

# An Empirical Analysis of the Adoption Barriers of E-commerce in Small and Medium sized Enterprises (SMEs) with implementation of Technology Acceptance Model

Majid Esmaeilpour\*,<sup>1</sup>, Seyed Yaaghoob Hoseini\*\* and Younes Jafarpour\*\*\*

## ABSTRACT

Entrance of electronic technologies to the field of trade has caused many changes in the business environment and competition and has caused a large number of companies to pay attention to E-commerce methods and some of them succeed to obtain a lot of advantages and benefits from them. Small and Medium sized Enterprises are forced to use electronic technologies to survive in the competitive environment and gain more market share against large companies. But in this way they are faced with problems. Therefore, the challenges and limitations of these companies should be examined in the adoption of e-commerce. The aim of this study is to identify the main obstacles and challenges of E-commerce adoption by SMEs. The aim of the present study is applied and data collection is descriptive -survey and correlational. The study population consisted of managers and experts of companies in the industrial city of Bushehr (Iran). Total sample size is 157 people from 86 companies that were collected by convenient sampling data. Data were collected by using a questionnaire. The validity of questionnaire was confirmed through the content validity and reliability was confirmed by Cronbach's alpha coefficient. Analyzing the data was done by structural equation modeling via partial least squares method by the help of smart PLS software. The results showed that organizational barriers, technical barriers and environmental barriers as external factors on technology has effected on two starter variables of technology acceptance model that includes usefulness and perceived ease and this predicted relationships are confirmed. In addition, expressed relationships in the Technology Acceptance Model (TAM), including the impact of usefulness and perceived ease on attitude, impact of attitude on Intention and finally impact of Intention on actual use was confirmed.

**Keywords:** Barriers to adoption, E-commerce, SMEs, Technology acceptance model.

## 1. INTRODUCTION

Countries growth and economic development in the present century has made complying with changes inevitable. The rapid development of information and communication technology was an important change in recent decades and its impact on countries economic growth is undeniable. E-commerce is one of various aspects of this technology that has several impacts on commercial and non-commercial organizations. E-commerce means using electronic devices to accelerate business transactions and improve efficiency in business processes across the organization [1]. Now E-commerce is growing rapidly on a global level and affects all industries [2] and has changed the way organizations conduct their business [3]. In the business environment, not only E-commerce has penetrated rapidly in large organizations but also it has developed in small and medium sized enterprises too [4]. Small and medium sized enterprises have also realized the benefits of E-commerce and are trying to apply this technology, but for various reasons they haven't entered to this area and have faced with obstacles [5].

\*,<sup>1</sup> Assistant Professor, Department of Business Management, Persian Gulf University, Bushehr, Iran

\*\* Associate Professor, Department of Business Management, Persian Gulf University, Bushehr, Iran

\*\*\* Graduate student of Business Management, Persian Gulf University, Bushehr, Iran

The results of many studies have shown that small and medium sized enterprises against large companies do not benefit from information and communication technologies and E-commerce and this has made them vulnerable in the face of changing economic conditions and gas made the level of their competitiveness so low [6]. Despite the growing use of communications technologies in small and medium-sized enterprises, the growth rate of technology adoption in these companies remains at a low level; but large organizations in this field have achieved significant productivity both in cost savings and sales [7]. Small and medium-sized enterprises have a very slow process in electronic commerce adoption [8] and this is especially so slower in developing countries than in developed countries [5]. Iran as one of the developing countries is in the preparatory stages of using the E-commerce and primarily uses it as a promotional tool [9]. While there is a potential context for using E-commerce in Iranian small and medium industries, but now small and medium enterprises tend to use E-commerce less than average, use computer applications and network connections, establishment of intelligence, operational and strategic E-commerce in low level [10]. These investments in small and medium industries are not so serious and suitable (Sanayei et al., 2010). Although E-commerce has many advantages for Small and Medium sized Enterprises, but there are many obstacles for its widespread acceptance and usage (Maryeni et al., 2012). To succeed in the world of electronics and e-commerce, the first and most important step in planning is to identify the barriers of using e-commerce. For designing and implementing appropriate strategies for using e-commerce, organizations need to be aware of these obstacles [9]. Small and medium-sized organizations should consider drivers, barriers and issues of accepting communications technology [11].

