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# **An investigation of the benefits and barriers of e-business adoption activities in Yemeni SMEs**

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## **Abstract**

**Purpose** - This study aims to measure the e-business adoption activities in Yemeni small and medium-sized enterprises (SMEs) as well as investigate the benefit and barriers of using e-business in SMEs in developing countries such as Yemen.

**Design/methodology/approach** - the study employs a mixed method case approach. The paper integrates different methods in order to facilitate a deep understanding of the adoption level of e-business in SMEs in. Firstly, semi-structured interviews are conducted with SMEs' managers. Secondly, a questionnaire is used to generalise and verify the findings from stage 1 to the SME population. Four hypotheses are tested at 0.05 level significance. The collected data are analysed using the Statistical Package for the Social Sciences (SPSS) software. Independent-samples t-test is 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-business adoption. Also, linear regression examines the relationship between the predictor variables on the level of e-business adoption. About 23.5% of SMEs have employees between 1 and 9, and 76.5% of SMEs have employees between 10 and 49; therefore the majority of them are medium sized firms. In addition, about 51% of the SMEs have been established for 10 years and below, and 49% are above 10 years.

**Findings** - The results indicate that the Yemeni SMEs are at the early stages of e-business adoption. It also indicates there are a number of factors that deter Yemeni SMEs from the adoption of e-business. Factors such as the low level of technology usage within the organisation, lack of qualified staff to develop and implement and support websites, limited resources in terms of finance, computer software and hardware appear to have a detrimental effect on e-business adoption amongst Yemeni SMEs.

**Key words:** e-Business, e-commerce, measurement evolution model, SMEs, Yemen.

## **Introduction**

Increasingly, in developed and developing countries, small and medium-sized enterprises (SMEs) are becoming more important to national economies due to their strategic significance in developing different industrial sectors worldwide (Maad and 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 (GDP) and its labour force by creating more job opportunities and developing skilled labour. The integration of information and communication technology (ICT) has a strong effect within the organisation and individual with improved productivity, an increase in the number of customers has reduced the cost of products (Andam et al., 2003). However, one of the most important strategies that can effectively help SMEs to enhance their business performance is the utilisation of information and communication technology (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 (Sharma and Sheth, 2010). The worldwide economy is developing and e-business has increased and become an important component of business strategy and economic development (Al-Marti, 2008). Therefore, rapid development has been witnessed in the world within different aspects of life, especially the technological revolution such as e-business. For instance, there is widespread use of the internet in every aspect and phase of business (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 (Warzan) and became arguably the best e-commerce site in the scope of e-commerce in Yemen. Although there are many individuals using Facebook pages to promote their products, those pages do not have sufficient confidence 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 consumer rights (Almotamar, 2014).

The study develops a measurement evolution model based on the e-adoption ladder model. The e-adoption model used by a number of researches and this approach is a "step-by-step" process which starts with email communication then with basic website, ecommerce, e-business until the point of the transformed organization (Hoque, 2000; Willcocks and Sauer, 2000; Parish et al. 2002; Jones et al. 2003; Vosloo, 2003; Teo and Pian, 2004). The developed model is extended 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 adopt through adopting e-business.

Despite several studies related to e-business adoption, the majority of these studies focused on comparatively well developed countries such as Wales (Thomas and Simmons, 2010); South Africa (Cloete et al., 2002); New Zealand (Al-Qirim, 2007), parts of Asia (Sharma and Sheth, 2004), and the United Kingdom (Simpson and Docherty, 2004). However, few studies have concentrated on the adoption of e-business in a developing economy (Li et al., 2010). Furthermore, empirical studies into e-business adoption in SMEs have remained rare in developing countries. This is especially the case in Middle East countries. In addition, most previous studies focused on a broad and generic view of e-business adoption in SMEs' (Aladwani, 2003, Zolait et al., 2010, Al-Marti, 2008, Almotamar, 2014). This study conducted in a cross-country context; considered SMEs' adoption of e-business from the perspective of the level of adoption.

