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Designing and Deploying an E-Business Model for Small and Medium-Sized Enterprises in Saudi Arabia

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Abstract

This work was carried out to deploy e-business and e-commerce through small and medium-sized enterprises (SMEs) in Saudi Arabia. To that end, a study on market behaviour was conducted, and a model was developed to transfer from traditional business to e-business. Finally, an application of this model was applied in a local small business. A study was carried out to find the two main characteristics of SMEs in Saudi Arabia: the level of adoption of e-business and the most significant limitations and barriers to this adoption. According to a survey of one hundred and nine SMEs in Saudi Arabia, 14% were found to depend only on e-mails for communication purposes. A total of 76% were found to have used websites for marketing their businesses. Six percent were already using e-commerce for online sales, and only 4% of Saudi SMEs had fully integrated e-business systems through their supply chains. The results also showed that organizational, technical and economic barriers are the most significant in terms of e-business adoption. Therefore, when the model was under development, these three groups of barriers were used as criteria. After the study was conducted, a model was developed in the form of a strategy to transform traditional businesses into e-businesses. A new strategy was introduced that combines in-sourcing and outsourcing with the help of e-commerce site builders. Finally, this research will contribute to deploying e-business systems among SMEs in Saudi Arabia to align them with current market needs and consumer expectations better and to sustain competitive advantage.

Keywords: E-Business, Small and Medium-Sized Enterprises, Linguistic Barriers

1. Introduction to E-Business and SMEs in Saudi Arabia

With the advancement of the Web, the capacity to send data is presently unimaginably quick. Companies have realized this reality and have utilized the Web as a tool to extend their businesses. The term 'e-business ' was first coined by IBM in 1997. Initially, it was defined as "the change of key commerce forms through the utilization of Web innovations." Thus, an e-business could be a way to conduct minor and major trade exchanges online rather than going into a store. Moreover, it suggests a change of existing commerce forms into more productive forms. It pleases people who would rather have an item be dispatched from a store to them than go to an actual store to buy it. E-business applications will usually organize services, will help reduce waiting times and will contribute

to people's convenience. In Saudi Arabia, the need for a well-designed e-business system is growing. People in Saudi Arabia are becoming better educated. Uses of internet technology have become more popular, more accessible and more familiar to Saudi people, especially after the rapid, obvious boom in communication technologies in recent years.

This research will be carried out to determine the level at which SMEs in Saudi Arabia are adopting e-business. Then, the barriers and limitations to applying e-business systems in local SMEs will be defined so that we can develop a successful business model that overcomes those barriers and that can be easily applied in the market. The results of this research will help deploy e-business systems among SMEs in Saudi Arabia to align them with current market needs and consumer expectations better and to sustain competitive advantage.

1.1 Problem Description

The e-business showcase share in Saudi Arabia will hit SR50 billion by the end of 2015, according to Saudi Post sources. E-business is reliably attracting new buyers and making strides in income. Approximately 1 in 4 Saudi Web users are currently engaging in e-commerce, and they visit almost 70 million e-commerce pages per month. User development is at an evaluated 9.3 percent per year. This rate will most likely grow faster as e-business companies within the Kingdom learn how to gain and use their customers' trust. This means that e-business investing has reached an all-time height within the Kingdom. In general, one cannot currently compete without a few kinds of e-business procedure. Whereas e-commerce basically centres on a firm's customers, e-commerce extends the network of the organization to incorporate its suppliers, employees, and stakeholders.

E-business systems in Saudi Arabia are currently affordable in most international organizations and large local organizations, but the introduction of e-business among small and medium-sized enterprises (SMEs) in Saudi Arabia is a relatively unexplored area that needs to be better understood. The reason is that SMEs play a very significant role in the Saudi economy, and e-business introduction can transform this sector and make it more productive and competitive.

1.2 Goal

The main goal of this work is to deploy e-business systems for small and medium-sized enterprises in Saudi Arabia by studying the current level of adoption, finding the limitation and barriers to the growth of such systems and finally designing an infrastructure model to be easily applied in the market to transform businesses from traditional businesses into electronic businesses or e-businesses. This is to sustain competitive advantage and deliver customer satisfaction.

1.3 Objectives

1. To comprehensively study and determine the level at which SMEs in Saudi Arabia are adopting e-business.
2. To study the limitations and barriers affecting the adoption of e-business systems in Saudi SMEs.
3. To propose recommendations to design an e-business model that can be easily applied in SMEs in Saudi Arabia.

1.4 Methodology

The methodology of this research will be divided into four steps, as shown in the following:
1. Reviewing the literature on e-business, e-commerce and SMEs
2. Comprehensively studying the adoption of e-business by SMEs in Saudi Arabia
3. Defining a strategic approach and model for the adoption of e-business systems in Saudi SMEs

2. Literature Review

Information technology (IT) has had a colossal effect on the world of commerce. With the assistance of IT, trade forms and operations that used to require days or weeks can presently be performed in a matter of seconds. This allows people to be better served than they were in the past. Each firm that seeks future success is endeavouring to use effective e-business techniques. This is a hot issue within the world of commerce and is influencing every type of organization as they endeavour to improve their proficiency and remain ahead of their competitors. Waters (2000) demonstrated that e-business has become an inevitable reality of life, almost as fundamental to commerce as the phone.

The term 'e-business ' was first coined by IBM in 1997. Initially, it was defined as "the change of key commerce forms through the utilization of Web innovations" (Al-Gahtani, 2003). Amor extends the definition by depicting e-business as "a secured, adaptable and coordinated approach to organization to offer different companies value through the combination of frameworks and strategies and so be able to oversee the core commercial strategies with the effortlessness and introduction of Web innovations" (Al-Ghaith, Sanzogni & Sandhu, 2010). These two definitions of e-business both allude to utilizing the Web to interface with customers, suppliers, and other stakeholders. Nonetheless, the term also implies a transformation of existing trade forms into more productive ones.

E-business allows the amplified organization to be connected. This implies that all workers, customers/clients, suppliers, and other partners, regardless of geographical location, are interconnected. E-business tasks include common electronic information benchmarks with computer robotization innovations to electronically interconnect data frameworks, coordinate inner and outside information flows, and computerize commerce forms between trade partners (Wellbeing Industry Nowadays, 1999). E-business encourages information flows in business-to-business or system-to-system forms. The foremost imperative task of e-business is its interconnectivity and framework interaction. As a result of mechanization, numerous human capacities are eliminated from different forms, such as pointless key input, mediation, and inner reprocessing of electronic trade data. The effectiveness improvement from quicker handling and diminished errors is, at that point realized in schedule information forms and commercial interactions.

E-business allows the benefiting suppliers to connect with their suppliers and customers (Follit, 2000). Evidently, the number of applications for e-business processes is nearly infinite (Bharadwaj & Soni, 2007). There are six fundamental commercial models for conducting transactions with e-business on the Web. These six fundamental commercial models are business-to-business (B2B), business-to-consumer (B2C), business-to-employee (B2E), business-to-government (B2G), consumer-to-consumer (C2C), and a hybrid that combines both the B2B and B2C models (Pearlson & Saunders, 2006). Each of these distinctive models communicates with a buyer and a vender, and through them products, transactions and data can pass through the Web. The B2B model centres on the relationship between two businesses and is characterized by internal items and transactions or the sharing of information. The B2C model centres on the relationship between a firm and a customer within the commercial centre.

The B2C model is most likely the most well-known model to most individuals. Websites that offer merchandise and transactions to buyers fall into this wide category. The B2E model focuses on the relationship between a firm and its employees. This is often ordinarily an internal form utilized by businesses to communicate and allow transactions to happen inside the organization.

2.1 E-Business and E-Commerce in Saudi Arabia

Saudi Arabia is endowed with large natural resources and is ranked first in the world in oil reserves (Global Oil Reserve, 2010). It has one of the fastest developing economies within the Middle Eastern world, and the future financial vantage point remains energetic, upheld by record-high global prices for both oil and natural gas (Darrat & Al-Sowaidi, 2010). Profiting from government endeavours to expand the residential economy and adopt elective (nonenergy) sources of national income, Saudi Arabia has experienced a surprising record of

development, at least over the recent period 2000-2010, whereby its genuine non-oil economy has been developing by more than 10% annually (Darrat & Al Sowaidi, 2010). The flourishing economy has led to a number of government initiatives promoting a leading innovation-based knowledge economy, the most notable being the establishment of "smart cities," for instance, the King Abdullah Economic City. This city contributes to increasing the number of organizations implementing e-business systems to become an integral part of their business transactions (Manibo, 2010). Furthermore, Saudi Arabia has the largest e-business market in the Gulf region, with a forecast value of US$3.3 bn in 2010, which is expected to rise to US$4.6 bn by 2014 (ReportLinker, 2010). E-business spending in Saudi Arabia has held up better than in some other neighbouring countries located in the Middle Eastern region (Sait, Al-Tawil, & Hussain, 2004). Despite the global financial crisis, which restricted global economic recovery, the Kingdom continues to be a lucrative market for e-business (OECD, 2004) products and services over the forecast period because it heavily invests in upgrading its IT and communications infrastructure (Tashkandi, 2010). Saudi Arabia's e-business market has a number of positive drivers, including a growing population and government support programmes (e.g., the Management Assistance Programme and Financial Assistance Programme) (ReportLinker, 2010). It is predicted that per capita e-business spending will reach US$173 by 2014, as PC penetration rises to more than 30%. Youthful demographics and a growing population are expected to support a positive market trajectory as well (ReportLinker, 2010).

2.2 Small and Medium-Sized Enterprises (SMEs)

2.2.1 Definition of SMEs
There is no single definition of SMEs. A few criteria, such as business, deals and speculation, are frequently utilized to define the term "SME." However, the most prevalent definition uses the "number of employees" as the essential basis to characterize an SME. Indeed, the definition of SMEs on the premise of a specific model (e.g., the number of employees) is not uniform across nations (Ayyagari, Beck, & Demirguc-Kunt, 2007). For example, in the United States of America (USA), an SME refers to an enterprise with less than 500 employees (Wen & Chen, 2010); however, in the European Union (EU), an SME is characterized as an enterprises with less than 250 workers (European Commission, 2010).

The fourth and fifth columns of Table 1 clearly show that there is almost no agreement on the upper limit of the number of employees utilized in characterizing an SME. The definition of Saudi SMEs given by Otsuki (2002) says that an SME is an enterprise with less than 100 workers. A smaller-scale enterprise in Saudi Arabia is considered to be one that has less than 10 workers. This definition is satisfactory since the majority of nations use it and there is no particular definition for SMEs for Saudi context.

Table 1. SME definitions by region

Regions		Literature sources	Micro	Small	Medium
USA		Ward (2010)	< 5	< 100	< 500
EU		European Commission (2010)	< 10	< 50	< 250
Australia		ABS (2004)	< 5	< 20	< 200
Asian					
	Singapore	Hew and Loi (2004)	< 10	< 50	< 200
	Malaysia	Hew and Loi (2004)	< 10	< 50	< 200
	Korea	Hew and Loi (2004)	< 10	< 50	< 200
	Hong Kong	Hew and Loi (2004)	< 10	< 50	< 200
Gulf Region					
	Saudi Arabia	Otsuki (2002)	Not specified	< 60	< 100
	Bahrain	Hertog (2010)	< 10	< 50	< 150
	Oman	Hertog (2010)	< 5	< 20	< 100
	UAE	Hertog (2010)	< 10	< 20	<100

2.2.2 SMEs in Saudi Arabia

The most commonly adopted definition of SMEs in Saudi Arabia is shown in Table 2. However, there is a need for a clear Kingdom-wide strategy for SMEs, with only one institution and one definition.