Although research has been done about adoption of information technology more than a decade and many theories have attempted to explain the adoption of information technology in various fields, but among the studies that focused on the adoption of information technology, only a small percentage has focused on adoption of E-commerce in SMEs. The only study in the field of E-commerce barriers of adoption in small and medium-sized enterprises by using known technology adoption model in the country has been done by Sanayei et al. [9] in the city of Isfahan. But in their study, effective external factors are not considered. In all studies, little research has been done to eliminate this threat in the country and the foundations and theoretical frameworks are not enough. Therefore, obstacles for small and medium sized enterprises to use E-commerce are still unknown. The main issue of this study is that what are the challenges and obstacles of small and medium sized enterprises in the adoption of E-commerce? The research is searching challenges and barriers to E-commerce adoption by small and medium sized enterprises.

## **2. LITERATURE REVIEW AND BACKGROUND OF STUDY**

### **2.1. The definition of E-commerce**

Depending on the context and objectives of the study, E-commerce is defined in different ways [12]. A variety Definitions are provided for E-commerce and there is no common definition agreed. This difference stems from this issue that whether E-commerce activities is defined just as the Internet-based activities or is defined as any business change in any type of network [13]. E-commerce includes supporting the exchange of information and commercial transactions and via electronic communication networks links business stakeholders (typically customers and suppliers) [14]. E-commerce based on Internet or other devices is the change in the way that organizations perform their duties, communicate with customers and do this business through it. E-commerce is not only buying and selling through electronic means. It also covers all other activities to support sales and includes any form of handling commercial activities through electronic means which could range from scope of information about the product to buying or selling products or services [15]. By using E-commerce technology, business information is shared, commercial communications is done and commercial transactions are guided through the communication instrument and networks [16].

## 2.2. Technology Acceptance Model

In recent decades, according to information technology (IT) development, their use in various fields, patterns and several models have emerged in the field of technology adoption and one of them is the Technology Acceptance Model [9]. Technology Acceptance Model is one of the models that is used extensively for explaining the factors influencing the adoption of information systems and information and communication technology by users and customers [17]. The model helps us to understand how decision-makers accept technology for their companies or reject it [18]. This model is known as a powerful model for predicting the acceptance of technology by users [17].

Fred Davis in 1989 introduced the Technology Acceptance Model [19]. By suggesting this model, he was trying to create a platform to recognize why users accept IT or reject it? This model has been developed based on the theory of reasoned action that is one of the theories of psychology. Theory of reasoned action assumes that individual behavior is stimulated through intention and desire. The intention and the behavioral intention is the function of individual attitudes toward behavior and subjective norms that is related to behavioral performance [20]. Theory of reasoned action has been developed to describe any human behavior. The need to design a model for studying the determinants of adoption and application of computers in the 1980s as a behavior was felt and Technology Acceptance Model was a response to these needs [21]. Figure 1 shows the model of technology adoption.

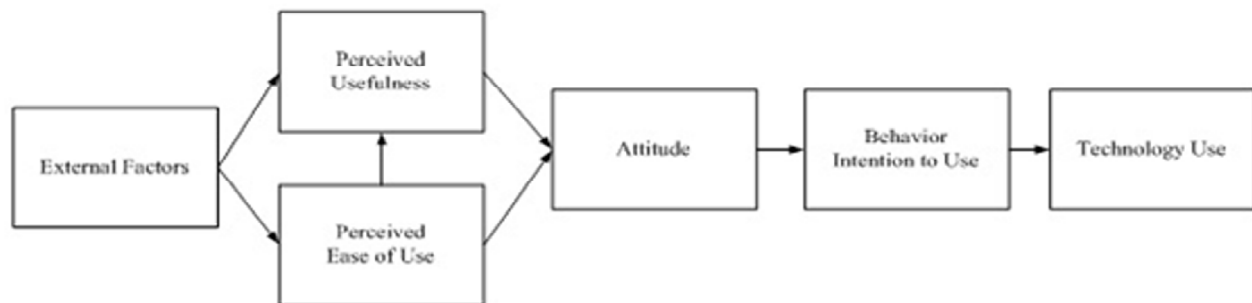


Figure 1: Technology Acceptance Model, Davis, et al., 1989, pp. 985.