The adoption of ICT and e-business offer organisations more efficient resource management as well as making firms' communication faster (OECD, 2004). Moreover there are barriers for SMEs adopting e-business such as cost, size and skilled labour (Middleton, 2011). This study focuses on SMEs and the fields of manufactory, services and retail. To the knowledge of the authors there is no similar study that has used adoption ladder models to measure e-business activities in Yemen. In addition, studies on e-business adoption remain rare and no studies have focused on SMEs' e-business adoption. Therefore, this research needs to be carried out.

This study's main aims are to measure e-business adoption activities in Yemeni SMEs as well as investigate the benefit and barriers of using e-business in SMEs in developing countries such as Yemen. The study aims to answer the following research questions:

- To what extent are SMEs engaging in e-business?
- What deters Yemeni SMEs from adopting e-business?
- What are the benefits of e-business adoption?

## ***Background and Yemen context***

### **SME Definition**

The definition of an SME varies from country to country. To define whether a company is an SME, there is a need to identify employee number, annual turnover and balance sheet of the company. In European law the Medium-Sized Enterprise is 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)

### **SMEs in Yemen**

The (YMIT, 2014) state the number of SMEs in Yemen at about 27,796 companies in the manufacturing field (see Table 1).

<b>Table1 Number of SMEs</b>		<b>Percentages</b>
<b>Enterprise</b>	Large	0.51
	Medium	1.91
	Small	19.15
	Micro	78.43
<b>Location</b>	Sana'a	18.06
	Taiz	13.93
	Rest of the cities	68.01
<b>Type of Enterprises</b>	Food products and beverage	43.75
	Fabricated metal products	14.78
	Non-metallic 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%, Non-metallic mineral products with 11.02%, apparel products with 10.80% and other activities, services and retails with 19.65%.

### **Yemen and ICT policy**

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 incumbent 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 continues to be the big success story in Yemen (BuddeComm, 2012). 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 have clear ICT policies. There was a large investment by the Yemeni government towards ICT to achieve greater productivity. Most government organisations have computers used in their daily work life to speed 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. For example, to reduce computer illiteracy, some 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 GSM and CDM. But the Yemen government is still the only internet provider in the country.

According to the 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, p.515) state that the Telecommunication Corporation (yemen.net.ye) and Teleyemen (y.net.ye) are the only two ISP's internet services providers in the country which belong to the Yemen government. Al-Wazir and Zheng (2012, p.514) 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 so as to meet the needs of economic and social development and to encourage investment in these areas and 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 and using the technology called (EV-DO Rev A). Yemen commercial broadband technology includes: Fixed (wired)-

broadband technology (DSL), 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 (NGN) are one of the new developments which were installed in two locations Aden and Mukalla in Yemen. In addition, fibre optic paths with a length of 1,187km 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 (YemenPortal.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 places available to the Yemeni citizen for internet access due to the 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).

### **E-business and SMEs in Yemen**

The Yemen e-commerce sector is witnessing rapid growth with exceeded expectations, and has become a new way of shopping compared with previous years(Almotamar, 2014) . In the last year, the first electronic store website was established called Warzan and became arguably the best e-commerce site in the scope of e-commerce in Yemen. Although there are many individuals using Facebook pages to promote their products, those pages do not have sufficient confidence 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 consumer rights (Almotamar, 2014). Whereas Nations (2007) reports that e-business 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 (Nations, 2007). Further, Al-Marti (2008) argues that e-business 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).

## ***Literature review***

The literature review will identify e-business and e-commerce definitions and e-business in developing countries and the Middle East and will investigate the barriers and benefits of the adoption of e-business.

## ***E-business and E-commerce***

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 organisation.