Table 2. Current Ddefinition of SMEs in Saudi Arabia (champer of comerce, 2015)

Current Definition of SMEs in Saudi Arabia		
Enterprise Category	No. of Employees	Annual Revenue
Micro	1–2	Less than USD 27,000
Small	3–49	USD 27,000–1.3 million
Medium	50–200	USD 1.3–13.3 million

2.3 Adoption of E-Business by SMEs in Saudi Arabia

In recent years, some scholars have initiated e-business-related studies in the Saudi context. First, most studies focus on B2C systems, and a few studies examine B2B e-business systems. Second, the primary objective of most studies is to understand the decision of individuals (people/organizations) to adopt e-business systems. Third, few studies focus on IT/e-business introduction in SMEs. The few studies that examine some aspects of IT/e-business introduction identify several key factors that affect their adoption in the Saudi context. These factors include comparative advantage (Al-Gahtani, 2003), compatibility (Al-Gahtani, 2003), complexity (Al-Gahtani, 2003), technical issues (Al-Hawari, Al–Yamani, & Izwawa, 2008), security concerns (Al-Hawari, et al., 2008), enterprise IT experience (Alfuraih, 2008) and cost (Alfuraih, 2008). Finally, none of these studies examine technology introduction in SMEs using a stage model framework, perhaps due to the lengthy time periods needed to undertake such an investigation. Although SMEs currently have huge effects on the Saudi market, there is no clear research that distinguishes the adoption of e-business systems between large and smaller enterprises. Most studies put all types of enterprises under one umbrella, in addition to including large global organizations. For example, (Sait, et al., 2004) examined e-business adoption in the Saudi context. Sait identified the factors that influence e-business adoption in Saudi Arabia, for instance, the lack of skills, security concerns, privacy and competition. Alwabel and Zairi found that the most important factors that influence e-business introduction in Saudi Arabia are competition intensity, supplier/customer pressure, regulatory issues, value chain process and top management support and commitment. Although these studies are useful, their focus is not on the SME context. Hence, further research is needed.

2.4 Target SME Population and Sample Size

Based on the definition mentioned in the literature review, SMEs in Saudi Arabia are companies with more than 3 employees and less than 200 employees and with annual revenue between 27,000 USD and 13.3 million USD, as mentioned in Table 2 in the previous section. According to the Saudi Chamber of Commerce, the total number of SMEs is approximately 265,000 enterprises in different sectors. Since the number is very large, a random sample was picked according to the following criteria:

- The sample should contain all leading SME sectors in Saudi Arabia, such as trade, construction, industrial manufacturing and social services.

- For the purposes of this research, we focused primarily on the fastest-growing SMEs in Saudi Arabia since they are most likely to participate in and encourage this study compared to others. They were determined by the Saudi Arabian General Investment Authority's (SAGIA) Private Sector Initiatives Programme, called the Saudi Fast Growth 100.

According to the above criteria, a sample of 150 SMEs was picked randomly with a confidence level of 95% and a confidence interval of 8%.

2.5 Data Collection

The methodology used for data collection consisted of distributing questionnaires to the selected companies, and the questionnaire distribution and design are explained in the following.

2.6 Questionnaire Design

The questionnaire was designed according to the main research questions regarding the level of e-business adoption by Saudi SMEs and the barriers limiting this adoption.

The questionnaire started with a brief half-page introduction of the research purposes and the researcher. Then, the questions started with the name of the company, the name of the employee (voluntary) and employee's position. The questions were divided into two parts:

Part one: A question about the level of adoption is asked: "At which level do you think your company has adopted e-business?"

Part two: A Likert-type scale is used for each of the common barriers discussed in the literature review, excluding some barriers that are most likely not applicable in Saudi Arabia, When responding to a Likert scale item, respondents indicate their level of agreement or disagreement on a symmetric agree-disagree scale organized based on a certain number of responses. In this way, the scale captures the level of their sentiments with regard to a given item. One means strongly disagree, 3 means neither agree nor disagree, and 5 means strongly agree. The total number of barriers is 26 (listed in Table 4).

Table 4. Barriers to e-business adoption by SMEs

#	**Barrier name**
1	Lack of popularity of online marketing and sales
2	Lack of awareness of e-commerce benefits
3	Lack of external pressure from suppliers and customers
4	Linguistic barriers
5	Lack of Internet security
6	E-commerce infrastructure
7	Lack of qualified staff
8	Inadequate quality and speed of lines
9	Increased innovations and new technologies
10	Lack of financial infrastructure
11	Unclear benefits from e-commerce adoption
12	Cost too high
13	Competitive pressure
14	Lack of secure payment infrastructures
15	Change in regulations with each government
16	Changes in government policy
17	Lack of an appropriate legal environment to apply e-commerce
18	Low level of readiness among government institutions
19	Difficulty in changing the existing working procedures
20	Lack of management support
21	Organizational resistance to change
22	Limited use of Internet banking and web portals by SMEs
23	Absence of legal and regulatory systems

24	No simple procedures and guidelines
25	Lack of e-commerce standards
26	Lack of e-trading legislations

2.7 Questionnaire Distribution

Data collection and the distribution of questionnaires took almost three months. The directory of the Saudi Chamber of Commerce was very helpful in finding the contact information for each of the 150 SMEs, and contact was made either personally by phone or in most cases through e-mail. One questionnaire was distributed to each SME, and it was required for the questionnaire to be completed by any employee in a managerial position or in an IT position, if any. In fact, not all distributed questionnaires were returned. There were many reasons, such as simply no response from some companies to emails or phone calls, no interest in improving e-business systems in some companies or in some cases the inability to find employees in the required positions. However, 109 questionnaires out of 150 were returned. This means that the response rate was 72.6%.

2.8 Data Analysis

The data of the questionnaire will be analysed in two ways according to the question type. For the responses to the questions in part A, the analysis is easy, consisting of just comparing the percentage of each level in one chart, which will give us a clear indication of SMEs' level of e-business adoption. For the responses to the questions in part two, the analysis is slightly complex since there are 26 barriers, and each is scored on a symmetric Likert scale. The following methodology will explain how the data are analysed in this part of the study:

1. To facilitate the analysis of the responses to the questions in part two, the 26 questions are grouped into six categories based on the nature of the barrier: social and cultural barriers, technical barriers, economic barriers, political barriers, organizational barriers and legal barriers. The barriers and their groups are shown in Figure 1.
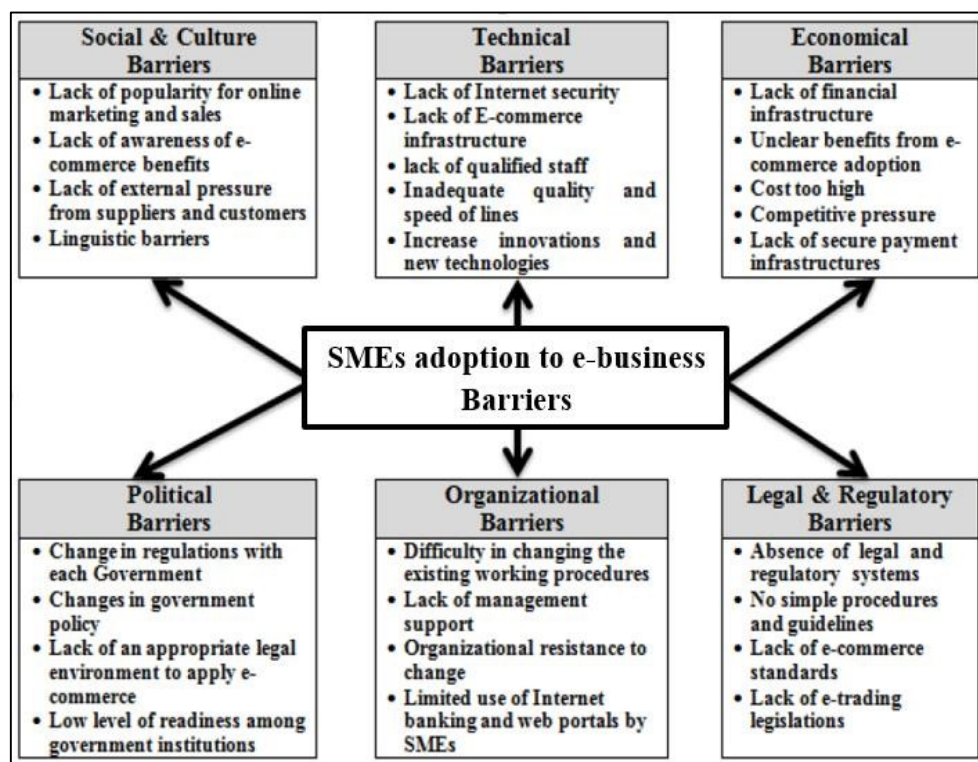

Figure 1. Groups of barriers

2. To analyse the data, the mean score for each barrier will be calculated by summation of the product of the

scale into its total number of participants and then dividing it by the total of all participants, which is equal to 109 (total number of questionnaires). The formula for calculating the mean scores is as follows:

$$Rating\ mean = \sum_{i=1}^{5} \frac{i * x_i}{n}$$

i = Likert scale number for each barrier =1, 2, 3, 4 and 5 x_i = Number of participant responses for each number on the scale (i) n = Total number of participant = 109

3. The calculated mean score for each barrier is used to assess the degree of importance of each barrier, and it is ranked as shown in Table 5.
4. The degree of importance of the groups of barriers will be calculated as an average in relation to the groups' single barriers. A strong or medium score is accepted as an effective barrier to e-business adoption by SMEs.

Table 5. Degree of importance according to mean scores

	Criteria	Effect
1	If the mean scores is greater than or equal to 4.00, the group of barriers or single barrier has a strong effect	Strong Effect
2	If the mean score is greater than or equal to 3.00 and less than 4.00, the group of barriers or single barrier has a medium effect	Medium Effect
3	If the mean score is less than 3.00, the group of barriers or single barrier has a low effect	Low Effect

3. Results and Discussion

In this section, the results of the two parts of the questionnaire will be discussed and analysed. Part A is related to the level of adoption, and Part B is related to the limitations and barriers.