Technology Acceptance Model has six variables that are define at below:

- *External factors:* External factors includes any factors like organizational factors, social factors, computer systems features such as hardware and software, how to teach and help of others in the use of computer systems that effects on the perception of the usefulness and ease of using information technology [17]. External factors can effect on people's perceptions of the usefulness and ease of using information technology [21]. External factors offer this understanding that how much the use of technology enhances the performance and how much effort it requires. According to this model, perceived usefulness and ease of use is influenced by external factors that effects on the attitude [22]. In this study, external factors as barriers of E-commerce adoption in SMEs are classified into three categories: organizational barriers, technical barriers and environmental barriers.
- *Organizational barriers:* Organizational barriers refer to barriers of creating innovation in the organization that results from inert and ineffective organizational structure and culture [23]. Organizational context shows internal factors of organization that is effective in the adoption and implementation of innovation [5].
- *Technical barriers:* Technical background is a set of technologies available to a company for acceptance of E-commerce. This background could include technology available in the market as well as the company's own technology and current equipment [23]. Technical criteria for the acceptance of E-commerce include issues such as compliance, security of Internet network, enough computers, Internet speed and etc. [2].

- *Environmental barriers*: Environmental barriers are obstacles that the organization can not solve and resolve them and is forced to operate within these obstacles [23]. The external environment is the range and the area in which an organization conducts its business operations [24]. Foreign direct pressure and support for E-commerce adoption by SMEs arises from environment that includes suppliers, vendors, government and customers [1].
- *Perceived usefulness*: Perceived usefulness is defined as the degree to which a person believes that using a particular system increases the performance of his work [25], [26].
- *Perceived Ease of Use*: Ease of use is defined an individuals' perception about how much hard work is required to use the new technology (Or how much it can be used without much effort) [25], [26].
- *Attitude*: Attitude refers to one's positive or negative feeling about a particular behavior that is shaped by his most important beliefs and specific behavioral performance [27].
- *Intention and desire (intention to use)*: Desire is taken into consideration as a motive that makes certain behavior. Behavioral intention is the severity of a person's intention to perform specific behavior. Behavioral intention is a good predictor benchmark of actual use [25], [26].
- *Behavior (actual use)*: Actual behavior is measured based on the frequency and duration of interaction with information systems [25], [26].

In this study, technology acceptance model is accepted. The main reason for the choice of technology acceptance model in this study is its scientific credibility on issues related to technology acceptance that is more applicable compared to other models. It can show acceptor's mental behavior properly [17], [18].

### 2.3. Empirical literature review

In connection with the position of current study, different researches were conducted in Iran and other parts of the world and some of them are mentioned briefly.

In a survey by the Ghorbani et al. [21], they considered institutional barriers in using E-commerce in agricultural industries in Mazandaran province. Their findings suggest that the most important effective organizational barriers in applying E-commerce is E-commerce mismatch with organization products and services, poor planning and organizing for E-commerce, lack of sufficient knowledge in this area in the organization, mismatching with the business and lack of sufficient time to review new technology and systems. Sanayei et al. [9] investigate the use of technology acceptance model and theory of planned behavior in small and medium enterprises in Esfahan city. Their findings suggest that the perceived benefits effects on the use intention and attitudes, perceived ease of use effects on attitude and perceived benefits, attitude effects on use intention, perceived behavioral control effects on use intention, subjective norms effects on use intention, reliance effects on perceived benefits and attitude and perceived behavioral control and subjective norm, ease of use effects on trust and perceived risk effects on use intention.