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 organisational processes and the connection between the organisation and their suppliers and partners as well as customer scarification. However, Fillis et al. (2004) state e-business as companies that employ ICT in their business operations, but exclude sending and receiving text-based e-mail messages. Most researchers (Parazoglou 2006, Turban 2010, Fillis et al. 2004, Chaffey, 2011), 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 context of e-business**

Information and communication technology is one of the key roles of tackling economic problems in developing countries (Parliamentary, 2006). It can solve many challenges to achieve Millennium Development goals. 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, 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 and Sharma, 2007).

However, the characteristics of SMEs, such as structure, resource constraints and size, generate several challenges and difficulties towards 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 et al., 2010). According to Ghobakloo et al. (2012), SMEs have less tolerance in accepting cost and risk associated with adopting new technologies. Furthermore,

the lack of ICT literacy among the owners and employees is another barrier that inhibits effective ICT deployment within SMEs (Mehrtens et al., 2001).

For the last five years the Arab countries have witnessed fast developing ICT especially in the area of mobile cellular. Using 3G network has an influence on increasing the number of internet users as well as mobile-broadband subscribers (ITU, 2012). The investments of private sectors have made a change in the rapid development of information and telecommunications. These investments were in the field of mobile cellular services; an increase in the number of call centres and internet cafes, software companies and so on (United Nations, 2009).

### **E-business and SMEs in developing countries and the Middle East**

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 kind of e-commerce for buying or selling. Nine years later the number of internet users increased to about 300 million users, and only a few of the internet users used the internet for purchasing products and services from e-commerce sites for about 110 billion dollars. In 2013, products and services purchased by business-to-consumer were estimated at about 1.25 trillion dollars (WOT, 2013). E-business 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 and Collis, 2001).

The Middle East is characterised by one of the fastest-growing penetrations of the market as well as 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 tremendous exciting changes in the field of e-commerce in the Middle East (PayPal, 2013).

PayPal, (2013) predicted that the e-commerce market in the Middle East will achieve up to 15 billion US dollars in 2015, the growth achieved in the current year shows that the market is on track to achieve the 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 that were not available locally. The report showed 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-business activities: Benefits and Barriers**

In the current global economy e-business has increased and become an important component of business strategy and economic development (Kumar, Kumar, 2014). However, one of the most important

strategies that can effectively assist SMEs to enhance their business performance is the utilisation of information and communication technology (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 (Sharma and Sheth, 2010). The adoption of ICT and e-business can offer SMEs a wide range of benefits for their business process (OECD, 2004). For example, adopting ICT and its application offers organisations more efficient resource management as well as making communication faster. On other hand, e-business and the internet can provide SMEs with huge benefit 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 towards 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). According to 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 primarily 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-business adoption in SMEs such as Kaynak et al. (2005) who state that it is difficult to find and retrain employees with the required skills and knowledge. While, Bolongkikit et al. (2006) reported that there is a need for a high degree of human collaboration in SME markets. Hamed et al. (2008) stated it was difficult for many SMEs to obtain the levels of e-business skills to benefit from IT investment in e-business, 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-business is company size. Further, uncertainty of the financial benefits, lack of a clear e-business 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-business solutions (Parazoglou, 2006). Thus, Pahladsingh (2006) mentioned other e-business issues that influence the adoption of e-business and these include personal computers people own which reduce 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-business ethics are the main barriers to the adoption of e-business.

The OECD, (2012) reports that even though, 94 per cent of SMEs in OECD countries have a high speed internet connection, only 35 per cent are using online purchasing and 18 per cent 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 that 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-business adoption and these include cost, technology, SMEs' education and skills sets, lack of skilled labour and access to trusted advisors and consultants, red tape and bureaucracy, lack of time and resistance to growth. Berthon et al. (2008 p.86) argue that corruption has a strong effect on e-business adoption and development in the country.

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. Therefore, many studies have focused on the adoption of e-business barriers and drivers in developing countries and they reported that most developing countries face many challenges in terms of adopting an e-business 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, 2009, Zolait et al., 2010).