3.1 Part A: Results of the Level of E-Business Adoption by Saudi SMEs

Table 6 and Figure 2 show the results obtained from the questionnaires based on the DTI adoption ladder discussed in the literature review:

Table 6. Results for the level of e-business adoption by Saudi SMEs

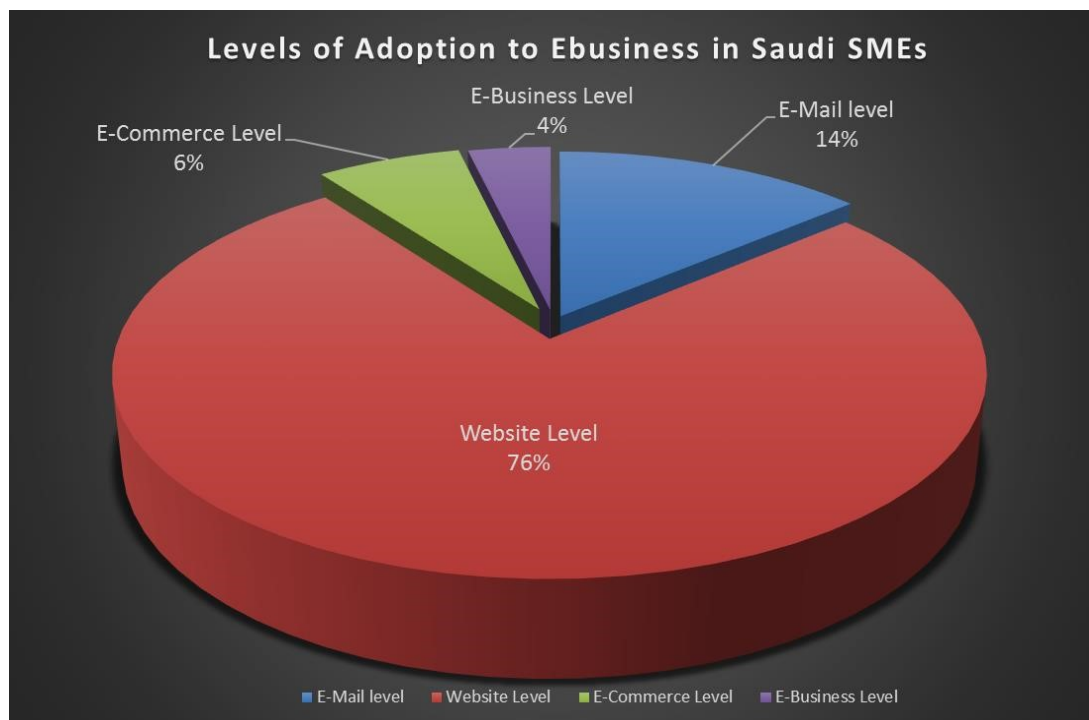| Adoption Level	Number of SMEs	Percentage
E-Mail level	15	14%
Website Level	83	76%
E-Commerce Level	7	6%
E-Business Level	4	4%
Total	**109**	**100%**

Figure 2. Results for the level of e-business adoption by Saudi SMEs

From Table 3 and Figure 2, it is obvious that the majority of SMEs in Saudi Arabia are at the website level, with a percentage of 76%. Additionally, based on the above results, it is obvious that there is a proportion of SMEs that do not even exist on the internet; 14% of SMEs in Saudi Arabia are using only e-mail and nothing else to facilitate communication. One of the purposes of this work is to help these companies at least exist in the internet world and find a place for themselves among others. In fact, 6% of SMEs are already at the e-commerce level. This will help them complete growing to the e-business level to reach the top of the ladder, which will directly contribute to minimizing waste at every stage of their supply chain. Fortunately, 4% of SMEs have already reached the top of the ladder and are at the e-business level, which is a promising number.

Table 3. Levels of e-business adoption

Level Rank	Level name	Business benefits
1	e-mail level	Efficient internal and external communication
2	website level	A place in the worldwide market
3	e-commerce level	Ordering and paying online, reducing costs, maximizing accessibility and speed.
4	e-business level	Integrated supply chain and delivery, minimized waste at every stage of the supply chain

3.2 Part B: Results of the Barriers to E-Business Adoption by Saudi SMEs

In this part, the result will be shown in a histogram, followed by a discussion of each of the 26 barriers. Then, the results of each barrier group will be discussed, and finally, a summary of all results will be given in one table.

3.2.1 Social and Cultural Barrier Results
The social and cultural barrier group consists of four major barriers, as discussed in the literature. These barriers are as follows:

- Lack of popularity of online marketing and sales
- Lack of awareness of e-commerce benefits
- Lack of external pressure from suppliers and customers
- Linguistic barriers

Each of the above barriers will be discussed separately in the following:

- **Lack of popularity of online marketing and sales**

From Figure 3, we can see that the majority of SMEs strongly disagree that the lack of popularity of online marketing and sales is a barriers. The mean score is $((1*30)+(2*45)+(3*10)+(4*15)+(5*9))/109 = 2.339$, which means that this barrier has no effect on the decision of SMEs in Saudi Arabia to adopt e-business. In fact, this result represents the reality in which the popularity of website and online marketing has grown significantly in recent years.
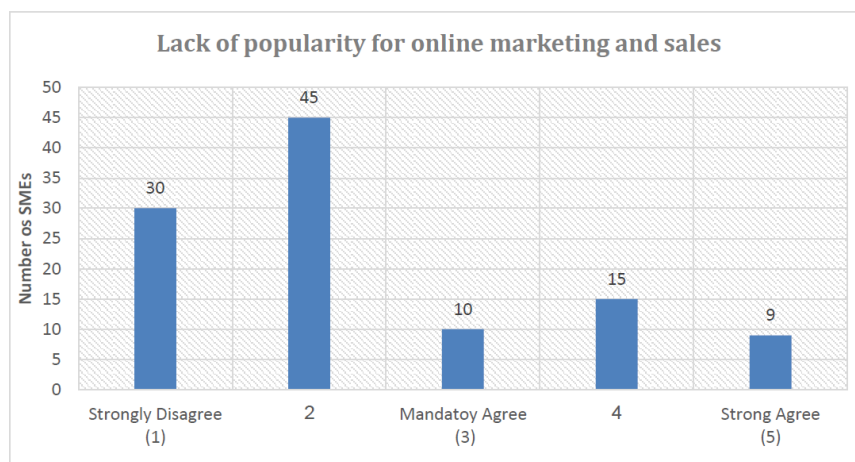
Figure 3. Results of the barrier: lack of popularity of online marketing and sales

- *Lack of awareness of e-commerce benefits*

The means score of the barrier of a lack   of   awareness   of   e-commerce   benefits   is $((1*43)+(2*20)+(3*20)+(4*10)+(5*16))/109 = 2.413$, which means that this barrier has no effect, and the majority of SMEs agree with the benefits of e-commerce application, as shown Figure 4.
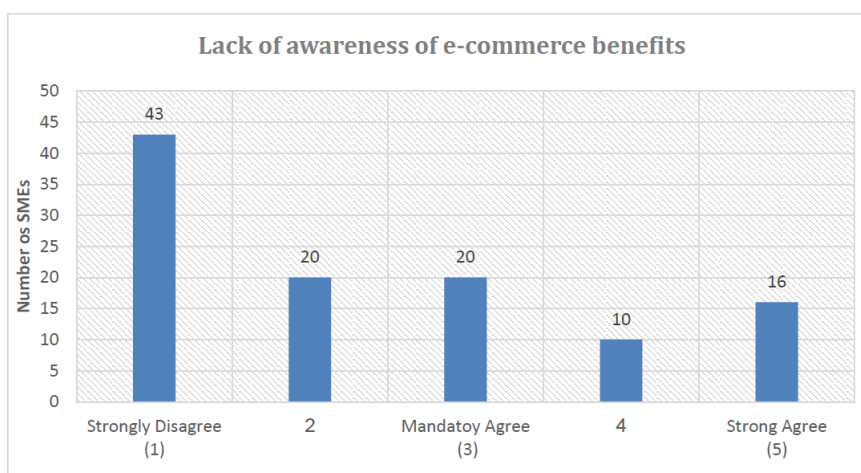
Figure 4. Results of the barrier: lack of awareness of e-commerce benefits

- **Lack of external pressure from suppliers and customers**

External pressure from suppliers sometimes plays a major role in terms of forcing an organization to apply changes in its processes, but for SMEs in Saudi Arabia, this is not the case since suppliers are concerned with applying e-business instead of traditional business. As shown in the above graph, the majority of SMEs disagree or neither agree nor disagree that this pressure is a barrier. The mean score here is $((1*23)+(2*10)+(3*40)+(4*40)+(5*20))/109 = 2.963$, which means it has a low effect on the decision to adopt e-business, as shown in Figure 5.
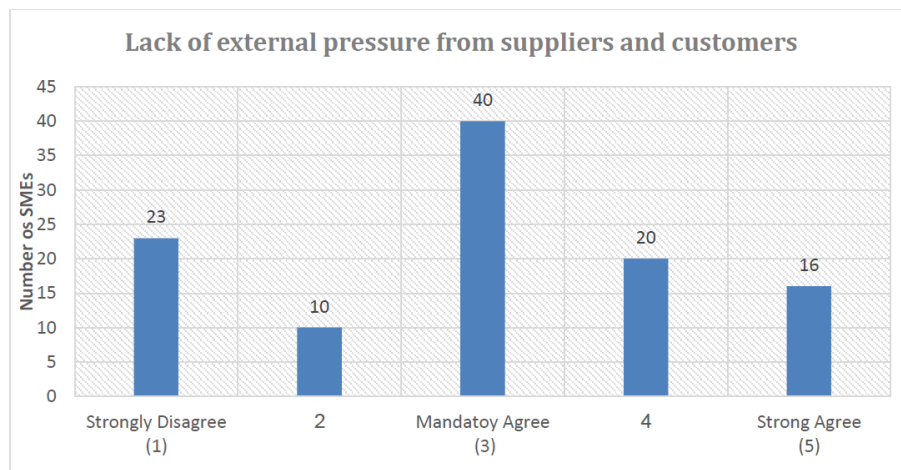
Figure 5. Results of the barrier: lack of external pressure from suppliers and customers

- **Linguistic barriers**

As shown in the above graph, linguistic barriers have no effect on the decision to adopt e-business since such barriers are not the case in our local market. Most e-business is done in the Arabic language or sometimes in the English languages, which has recently become more popular in our society. Therefore, the mean score of linguistic barriers was $((1*39)+(2*46)+(3*19)+(4*3)+(5*2))/109 = 1.927$, which means that linguistic barriers have no effect at all, as is obvious from Figure 6, where the majority of responses indicate disagreement.
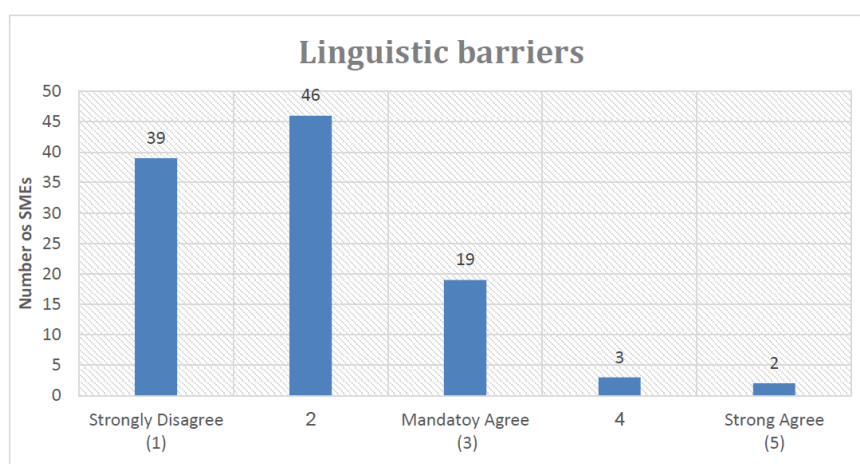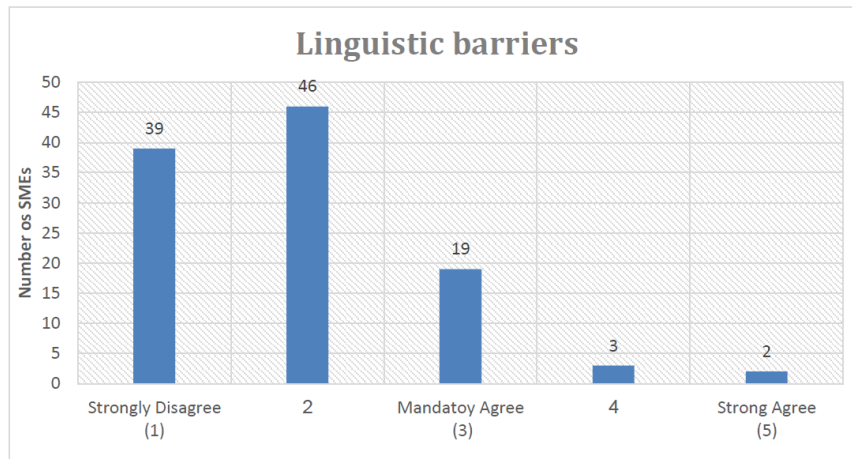
Figure 6. Results of the barrier: linguistic barriers