Yar Ali [28] in a study has examined barriers to the use of E-commerce by small and medium enterprises in the industry of Khoozestan province. His findings indicate three types of barriers in the use of e-commerce: Cultural barriers (owner perception, customers and suppliers of the benefits of e-commerce), Business environment (E-commerce is not useful to create competitive advantage), Poor government support (technical, educational, infrastructure). In addition, Kiyanjoori et al. [29] conducted a study to examine barriers of E-commerce in entrepreneurship. Their findings show that the main barriers for entrepreneurship in the field of E-commerce includes the lack of quick and easy access to the Internet, lack of appropriate cultural context, lack of qualified personnel, less risk tolerance compared to large companies, lack of government support, lack of appropriate training.

Lee and Kim [16] used technology acceptance models to assess the acceptance of E-commerce technology. According to the survey results, perceived ease of use, perceived usefulness and shopping pleasure effect on attitude. In addition, demographic variables such as age, education and income level also has an impact on the acceptance of e-commerce. Maryeni et al [5] in a study showed that high costs, Internet inadequate security and lack of support of legal system can prevent adoption of E-commerce in companies. Dash et al. [30] in their study used Technology Acceptance Model to investigate the behavior of bank customers in understanding and using banking internet technology. This study also has approved the relationships of variables in technology acceptance model and their impact. According to study results, perceived ease of use and usefulness effects on attitude, attitude effects on desire and desire effects on customers Intention to accept internet bank.

Celik and Yilmaz [31] also used the Technology Acceptance Model in a study about the acceptance of the Internet for customer's commercial transactions in Turkey. Their findings show that perceived ease of use and usefulness effects on attitude, attitude effects on intention and intention effects on actual use of the internet for buying. In another study by Seya and Rahim [32] in the field of electronic commerce acceptance in small and medium-sized businesses that was conducted in Brunei, the result showed that two variables that are perceived ease of use of technology and perceived usefulness in electronic commerce acceptance by small and medium business were effective in Brunei.

Thulani et al. [10] in their study identified high cost of using e-commerce, the complexity of the application, its disproportion with customers and suppliers transaction method, the lack of awareness of the benefits of E-commerce for the company, lack of knowledge and time to use E-commerce as barriers of electronic commerce acceptance. Arendt [6] believes that high cost, absence of innovation culture, required skills and knowledge, customers' Internet demand, infrastructure, security, legal framework, as well as lack of time and Intention of providers to use E-commerce are electronic commerce acceptance obstacles. Lawrence and Tar [24] have mentioned that technological factors, available technology skills, trained personnel, equipment costs and communications and information technology networks, security and trust and legal frameworks are barriers for E-commerce acceptance in developing countries.

Kartiwi and Macgregor [4] in a study examined barriers of applying E-commerce in developing countries. According to their research, most important barriers were disproportion between E-commerce and products and services and their methods, lack of fitness between E-commerce and suppliers and customer's business methods, lack of benefits for company, lack of E-commerce technical knowledge in the enterprise, application

**Table 1**  
**Empirical research results related to the research subject**

<i>Researcher/ Researchers</i>	<i>Title of research</i>	<i>Results of findings</i>
Ghobakhloo [23]	Barriers of E-commerce adoption among small businesses in Iran	Technical barriers (cost of e-commerce, incompatibility, risk), organizational barriers (lack of awareness of e-commerce, the lack of knowledge of information systems), environmental barriers (lack of external support, lack of state support, lack of preparedness partners)
Sarlak et al. [34]	Assessing barriers of E-commerce adoption in the fruit exporting companies in Iran	Lack of financial resources, lack of compatibility of enterprise system with e-commerce, lack of time to learn E-commerce knowledge and insufficient knowledge about the opportunities and advantages, lack of skilled and trained manpower in the organization, lack of knowledge about consumer's system, little trust to e-commerce, the lack of threat from competitors,
Harindranath et al. [35]	Factors affecting the adoption and application of ICT in small and medium-sized businesses	Barriers to technology adoption, including concern about the cost, uncertainty about the business benefits, concerns about security, inadequate expertise in the organization, worries about the attitude of staff
Marasini et al. [36]	Assessment of E-business adoption in SMEs	Barriers to adoption of ICT in small and medium-sized businesses: fear of change, high costs, poor basic skills, lack of awareness of its benefits

(contd...)

(Table 1 contd...)