The main drivers and barriers are technology, cost, infrastructure, time, information and regulation. The main reasons behind delaying adopting e-business 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 non-delivery 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 (PayPal, 2013). Al-Marti (2008) reported that there are many challenges for the adoption of e-business in Yemen such as a weak spread of internet connections and infrastructure. Table 2, 3 illustrates the benefits and barriers mentioned above.

Table 2 Benefits of e-business adoption

<b>Benefit</b>	<b>Key Authors</b>
- Improve productivity - Reduce the cost of products	(Andam et al., 2003)
- Integration of supply chain partner - Organisation function - Offering critical information at the right time	(Sharma and Sheth, 2010)
Efficient resource management Faster communication Reducing transaction costs	(OECD, 2004).

Increasing the speed and rebiality of the transaction	
- Enhance business perfomance	(Tan et al., 2009).
- sales increase - new market penetration - cost reduction	(Zhu and Kraemer, 2002; Zhu et al., 2004)

Table 3: Barriers of e-business adoption

<b>Barriers</b>	<b>Key Authors</b>
- Lack of employees with required skills and knowledge	- (Kaynak et al., 2005, Bolongkikit et al., 2006, Hamed el at., 2008, OECD, 2012, Middleton, 2011)
- Lack of IT investment in e-commerce	- (Hamed el at., 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.	- (Parazoglou, 2006, Pahladsingh, 2006, Middleton)
- Internet connection speed - Internet connection cost - cost of hardware and software services - credit card interest - regulation - country culture - language - E-business ethics.	- (Pahladsingh, 2006)
- Institutional environment - legal system - Tax policy for online transactions.	- (OECD, 2012)
- government policies - ICT infrastructure	- (Pahladsingh, 2006, OECD, 2012)
- lack of clear e-business strategy	- (Parazoglou, 2006, OECD, 2012)

<ul style="list-style-type: none"> <li>- Difficult topography</li> <li>- scattered population group with low density</li> <li>- low level of distribution networks in cities and rural areas</li> </ul>	- (Al-Madhagy, 2013)
<ul style="list-style-type: none"> <li>- Corruption</li> </ul>	- (Berthon et al, 2008)
<ul style="list-style-type: none"> <li>- Lack of awareness</li> <li>- Absence of trust</li> <li>- weak income</li> <li>- poor economy</li> <li>- purchases made online</li> <li>- online payment service</li> <li>- Regulation</li> <li>- Cost</li> <li>- technology</li> <li>- Suitable infrastructure.</li> </ul>	- (Zolait et al., 2010, Hamed et al., 2008, Ntoko, 2009)
<ul style="list-style-type: none"> <li>- Security concerns</li> <li>- online payments fraud</li> <li>- delivery of products</li> <li>- Electronic payment Systems.</li> </ul>	- (PayPal, 2013)

## ***Research framework***

### ***E-adoption model***

The e-adoption model used by a number of researchers and this approach is a "step-by-step" process which starts with email communication then with basic website, ecommerce, e-business until the point of the transformed organization (Hoque, 2000; Jones et al. 2003; 2000; Parish et al. 2002; Teo and Pian 2004, Vosloo, 2003; Willcocks and Sauer). Furthermore, many researchers developed similar frameworks based on organisational, environmental and innovation factors to describe the differences in the adoption of e-business (Tan et al., 2007; Kshetri, 2007; Molla and Licker, 2005; Soliman and Janz, 2004). Many studies have outlined and highlighted theoretical and conceptual frameworks for e-business and e-commerce adoption in developing, Islamic and Arab countries (Dali et al., 2003, Hamed et al., 2008, Nathan, 2009, Zolait et al., 2010) (see table 4).