3.3 Technical Barriers

The technical barriers are as follows:
- Lack of Internet security
- Lack of e-commerce infrastructure
- Lack of qualified staff
- Inadequate quality and speed of lines

- Increased innovations and new technologies

Each barrier will be discussed separately in the following:

- **Lack of Internet security**

As we can see from Figure 7, all SMEs agreed that this is a barrier, with the only differences being in the level of their agreement. The mean score of this barrier is $((1*0)+(2*0)+(3*14)+(4*38)+(5*55))/109 = 4.358$, which means that this barrier has a strong effect on the decision to adopt e-business in the local market. In fact, these results reflect that there are still many concerns about data being stolen or hacking through e-commerce systems.
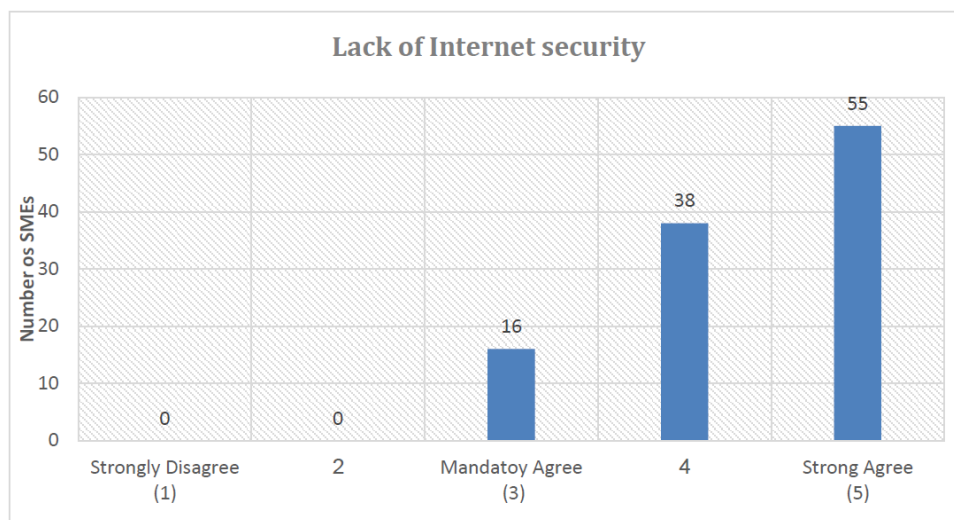
Figure 7. Results of the barrier: lack of Internet security

- **E-commerce infrastructure**

Having an e-commerce infrastructure means that an organization has all the basic requirements to run an ecommerce system smoothly. Such an infrastructure consists of a logistics system that supports the ecommerce business, trained workers to run day-to-day e-commerce operations and, most importantly, all the necessary resources such as time and money. The mean score of this barrier was expected to be very high, just as reflected in the responses shown in Figure 8.
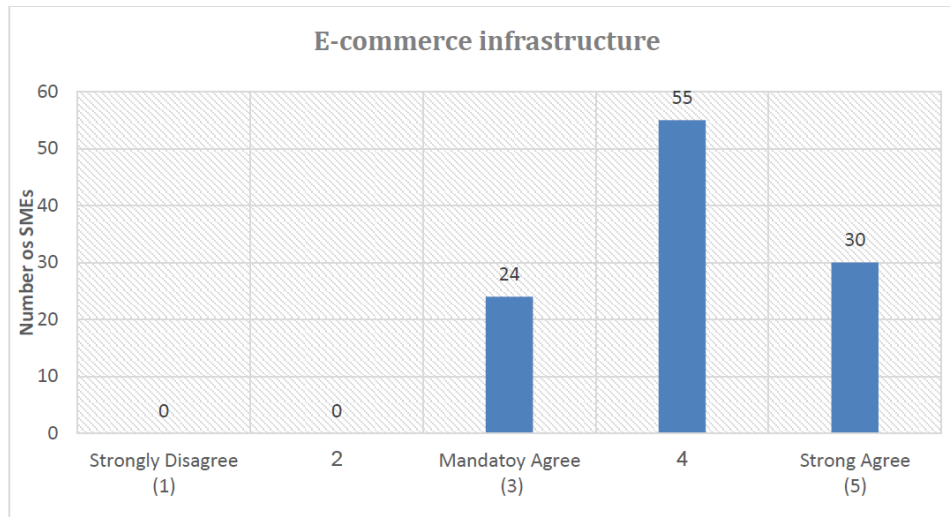
Figure 8. Results of the barrier: e-commerce infrastructure

The mean score is ((1*0)+(2*0)+(3*24)+(4*55)+(5*30))/109 = 4.055. This barrier is considered to have a strong effect on the decision to adopt e-business.

- **Lack of qualified staff**

As shown in Figure 9, a lack of qualified staff is considered one of the highest barriers, having a strong effect on the decision to adopt e-business; its mean score is((1*0)+(2*0)+(3*19)+(4*10)+(5*80))/109 = 4.560.
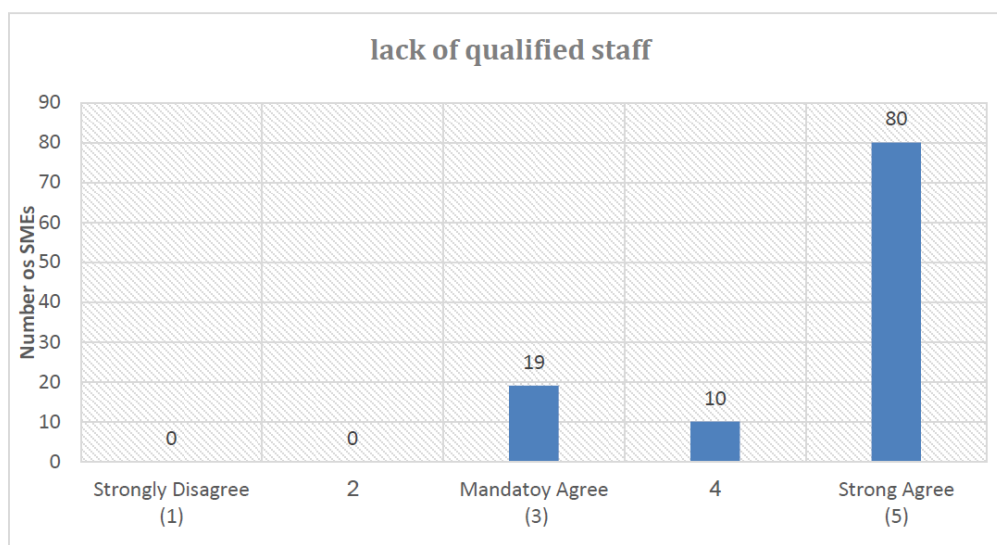

Figure 9. Results of the barrier: lack of qualified staff

- **Inadequate quality and speed of lines**

The quality and speed of internet lines play an important role in e-business or ecommerce application. The quality and speed of lines could be one of the barriers affecting the decision to adopt e-business, especially for SMEs that have a limited budget to afford such capabilities. The mean score of this barrier is $((1*15) + (2*12) + (3*40) + (4*15) + (5*27)) /109 = 3.248$, which means that it has a strong effect but not an effect that is as strong as that of the other technical barriers. This could be because of the recent boom in internet technologies with affordable prices introduced by communication companies. However, these options are only available in major cities, which could be the reason for the variances observed in Figure 10.
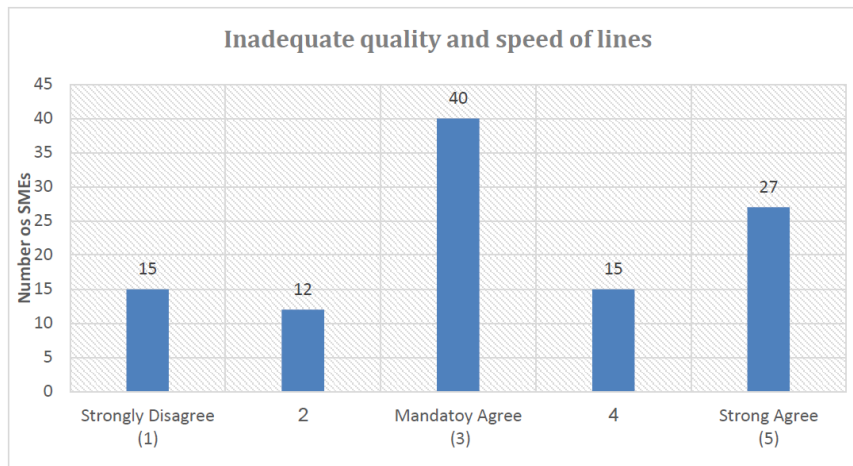
Figure 10. Results of the barrier: inadequate quality and speed of lines

- **Increased innovations and new technologies**

Innovations and new technologies are considered barriers to adopting e-business for some SMEs that are still using old systems run by people with an old and traditional mindset. On the other hand, this factor could be a motive to apply e-commerce for fresh blood and innovative SMEs in Saudi Arabia. According to our sample of fast growing SMEs, the results varied between agreeing and disagree, and the mean score from the Figureure below is $((1*5)+(2*10)+(3*14)+(4*30)+(5*50))/109 = 4.009$. This means that increased innovations and new technologies are considered a barrier with a strong effect on the decision to adopt e-business, which may reflect the reality that most of our SMEs are still run in traditional ways and with old mindsets, as shown in Figure 11.
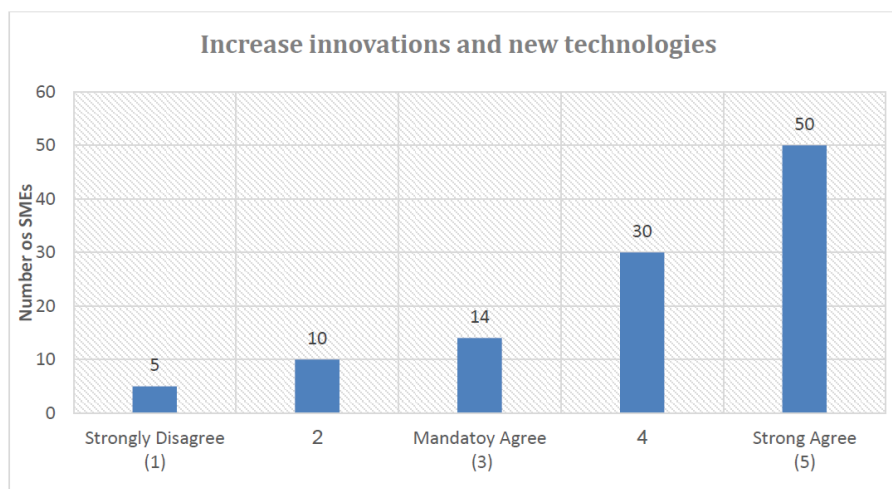

Figure 11. Results of the barrier: increased innovations and new technologies

3.4 Economic Barriers

The economic barriers are as follows:

- Lack of financial infrastructure
- Unclear benefits from e-commerce adoption
- Cost too high
- Competitive pressure
- Lack of secure payment infrastructures

Each of these barriers will be discussed separately in the following points.