Researcher/ Researchers	Title of research	Results of findings
Chitura et al. [37]	Barriers to E-commerce adoption in SMEs: a critical review.	Lack of business opportunities, insufficient time, concerns about the security of e-commerce, little E-commerce acceptance among customers and suppliers, lack of enthusiasm of senior managers for using of technology, high costs, inadequate communication infrastructure, uncertainty about benefits, complexity, lack of fitness with products ,
MacGregor & Vrazalic [38]	The role of gender in the perceived barriers to E-commerce adoption in small and medium-sized businesses	Perception of female managers toward lack of fitness barriers with goods and services, lack of fitness with the company's business, mismatching with customers, lack of knowledge and skill, complexity, insecurity and lack of time is different.
Abid et al. [39]	The expected benefits and barriers in e-business technology adoption in small and medium-sized businesses.	Lack of time, complexity, lack of specialists, lack of compatibility with current technical infrastructure, lack of financial resources, lack of confidence, unintentional of managers, limited competition in the industry.
Apulu & Latham [40]	Adoption of ICT: challenges and difficulties of SMEs	Limited financial resources, lack of awareness of managers and owners about the benefits of information and communication technology, lack of technical infrastructure, inadequate legal infrastructure
Harindranath et al. [41]	Adoption of ICT in SMEs of Great Britain: it is a failure or innovation?	Costs and lack of financial resources, inadequate management skills and expertise, lack of local experts, uncertainty about the benefits of ICT managers and owners.
Lawrence [12]	The growth of E-commerce in developing countries: An exploratory study of the opportunities and challenges of small and medium enterprises.	Lack of adequate knowledge about E-commerce technology and its benefits, limitations of the required technical infrastructure, weak legal infrastructure, high cost, lack of required skills and expertise, lack of confidence in the payment system, problems related to rules and regulations.
Moshabbaki et al. [42]	Analysis of Barriers to implementation of E-commerce in food industry	Economic barriers at the customer level, customer level cognitive barriers, political - social barriers at the customer level, economic barriers in business level, political - social barriers at the level of trade, cognitive barriers in trade.
Kapurubandara [43]	Framework for e-business transformation of SMEs in developing countries	Barriers to electronic commerce adoption are divided into two categories. Internal barriers include: inadequate staff skills, inadequate security, mismatch with products, and mismatch between the ways companies run their business. External barriers include: lack of popularity of online sales, low penetration of Internet in the country, quality and low-speed electronic communications, the cost of Internet access, permanent changes in government regulations, lack of favorable government support, inadequate legal frameworks

Source: Provided by authors.

complexity, lack of security, large investment requirements and lack of time for implementation and application. In a research by Porter and Donto [22] with the aim of determining the role of Technology Acceptance Model components in creating attitude for Internet acceptance or rejection In USA in the purchase and sale transactions, they concluded that two variables that are perceived usefulness and ease of use have a strong influence on attitudes; beside it, Internet users' attitude has effected on their actual use. Other studies related to the subject of the research are summarized in Table 1.

#### 2.4. Hypotheses Development and research conceptual model

This research seeks to explain the barriers of E-commerce acceptance in Small and Medium sized Enterprises based on Technology Acceptance Model. By studying the theoretical and empirical literature of the subject and according to the findings of previous researchers that was mentioned in above lines, research hypothesis were formulated and hypothesis has been tested through primary data collection by using data collection tool.

$H_1$ : Organizational barriers of E-commerce acceptance have a significant impact on its perceived ease of use.

- $H_2$ : Organizational barriers of E-commerce acceptance have a significant impact on its perceived usefulness.
- $H_3$ : Technical barriers of E-commerce have a significant impact on its perceived ease of use.
- $H_4$ : Technical barriers of E-commerce have a significant impact on its perceived usefulness.
- $H_5$ : Environment barriers of E-commerce have a significant impact on its perceived ease of use.
- $H_6$ : Environment barriers of E-commerce have a significant impact on its perceived usefulness.
- $H_7$ : Perceived ease of use of E-commerce has a significant and positive impact on perceived usefulness.
- $H_8$ : Perceived ease of use of E-commerce has a positive and significant impact on the attitude of its use.
- $H_9$ : Perceived usefulness of E-commerce has a positive and significant impact on the attitude of its use.
- $H_{10}$ : Attitudes toward the use of E-commerce has a significant and positive impact on intention (desire) to use.
- $H_{11}$ : Intention (desire) to use E-commerce has a significant and positive impact on its actual use.