Table 4: Stages Models

<b>e- Adoption Ladder Models</b>	<b>Description</b>	<b>Reference</b>
The Commerce Stairway	Six Stages	(Thomas et al., 2009)

	step 0 (no started) step 6 (advanced e-Commerce)	
e-commerce adoption ladder	five steps step 0 (no started) step 5 (transformed organisation )	(Thomas et al., 2013)
organisation level of e-commerce adoption	five stages stage 0 (no online capability) stage 5 (integrated web)	(Al-Somali and Clegg, 2013)
e-business adoption ladder	six stages, stage 1 (email), stage 6 (digital ecosystem)	(Mpofu et al., 2013)
moving to e-business	four stages stage 1 (commerce+) stage 4 (e-business)	(Levy and Powell, 2003)
ladder of connectivity	six stages stage 0 (no started) stage 6 (advanced e-commerce)	(Murphy and Symonds, 2004 )
stages of the e-commerce adoption ladder	six stages stage 0 (have not started yet) stage 6 (use advanced e-commerce)	(Beynon-Davies, 2010)

### ***E-business Measurement Evolution Model***

This research contributes to the existing literature in e-business adoption by outlining the factors involved with e-business adoption in SMEs in developing countries and Yemen. This study does this by developing a specific e-business Measurement Evolution model based on the contribution of existing literature and the e-adoption ladder model. This is because organisations may differ in their level of e-business 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 5: E-business Measurement Evolution Description (source: current study)

<b>Stages</b>	<b>Description</b>
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
<b>Stage 2</b>	(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 initialising 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

<b>Stage 5</b>	(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.
<b>Stage 6</b>	(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, fulfilment, accounts and/or marketing.
Stage 8	(Transformed Organisation), Internet technology drives the business internally and externally, and is used to manage all processes end-to-end more effectively and efficiently.

The literature highlights the benefits and barriers that SMEs face when making changes in their strategy toward adopting e-business 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:

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

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

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

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

Following the introduction, background and Yemen context, literature review, research framework and hypotheses, the next sections describe the research methodology, and provide the findings, discussion and conclusion.

## ***Research Methodology***

The aim of this study is to measure the e-business adoption activities in Yemeni SMEs as well as investigate the benefit and barriers of using e-business 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-business in SMEs in Yemen. Following a sequential exploratory design (Creswell, 2003), this study comprised two stages and employed a total of two different data collections that include: semi-structured-interviews and survey questionnaires. In exploratory design, qualitative data has the priority over quantitative results (Johnson and Onwuegbuzie, 2004). The exploratory mixed methods design (Creswell, 2003) used “to explore a phenomenon, and then [collect] quantitative data to explain the relationships found in the qualitative results” (Creswell, 2003). 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-business 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-business 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 generalise and verify the findings from stage 1 to the SMEs’ population. In addition, 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 situation in Yemen as a politically charged country fully developed.

### **Research Sample frame**

A research sample frame refers to the set of source materials from which the sample is selected (Särndal et al., 2003). The current study has obtained the SMEs contact details from the Ministry of Trade in Yemen. The Ministry provided valuable information about the firms and 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 organisations including contact numbers and business 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-business activities and the factors that positively and negatively influence SMEs to adopt e-business. The SMEs’ survey characteristics include - size: 1-50 employees, location: Taiz and Sana’a in Yemen and business activities: retailer, wholesale, manufacturing, other services. An SME is a firm that employs not more than 50 employees. A total of 300 questionnaires were distributed randomly to managers and decision makers in 150 SMEs in Yemen and the return was 102 questionnaires, giving a response rate of around 34%.

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS) software. An independent-samples 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-business adoption. Linear regression examined the relationship between the predictor variables on the level of e-business adoption.

A high percentage of the SMEs surveyed in the study were business services (41.2%) and wholesale and retail (31.4%). About (23.5%) of SMEs have employees between 1-9 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.