- **Lack of financial infrastructure**

The lack of financial infrastructure means that there are unclear roles in budgeting and money allocation in the organization, which could be a barrier affecting e-business adoption by Saudi SMEs. Figure 12 shows the result of this barrier:
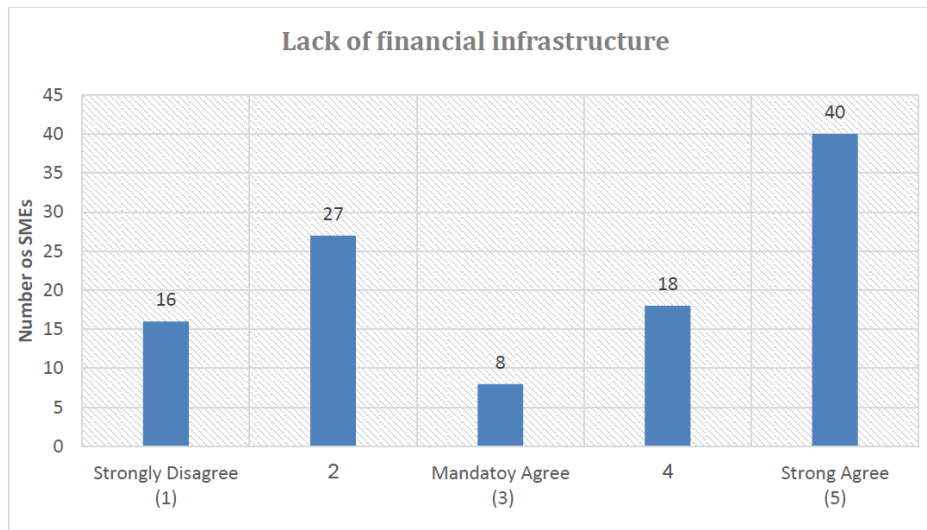
Figure 12. Results of the barrier: lack of financial infrastructure

The mean score is $((1*16)+(2*27)+(3*8)+(4*18)+(5*40))/109 = 3.358$, which means that this barrier affects the decision to adopt e-business in Saudi SMEs.

- **Unclear benefits from e-commerce adoption**

Many SMEs are concerned with having an e-commerce system that costs money more than the revenue it brings in. Figure 13 shows the results of this barrier.
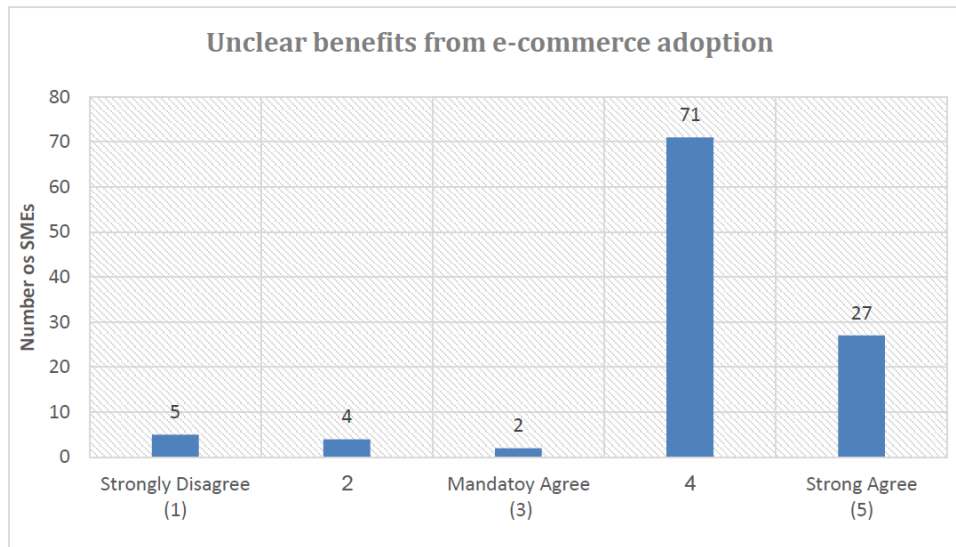
Figure 13. Results of the barrier: unclear benefits from e-commerce adoption

The mean score for this barrier is ((1*5)+(2*4)+(3*2)+(4*71)+(5*27))/109 = 4.018, which means that for most SMEs in our market, the benefits from e-commerce in financial terms are unclear. In fact, this barrier has shown a strong effect on the decision to adopt e-business, as the mean score clearly indicates.

- **Cost too high**

It is clear from Figure 14 that the cost plays a major rule in terms of applying either e-commerce or e-business systems; the majority of the responses by SMEs indicated that they agree or strongly agree that this is a real barrier. The mean score is ((1*5)+(2*4)+(3*2)+(4*71)+(5*27))/109 = 4.514, reflecting reality. Cost is the major concern that always stands between organizations and new ideas. For this reason, cost should be our main focus when designing a business model for SMEs in Saudi Arabia.
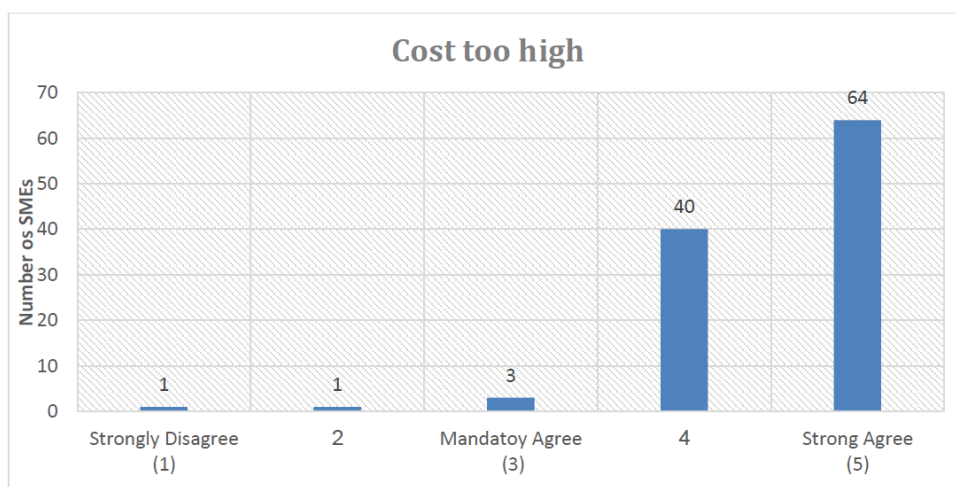

Figure 14. Results of the barrier: cost too high

- **Competitive pressure**

This barrier concerns competition from the economic side: is there any competition that requires local market organizations to have a strong e-business system to compete? If the answer is no, then competitive pressure is one of the barriers. Figure 15 shows the results of this barrier.
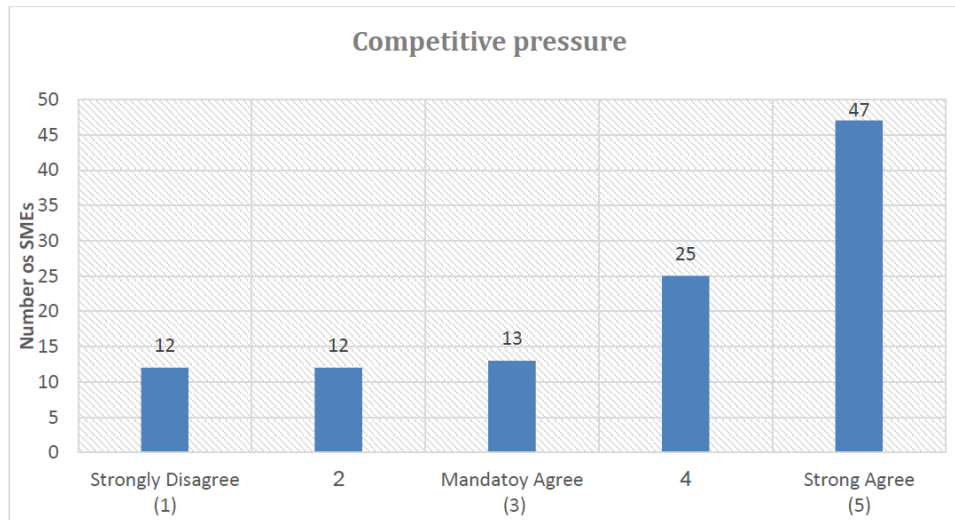

Figure 15. Results of the barrier: competitive pressure

The mean score is $((1*12)+(2*12)+(3*13)+(4*25)+(5*47))/109 = 3.761$, which indicates that this barrier affects the decision to adopt e-business in Saudi SMEs.

- **Lack of secure payment infrastructures**

From the economic perspective, security does indeed matter, just as it does from the technical perspective, especially when there are payments and exchanges of money, products and services. From Figure 16, the mean score is $((1*0)+(2*0)+(3*16)+(4*48)+(5*45))/109 = 4.266$, which obviously indicates that payment security has a strong effect on the decision to adopt e-business in Saudi SMEs.
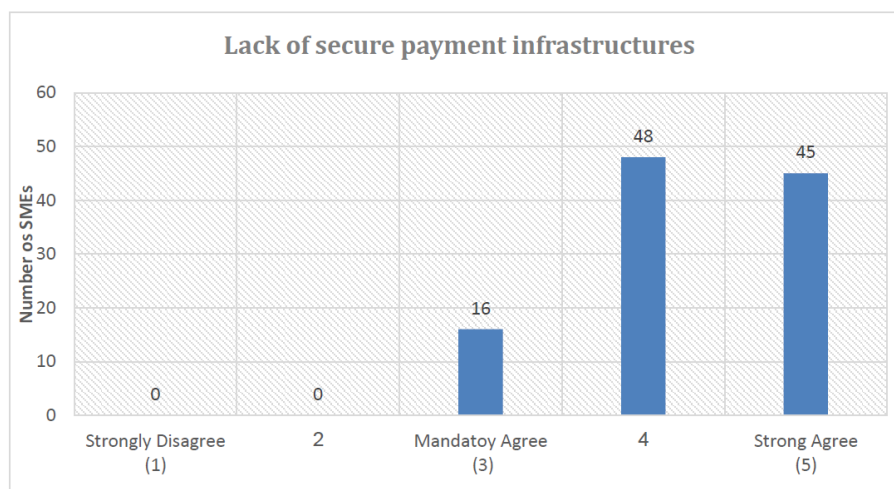

Figure 16. Results of the barrier: lack of secure payment infrastructures

3.5 Political Barriers

The political barrier group consists of the following:

- Changes in regulations with each government
- Changes in government policy
- Lack of an appropriate legal environment to apply e-commerce
- Low level of readiness among government institutions

 As with the analysis above, each one of these barriers will be discussed separately.