Based on Davis Technology Acceptance Model [19] and the results of previous researchers that was mentioned in above lines, this research conceptual model (Figure 2) has been designed. In Davis Technology Acceptance Model, there are external factors that affect the perception of the usefulness of technology. In this study, the identified barriers in previous research (Porter & Donthu [22]; Yar Ali [28]; Kim & Lee [16]; Ghobakhloo [23]; Sarlak et al. [34]; Lawrence [12]; Kapurubandara [43] entitled organizational, technical and environmental barriers were considered as external factors. This study tries to examine research assumptions and conceptual models by collecting actual data.

### 3. RESEARCH METHODOLOGY

Aim of this study is applied and the nature and method is descriptive survey and correlational. The study population consisted of managers and experts of companies in the industrial city of Bushehr (Iran). According to information received from the industrial Estates of Bushehr province, the number of companies located in the industrial city of Bushehr city was over 86 companies and the number of managers and experts of

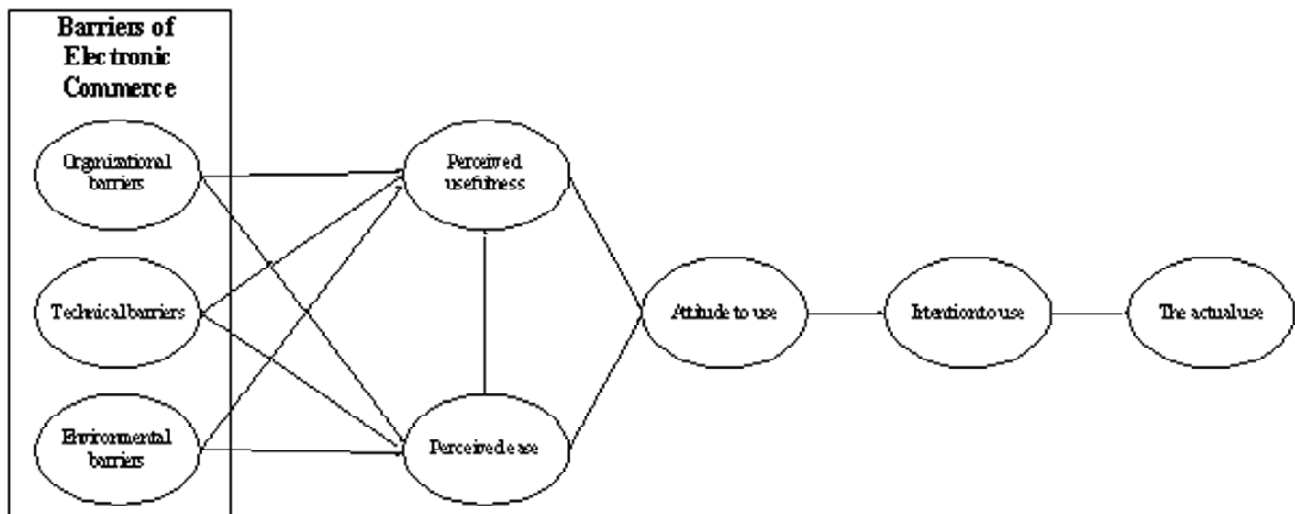


Figure 2: Research conceptual model (the relationship between external barriers and technology acceptance model)

these companies is about 280 people. According to Cochran's formula of limited population with a confidence level of 95% and sampling error of 5%, Sample size was over 162. Since preparing complete list of the population to select the required sample was not possible and access to respondents was difficult, so, in this study, convenience sampling was used.