## ***Findings***

### ***Summary of interview results***

Most of the interviews stated that they have basic ICT infrastructure such as computers and internet, and just a few have a website. This can be attributed to the fact that most of the SMEs' owners, managers and decision makers, described their understanding of e-business as an important technology for SMEs to grow, they stated that e-business is the main aspect for selling and buying over the internet as well as the product's advertisement. Furthermore they mentioned that e-business becomes a new way to extend their business and reach the whole world quickly. When they were asked why they have not yet adopted e-business, they mentioned a lot of barriers such as government and bank support, weak ICT infrastructure, electricity and electronic payments as well as legal aspects and the regulation of e-business. They added that there was a lack of experts, skilled employers and other barriers.

### ***Survey Results***

- The benefit of e-business adoption was measured through 12 questions using the Mean scores of a 1-5 Likert scale (Strongly Disagree, Disagree, Natural, Agree and Strongly Agree) as shown in Table 6. The result of the Reliability shows that a Cronbach's score of 0.865 which means the construct (Benefit of e-Business Adoption) is reliable for data analysis.

Table 6: Benefits of e-business adoption result

<b>Benefit of e-Business Adoption</b>	<b>Mean</b>
Reduce cost of business operations	4.57
Easy and fast exchange of documents and information	4.20
Improve customer service	4.33

Providing the customer with a more satisfying business experience	4.08
Increase the availability of products/service to customers	3.84
Improve accessibility to more customers	4.22
Support linkage with suppliers	4.08
Increase ability to compete	4.31
Providing managers better access to information	4.04
Support strategic decisions of managers	3.96
Support co-operative partnership in the industry	3.45
Save time	3.90
Cronbach's Alpha 0.865 for N(12)	

- The barriers of e-business adoption were measured through 15 questions using the Mean scores of a 1-5 Likert scale (Strongly Disagree, Disagree, Natural, Agree and Strongly Agree) as shown in Table 7. The result of the Reliability shows that a Cronbach's score of 0.829, which means the construct (Barriers of e-Business Adoption) is reliable for data analysis.

Table 7: Barriers of e-business adoption result

<b>Barriers of e-Business Adoption</b>	<b>Mean</b>	<b>Ranking</b>
Low level of technology usage within the organisation	4.02	6
Low level of literacy among SME owners	4.12	4
Unconvincing benefit to the organisation	3.69	9
Lack of qualified staff to develop, implement and support websites	3.63	10
Limited resources interms 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 0.829 for N(15)		

## **E-business Measurement Evolution Model**

The analysis of the questionnaires considers the current state of e-business adoption in Yemen SMEs via the e-business measurement evolution model as explained in figure 1, only 20 per cent of the SMEs are on the “not started” stage while 80 per cent at the “email stage” and they use the emails for communicating with their suppliers and customers. However, 68 per cent 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 per cent of them 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-business and transformed organisation.

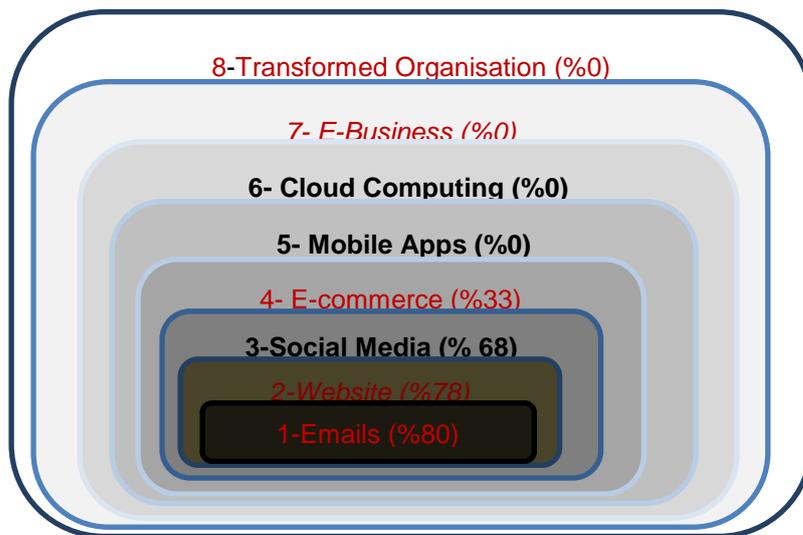


Figure 1: E-business Measurement Evolution Model (source: current study)