- **Changes in regulations with each government**

The mean score of this barrier is $((1*31)+(2*40)+(3*18)+(4*11)+(5*9))/109 = 2.330$, which means that there is almost no effect of this barrier on the decision to adopt e-business. This may be reflected in our local market since governments do not change frequently and if when they do, the same regulations and fundamentals are maintained by the new government. Of course, there are dramatic improvements made by governments, but the basic rules in terms of e-business and SME regulations are still retained, as shown in Figure 17.
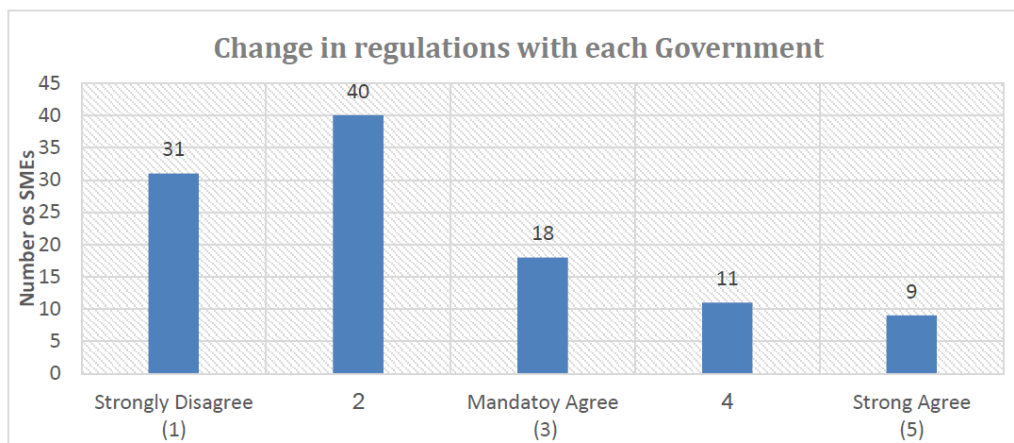

Figure 17. Results of the barrier: changes in regulations with each government

- **Changes in government policy**

The mean score of this barrier is $((1*32)+(2*49)+(3*18)+(4*7)+(5*3))/109 = 2.083$, which means that there is also no effect of changes in government policy on the decision by SMEs to adopt e-business, as shown in Figure 18. The same applies for both regulations and policies. To distinguish between the two terms, regulations are rules that are made by organizations to realize their goals and objectives, whereas policies are made by people, groups, companies, and indeed governments to carry out their plans. However, regulations are rules that are made to force individuals to comply and proceed in a certain way. A regulation has the effect of a law and is considered a restriction that is enforced by specialists to make individuals adopt the specified code of conduct.
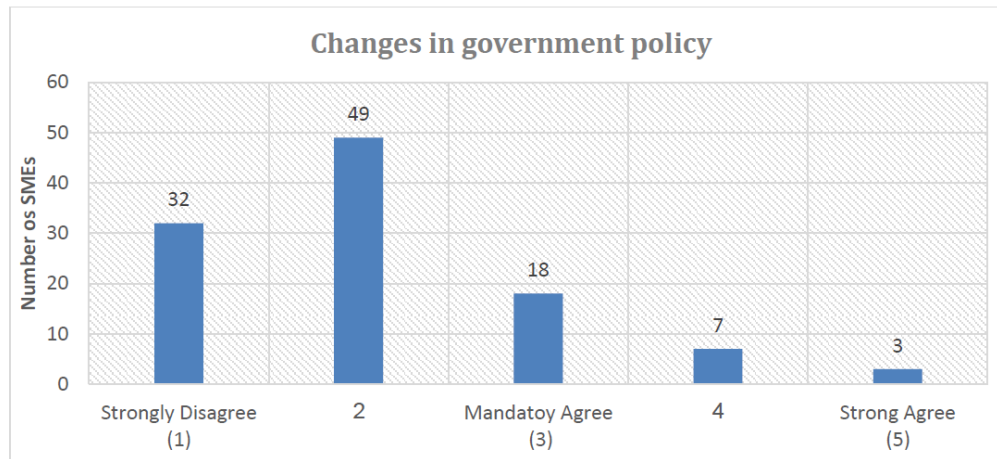
Figure 18. Results of the barrier: changes in government policy

3.6 Lack of an Appropriate Legal Environment to Apply E-Commerce

The lack of an appropriate legal environment is a more general category than policies and regulations; it concerns the whole environment of the e-commerce system, including the supply chain system and logistics, from a legal perspective. When dealing with e-business or e-commerce systems, many problems, failures and acts of fraud are highly anticipated. The Figureure below shows the result of this barrier.

The mean score of this barrier is $((1*20)+(2*17)+(3*61)+(4*6)+(5*5))/109 = 2.624$. This means that this barrier has a low effect on the decision by SMEs to adopt e-business, as shown in Figure 19. To explain these results, the reason could be the recently developed laws against fraud and all other similar acts through e-businesses in Saudi Arabia.
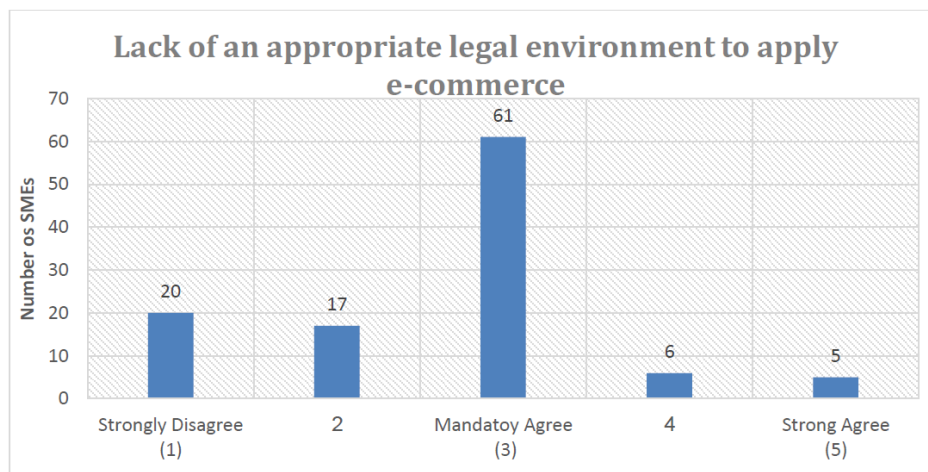

Figure 19. Results of the barrier: lack of an appropriate legal environment

- **Low level of readiness among government institutions**

The mean score of this barrier is $((1*18)+(2*20)+(3*66)+(4*2)+(5*3))/109 = 2.560$, which means that there is a good level of readiness in our government for e-business to take place, and government readiness is no longer a barrier to e-business adoption by SMEs in Saudi Arabia, as shown in Figure 20.
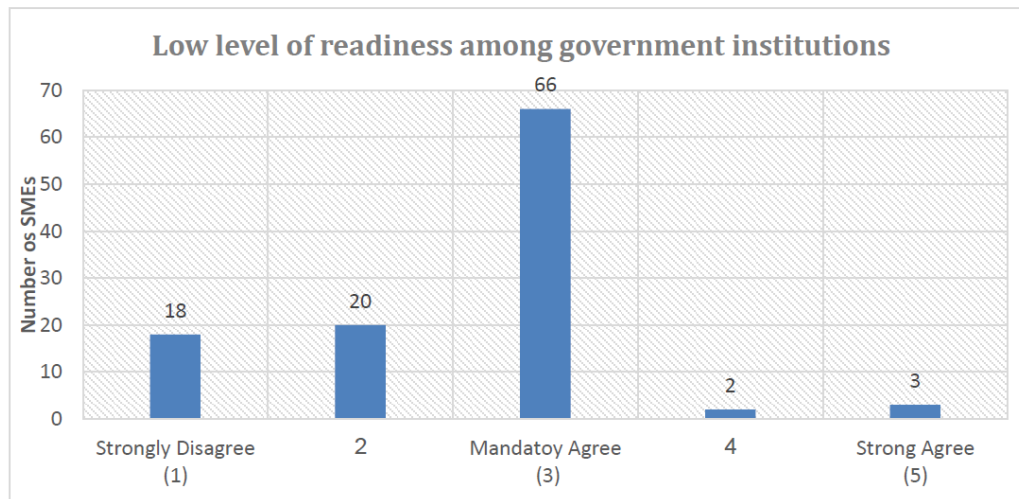
Figure 20. Results of the barrier: low level of readiness among government

3.6.1 Organizational Barriers

The organizational barrier group consists of the following:

- Difficulty in changing the existing working procedures
- Lack of management support
- Organizational resistance to change
- Limited use of Internet banking and web portals by SMEs

As with the analysis above, each of these barriers will be discussed separately.

- **Difficulty in changing the existing working procedures**

The mean score of this barrier is $((1*0)+(2*0)+(3*10)+(4*27)+(5*72))/109 = 4.569$, which means that for SMEs, there is difficulty in the process of changing their existing work procedures, as is obvious from Figure 21. The responses of the majority of SMEs indicate that they neither agree nor disagree, agree, or strongly agree that this barrier has a strong effect on the decision to adopt e-business in our local market.
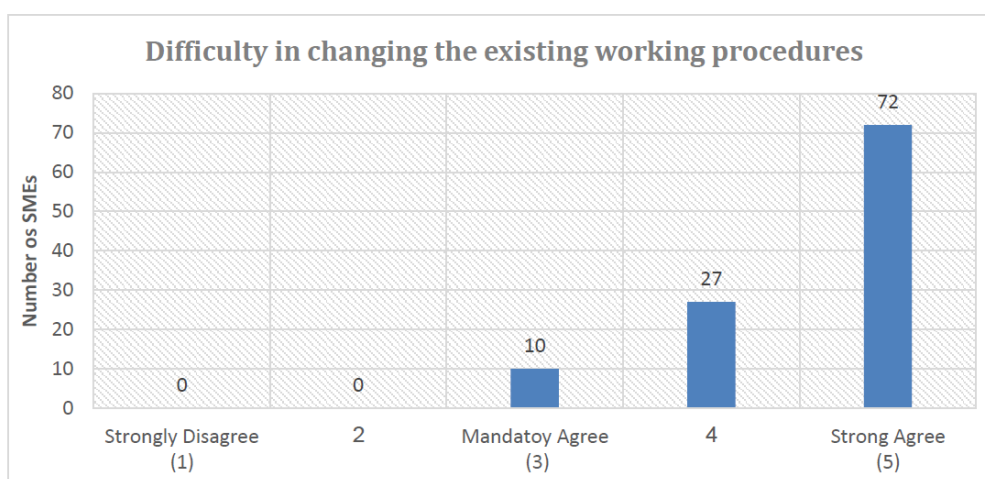