Data were collected by questionnaire. Questionnaire consists of three parts, which includes introduction, demographic questions and questions that measure the main survey variables. To measure 6 main survey variables, 58 questions were designed through combination of questionnaires and other researches associated with the survey subject. Variable measurement scale in this study is the whole five-item Likert (from totally agree to totally disagree). Table 2 provides information about the method of designing the questionnaire. A total of 165 questionnaires were distributed among society members in person and eventually a total of 163 questionnaires were collected. 6 questionnaires were excluded because they were no completed properly by respondents, and finally 157 questionnaires were used for analysis. As this study questionnaire was designed according to previous questionnaires and researches that were addressed in this survey empirical literature, and its validity has already been measured, therefore, we can say that survey questionnaire has necessary validity. But despite this, to determine the validity of questionnaire, formal content validity was used again. For this purpose, designed questionnaire was provided to a number of university professors in the field of management and marketing and administrators and experts of the companies located in the industrial city of Bushehr city and they were asked to express their opinion about the questionnaire validity. After collecting comments, the final questionnaire was designed. To examine the reliability of the questionnaire, the most common method for assessing the reliability of the questionnaire that is Cronbach's alpha coefficient was used. Cronbach's alpha coefficient for all variables was higher than 0.7 and for the entire questionnaire was 84%, which is a good factor and shows that the reliability of the questionnaire is at an appropriate level. Table 2 shows the results of reliability coefficients of questionnaire.

To test the hypothesis and research conceptual model, structural equation modeling (Partial Least Squares method) by help of smart PLS software was used. The reason for using smart PLS software was that sample size in this study was low and research conceptual model cannot be tested by Lisrel or Amos software that are sensitive to the sample size.

## 4. DATA ANALYSIS AND RESULTS

### 4.1. Demographic characteristics of respondents

For analyzing research data, descriptive statistics were used to analyze demographic variables. Table 3 is related to survey demographic variables that are analyzed through the collection of 157 questionnaires. As

**Table 2**  
**Research variables and resource of item extraction**  
**and reliability results of the data collection tool (questionnaire)**

<i>variable</i>	<i>Number of questions</i>	<i>Cronbach's alpha coefficients</i>
Technical barriers	10	0.717
Organizational barriers	18	0.762
Environmental barriers	12	0.792
Perceived usefulness	5	0.902
Perceived ease of use	3	0.860
Attitude	4	0.745
Intention to use	3	0.859
Actual use	3	0.736
Total questionnaire	58	0.844

*Source:* Provided by authors.



**Table 3**  
**Demographic characteristics of respondents**

<i>Demographic variable</i>	<i>Levels</i>	<i>Frequency</i>	<i>Percentage of frequency</i>
Gender	Male	99	63.1
	Female	58	36.9
Education	Diploma	5	3.2
	Associate	15	9.6
	Undergraduate	125	79.6
	Graduate and higher	12	7.6
Age	20 to 30 years	72	49.9
	30 to 40 years	60	38.2
	41 to 50 years	19	12.1
	Over 50 years	16	3.8
Type of enterprise activity	Chemical industry	27	17.2
	Metal industry	43	27.4
	Mining industry	22	14
	Food industry	24	15.3
	Service industries	17	10.8
	Electrical industry	11	7
	Fish processing industry	13	8.3

*Source:* Provided by authors.

Table 3 shows the highest respondents according to gender was male with 63.1 percent, the highest age of respondents was young people that their age ranged from 20 to 30 years with 45.9 per cent, the highest education level of respondents was experts with 79.6 percent, and most types of companies located in the industrial city in Bushehr was metal industry with 27.4 percent.

#### 4.2. Test of research conceptual model

Conceptual model and research hypotheses were tested by structural equation modeling and by help of smart PLS software.

Implementation of structural equation modeling helps researcher to examine the theoretical pattern which consists of different elements both generally and partially. The elements of structural equation modeling test shows that there is a significant positive relationship between the elements of different layers of research conceptual model. Figure (2) shows the results of the structural equation modeling test.

Figure 2 shows different version of research in absolute value of significant coefficient ( $|t\text{-value}|$ ). In fact, this model tests all measurement equations (factor loading) and structural equation (path coefficient) by using t statistic. According to this model, if the value of the t-statistic for directions is larger than 1.96, path coefficient and factor loading in confidence level of 95% is significant and if t-statistic is less than 96.1 for directions, so factor loading or path coefficient is not significant . Also, if the value of t-statistic is greater than 2.58, in this case, the path coefficient and factor loading are significant at a confidence level of 99%.