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

### ***Test of Hypotheses***

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

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

<b>Level of e-business adoption</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>t</b>	<b>df</b>	<b>p</b>
Number of employee (1-9)	24	.3380	.19239			
Number of employee ( =>10)	78	.4174	.16035	-2.022	100	0.046

Results in Table 8 indicate that there is significant relationship in the level of e-business adoption of the businesses whose size was 1-9 and those with size  $\geq 10$  ( $t = -2.022$ ,  $df = 100$ ,  $p > 0.05$  level of significance). The hypothesis was accepted.

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

Table 9: Relationship between age of organisation and the level of e-business adoption

Level of e-business adoption	N	Mean	Std. Dev	T	df	p
Age of organisation (1-5)	52	.4338	.13249	2.136	85	0.036
Age of organisation (>5)	50	.3622	.19801			

Results in Table 9 indicate that there is significant relationship in the level of e-business adoption of the businesses that were 1-5 years old and those >5 years old ( $t = 2.136$ ,  $df = 85$ ,  $p > 0.05$  level of significance). The hypothesis was accepted.

Table 10: Regression analysis indicating the joint effect of owner knowledge, barriers and benefits factors on the level of e-business adoption

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.248	3	.416	24.007	.000 <sup>b</sup>
Residual	1.699	98	0.17		
Total	2.947	101			

$R = 0.672$ ;  $R \text{ square} = 0.452$ ;  $\text{Adjusted } R \text{ square} = 0.435$

Table 10 indicated that the linear regression established that the combination effect of benefit, barriers and the owner knowledge factors on e-business adoption was not significant  $F(3, 98) = 24.007$ ;  $R = .651$ ;  $R \text{ square} = .424$ ;  $\text{Adjusted } R \text{ square} = .406$ ,  $p > 0.05$ ).

**Hypothesis 3, 4:** There is significant relationship between barriers and benefits factors on the level of e-business adoption.

Table 11: Regression analysis indicating the relative contributions of owner knowledge, barriers and benefits factors on the level of e-business adoption

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

Table 11 shows the various relative contributions and level of significance of the independent variables. Barriers ( $\beta = -.036$ ,  $P > 0.05$ ) and Benefits ( $\beta = .132$ ,  $P > 0.05$ ). The results indicate that the barriers and benefits factor was not significant.

Table 12: Summary of Hypotheses

Hypotheses	Variables	Test	Sig.
Hypothesis 1	There is significant relationship between age of SMEs and the level of e-business adoption.		Accepted

		T-test	
Hypothesis 2	There is significant relationship between size of SMEs and the level of e-business adoption.	T-test	Accepted
Hypothesis 3	There is significant relationship between benefits factors on the level of e-business adoption.	Regression	Rejected
Hypothesis 4	There is significant relationship between barriers on the level of e-business adoption.	Regression	Rejected

The findings presented above are now considered in the discussion section.

## ***Discussion***

The conducted study of the interviews 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, managers and decision makers, describe their understanding of e-business as an important technology for SMEs to grow. Also, they mentioned that e-business 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 some kind of e-commerce purpose such as to receive orders and process them manually and receive the payments either by bank transfer or cash. Referring to the e-business measurement evolution model SMEs are still at early stages of e-business adoption and these stages are the important basis of the adoption of e-business and it shows SMEs are able to move toward the stages to adopt e-business. These results agree with the findings of Mendo and Fitzgerald (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 a small use 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. In the last year, the first electronic store website was established called Warzan and became arguably the best e-commerce site in the scope of e-commerce in Yemen. Although there are many individuals using Facebook pages to promote their products, those pages do not have sufficient confidence 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 consumer rights.