Figure 21. Results of the barrier: difficulty in changing the working procedures

- **Lack of management support**

The mean score of this barrier is $((1*1)+(2*2)+(3*25)+(4*48)+(5*33))/109=4.009$, which means that it has a strong effect since most of employees mentioned the lack of management support as one of the main reasons their organizations did not apply e-business or e-commerce systems, as shown in Figure 22.
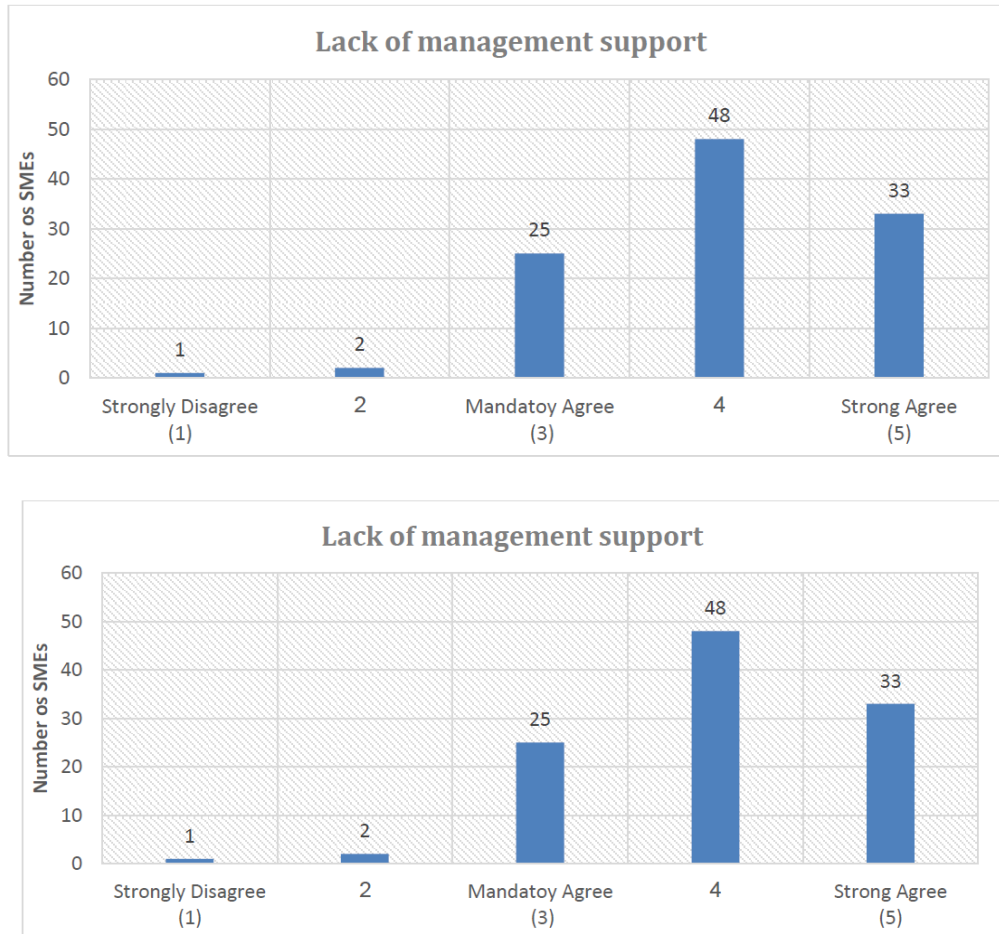
Figure 22. Results of the barrier: lack of management support

- **Organizational resistance to change**

The mean score of this barrier is $((1*0)+(2*0)+(3*16)+(4*22)+(5*71))/109=4.505$, which means that organizational resistance to change could be one of the strongest and most effective barriers to the adoption of e-business by Saudi SMEs, as shown in Figure 23. Resistance to change is a well-known term indicating that there is always opposition against any innovation, and apparently, it is a common problem in most of our SMEs.

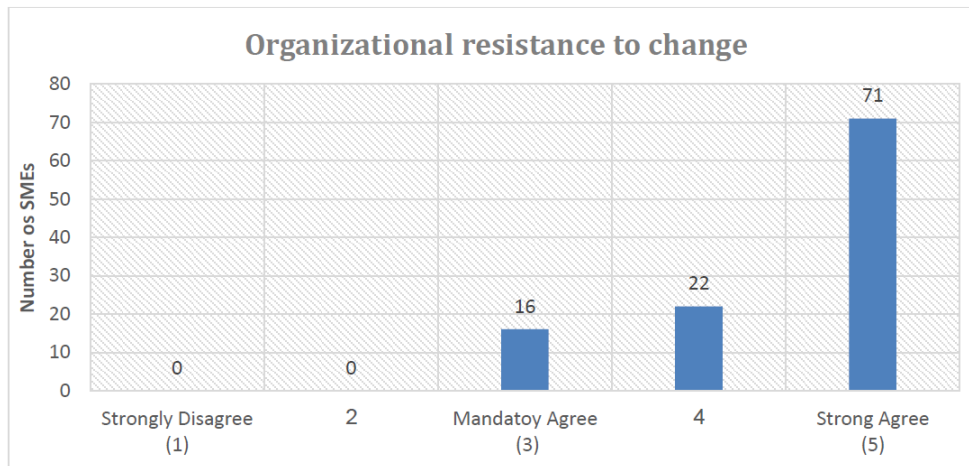Figure 23. Results of the barrier: organizational resistance to change

- **Limited use of Internet banking and web portals by SMEs**

The mean score of this barrier is $((1*0)+(2*9)+(3*80)+(4*12)+(5*8))/109=3.174$, which means that the limited use of internet banking and web portals by SMEs is a barrier affecting our local market, as shown in Figure 24. This is because there are so many SMEs that even those that are growing are still using traditional ways of banking.
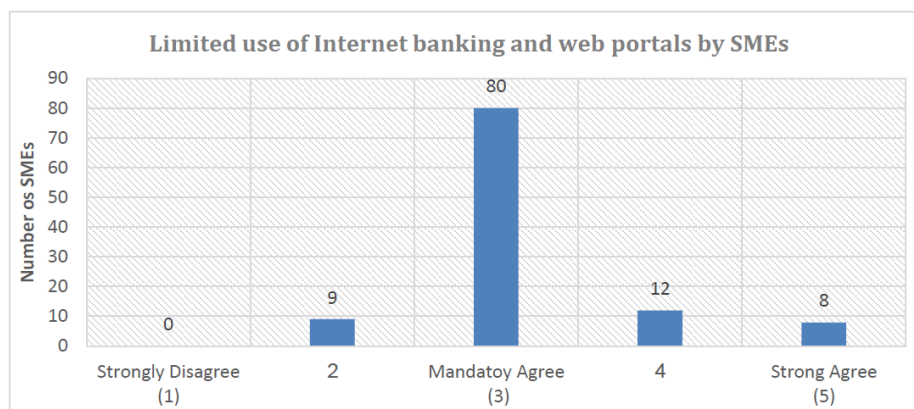
Figure 24. Results of the barrier: limited use of Internet banking portals by SMEs

3.7. Legal and Regulatory Barriers

This group of barriers consists of the following:
- Absence of legal and regulatory systems
- No simple procedures and guidelines
- Lack of e-commerce standards
- Lack of e-trading legislations

As with the analysis above, each of these barriers will be discussed separately.

- **Absence of legal and regulatory systems**

This barrier concerns the legal and regularity systems existing or the absence thereof, which is different from the discussion of the changes in and relevance of such systems included as a barrier in the political group. The mean score of this barrier is $((1*77)+(2*14)+(3*15)+(4*3)+(5*0))/109=1.486$, which means that this it has no effect at

all on the decision to adopt e-business. This is obvious: as discussed above, the government has already introduced improved rules and regulations in terms of e-businesses systems. The results of this barrier are shown in Figure 25.
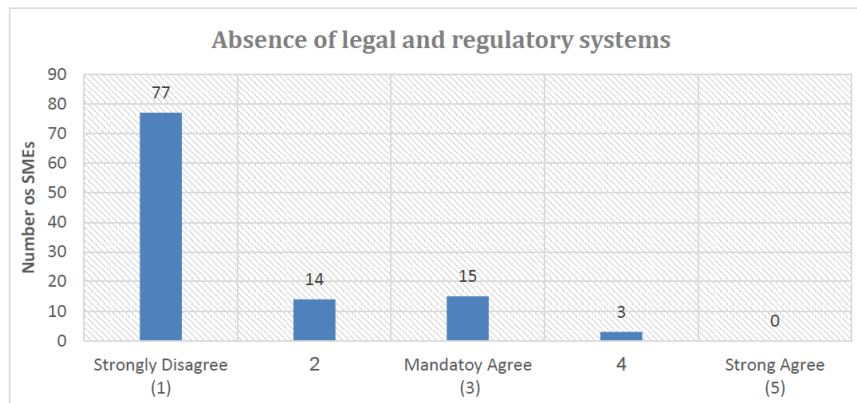

Figure 25. Results of the barrier: absence of legal and regulatory systems

- **No simple procedures and guidelines**

The mean score of this barrier is $((1*18)+(2*21)+(3*35)+(4*10)+(5*25))/109=3.028$, which means that it affects the decision to adopt e-business to an extent, as shown in Figure 26. This can be explained by the fact that the procedures and guidelines either are not well known by SMEs or are difficult to apply or to understand in our local market.
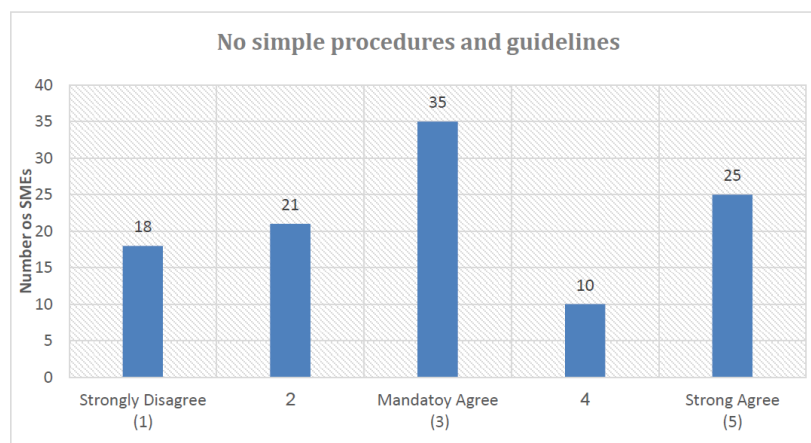
Figure 26. Results of the barrier: no simple procedures and guidelines

