted that this research has inferential and contextual limitations. The sample of this study was small due to the distance between the researchers' location and the subjects included in the study. Therefore, the study sample will need to be increased in further research and undertaken in times of relative political stability.

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