Organisation 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 10-49 employees. The findings showed that there is significant relationship between the size of the company and adoption which agreed with the result of Olatokun and Kebonye (2010) which showed that the large firm promotes internet technology adoption. Moreover the result agreed with Ghobakhloo et al. (2012), who revealed that small enterprises have less tolerance in accepting cost and risk associated with adopting new technologies.

The e-business adoption benefit and barriers was measured by a regression test which showed that there are not significant relationships with the adoption of e-business. However, the result showed that there are benefits of adopting e-business by SMEs such as to reduce the cost of operations, improve customers services and save time which confirms previous studies (OECD, 2004, Sharma and Sheth, 2010, Tan et al., 2009), adopting ICT and its application expect to offer the organisations more efficient resource management as well as to make the firm's communication faster. Contrastingly, e-business and the internet can provide SMEs with considerable benefits such as reducing transaction costs, and increasing the speed and reliability of the transaction.

## ***Conclusions***

E-business 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 paper's main aim was to measure e-business adoption activities in Yemeni SMEs.

This paper employed a mixed method case approach. Further, the paper integrated different methods in order to facilitate a deep understanding of the adoption level of e-business in SMEs. Firstly, semi-structured interviews were conducted with SMEs' managers. Secondly, a survey questionnaire was used to generalise and verify the findings from stage 1 to the SMEs' population.

The findings of this study have identified the current state of e-business adoption in Yemen SMEs via the e-business measurement evolution model, 20 per cent of the SMEs are on the "not started" stage while 80 percent at the "email stage" and they use email for communicating with their suppliers and customers. However, 68 percent 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 per cent 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-business and transformed organisation.

The main challenges that deter SMEs with the adoption of e-business is company size, lack of government support, lack ICT infrastructure, the high cost of the internet and the lack of electricity. The findings of the this study confirm the barriers above and also present more barriers such as low level of technology usage within the organisation, lack of qualified staff to develop and implement and support websites, unconvincing benefit to the organisation, limited resources in terms of finance, computer software and hardware. The benefits that SMEs can gain from adopting e-business are reduced operation cost, and an increase in customer's confidence. This study found that there is significant relationship between the SMEs' size and the adoption level. Furthermore, there was 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-business adoption in Yemeni SMEs. The literature review explained that empirical studies into e-business adoption in SMEs remains rare in the developing countries. This is especially so in Middle East countries. In addition, most previous studies focused on a broad and generic view of e-business adoption in SMEs' (Aladwani, 2003, Ali Hussein Saleh et al., 2010, Al-Marti, 2008, Almotamar, 2014). This study conducted in a cross-country context; considered SMEs' adoption of e-business from the perspective of the level of adoption. Therefore, it made an original theoretical contribution towards the current body of knowledge on the adoption of e-business through developing a specific e-business Measurement Evolution stages model based on the contribution of existing literature and the e-adoption ladder model. The e-business measurement evolution model along with barriers and benefits was measured on Yemeni SMEs using a mixed methods approach.

Based on the findings, the research offers the following recommendation: the owners and decision makers need to understand the benefits that their company can gain from adopting e-business as well as the growth of their business. Owners must be aware of the technology and they have to keep up-to-date with the evolution of technology. Decision makers should employ ICT experts to help the company identify the need for development to move the company toward the adoption of e-business. For instance, the e-business environment and infrastructure must be continuously improved to facilitate e-business applications in SMEs including high speed internet, a full functionality website, secure order processing and payment systems. SME employees need to be trained to use such technology.

Further research will investigate the relationship between e-business strategy and the level of e-business, as well as to increase the study sample. This will enable identification of the unique requirements and problems related to SMEs in adopting e-business and should 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 sample of the study. Therefore, the study sample will need to be increased in further research and undertaken in times of relative stability.

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