- **Lack of e-commerce standards**

The mean score of this barrier is $((1*0)+(2*0)+(3*10)+(4*88)+(5*11))/109=4.009$, which means that it has a strong effect on the decision to adopt e-business, as shown in Figure 27. This is explained by the lack of existing standards that SMEs should know and follow in the process of transforming from traditional businesses to e-businesses.
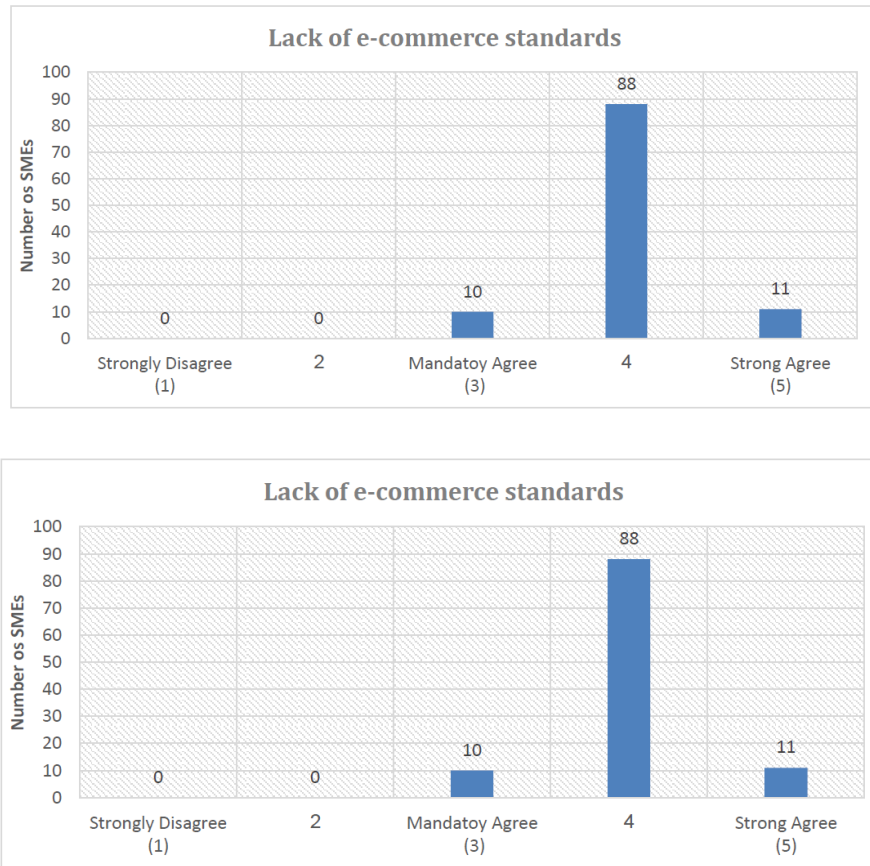
Figure 27. Results of the barrier: lack of e-commerce standards

- **Lack of e-trading legislations**

This barrier is basically similar to that discussed in the political barrier group regarding the e-commerce legal environment, but it is different in terms of being specifically addressed from the regularity point of view. In other words, there are clear and simple rules and laws for e-trading between all members of a supply chain. The mean score of this barrier is $((1*18)+(2*16)+(3*62)+(4*8)+(5*5))/109=2.668$, meaning that it has a low effect on e-business adoption, which is basically similar to the barrier in the political group. It is shown in Figure 28.

Figure 28. Results of the barrier: lsack of e-trading legislations

3.8 Ranking of All Groups

From Table 7, we summarize the results of the groups, which are ranked by the average of the mean scores of the barriers in each group from highest to lowest:

Table 7. Ranking of barrier groups

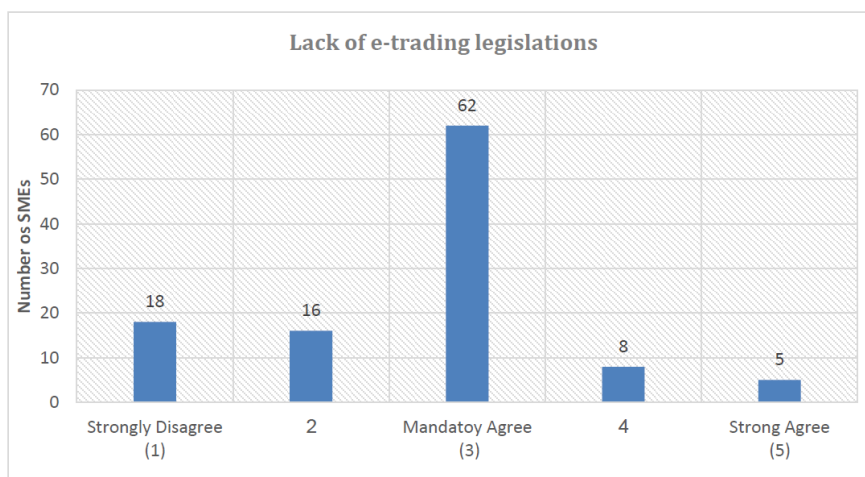| Rank	Barriers Group	Group Rating
1	Organizational Barriers	4.06
2	Technical Barriers	4.05
3	Economic Barriers	3.98
4	Legal and Regulatory Barriers	2.80
5	Social and Cultural Barriers	2.41
6	Political Barriers	2.40

It is clear that organizational barriers, technical barriers and economic barriers are at the top of the list of barrier groups, and for this reason, we will focus on them in future work. In contrast, legal, social and political barriers are the least significant and can be neglected.

3.9 Summary of All the Barriers and Their Results

Table 8 summarizes the results for all of the barriers:

Table 8. Summery of all Results

Barriers Group	#	Barrier name	1	2	3	4	5	Total	Rating Mean	Group Rating
Social & Culture Barriers	1	Lack of popularity for online marketing and sales	30	45	10	15	9	109	2.339	2.41
	2	Lack of awareness of e-commerce benefits	43	20	20	10	16	109	2.413	
	3	Lack of external pressure from suppliers and customers	23	10	40	20	16	109	2.963	
	4	Linguistic barriers	39	46	19	3	2	109	1.927	
Technical Barriers	5	Lack of Internet security	0	0	16	38	55	109	4.358	4.05
	6	E-commerce infrastructure	0	0	24	55	30	109	4.055	
	7	lack of qualified staff	0	0	19	10	80	109	4.560	
	8	Inadequate quality and speed of lines	15	12	40	15	27	109	3.248	
	9	Increase innovations and new technologies	5	10	14	30	50	109	4.009	
Economical Barriers	10	Lack of financial infrastructure	16	27	8	18	40	109	3.358	3.98
	11	Unclear benefits from e-commerce adoption	5	4	2	71	27	109	4.018	
	12	Cost too high	1	1	3	40	64	109	4.514	
	13	Competitive pressure	12	12	13	25	47	109	3.761	
	14	Lack of secure payment infrastructures	0	0	16	48	45	109	4.266	
Political Barriers	15	Change in regulations with each Government	31	40	18	11	9	109	2.330	2.40
	16	Changes in government policy	32	49	18	7	3	109	2.083	
	17	Lack of an appropriate legal environment to apply e-commerce	20	17	61	6	5	109	2.624	
	18	Low level of readiness among government institutions	18	20	66	2	3	109	2.560	
Organizational Barriers	19	Difficulty in changing the existing working procedures	0	0	10	27	72	109	4.569	4.06
	20	Lack of management support	1	2	25	48	33	109	4.009	
	21	Organizational resistance to change	0	0	16	22	71	109	4.505	
	22	Limited use of Internet banking and web portals by SMEs	0	9	80	12	8	109	3.174	
Legal & Regulatory Barriers	23	Absence of legal and regulatory systems	77	14	15	3	0	109	1.486	2.80
	24	No simple procedures and guidelines	18	21	35	10	25	109	3.028	
	25	Lack of e-commerce standards	0	0	10	88	11	109	4.009	
	26	Lack of e-trading legislations	18	16	62	8	5	109	2.688	

* : 1 (Strong disagree) ----> 3 (Mandatory agree) ---> 5 (Strong agree)

4. Conclusion

This paper contributes to the development and deployment of e-business systems for SMEs in Saudi Arabia. It began by presenting the term e-business and distinguishing between e-business and e-commerce: whereas the term e-business implies upgrading the competitiveness of an organization by conveying imaginative data and innovative communications throughout an organization and extending outward to stakeholders and customers, e-commerce essentially refers to transactions of buying and selling over the Web. It incorporates transactions such as placing orders, making payments, and tracking shipped orders on the Web.

As a type of infrastructure, e-commerce is playing a major role in the development of e-business systems. Thus, the term SME (which refers to small and medium-sized enterprises) was introduced, and SMEs in Saudi Arabia were defined as all businesses with fewer than 200 workers, according to the Saudi Chamber of Commerce. Therefore, this research focused on e-business adoption by small and medium-sized enterprises in Saudi Arabia.

A study was carried out to determine the two main characteristics of SMEs in Saudi Arabia: the level of e-business adoption and the most significant limitations and barriers to this adoption. According to a survey of one hundred and nine SMEs in Saudi Arabia, 14% were found to depend only on e-mail for communication purposes, but 76% of Saudi SMEs were found to have been using websites to market their businesses, which is a great proportion. Six percent of Saudi SMEs already had e-commerce systems; thus, they can move directly to e-business systems, as done by the remaining 4% of Saudi SMEs that had completed fully integrating e-business systems throughout their supply chains. Based on this study, we conclude that only 10% of Saudi SMEs use the internet to interact with customers in terms of selling their products or services. Thus, this work focused on the remaining 90% that are not involved in e-commerce or e-business. The other objective of this research was to test the most popular barriers in the literature against Saudi SMEs to define the most significant barriers. The barriers were grouped into six groups: organizational barriers, technical barriers, economic barriers, legal and regulatory barriers, social and cultural barriers and political barriers. The results found that organizational, technical and economic barriers are the most significant. Therefore, when the model was under development, these three groups of barriers were used as criteria for choosing the best model.

5. Recommendations

Finally, two main recommendations are given to enhance future research and contributions: the model should be expanded to include fully integrated e-business system modelling and application, and research should be expanded to include larger and smaller organizations. Each of these recommendations will be discussed separately.

First, in this work, we addressed the model that best fit SMEs in Saudi Arabia. The main focus was to find the best way to start an e-commerce system as an infrastructure to transform from a traditional business into an e-business. Future research could go technically beyond e-commerce model building and focus on how to build fully integrated e-business systems through the supply chain. This is because when e-commerce is built, and businesses grow faster, there will be a strong need to adjust and align business processes with the e-commerce business environment. This means that back-office business processes will need to be synchronized with e-commerce demands. If they are not, then customers will very soon notice the poor alignment and adjustment: products will not arrive on time, emailed questions or requests will receive no responses, it will be impossible to track the status of orders, the speed of service will be poor, there will be problems with customer returns and discrepancies in deliveries, there will be no opportunities for personalization, the process of placing orders will be clumsy. Here, businesses should move to the integrative e-business level. The most critical variable for transforming into e-business is supply chain management. Successful supply chain management can be achieved with the assistance of e-business methodologies, which can guarantee far better coordination between the wholesalers and retailers of different items. Superior integration of the supply chain, from the source to the final delivery of the item, can be viably realized utilizing the e-business procedure.

Second, in this research, the main focus was on small and medium-sized enterprises. To facilitate the research, micro-enterprises with only one or two employees were excluded. Future research could include micro-enterprises and large organizations, giving a full picture of our entire market. Moreover, such research can compare business segments to provide a better understanding of their behaviours in terms of e-business adoption. Then, a specific e-business model could be designed for each of the business segments according to their different needs. This will enhance the contribution to the deployment of e-business across all businesses in Saudi Arabia.

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