For model general fitness, Index of GOF is used. In this study, the GOF index was 0.74. As amounts of 0.10, 0.25 and 0.36 have been introduced as weak, medium and strong values for GOF [44], so it can be said that the overall research model fitness is good and confirmed. Since overall research model fitness is

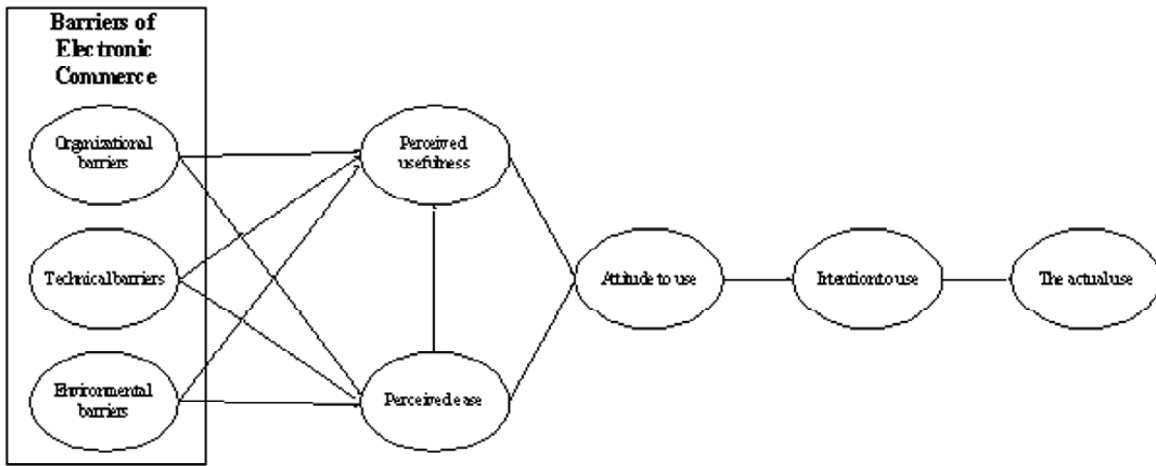


Figure 2: Implementation of structural equation model, along with some standardized coefficients (path coefficients) and significance coefficients (t-value)

good and confirmed, by data extraction from structural equation model, we can test the main research hypothesis. According to the results obtained from the standard path coefficients and significant coefficients or t-statistics (Figure 2), we can say that (organizational barriers, technical barriers and environmental barriers) variables have a significant impact on perceived ease of use and perceived usefulness variables at a confidence level of 90% to 99%. Path coefficient obtained from these relationships is also negative and shows that by increasing one unit in variable of organizational barriers, technical barriers and environmental barriers, perceived usefulness and perceived ease of use variables change 0.202 to -0.412 units in the opposite direction. Beside it we can also say that E-commerce perceived ease of use variable has positive and significant impact on perceived usefulness at a confidence level of 99%.

Table 4  
The results of testing research hypothesis

Hypothesis	Conceptual model relations	Std. path coefficient	Calculated t-value	p-value	Result
1	Organizational barriers → Perceived ease of use	-0.412	3.88	01/0>	Confirmed
2	Organizational barriers → Perceived usefulness	-0.151	1.88	1/0>	Confirmed
3	Technical barriers → Perceived ease of use	-0.201	1.82	1/0>	Confirmed
4	Technical barriers → Perceived usefulness	-0.320	3.52	01/0>	Confirmed
5	Environmental barriers → Perceived ease of use	-0.264	2.06	05/0>	Confirmed
6	Environmental barriers → Perceived usefulness	-0.202	2.38	05/0>	Confirmed
7	Perceived ease of use → Perceived usefulness	0.322	5.88	01/0>	Confirmed
8	Perceived ease of use → Attitude	0.439	4.72	01/0>	Confirmed
9	Perceived usefulness → Attitude	0.482	5.51	01/0>	Confirmed
10	Attitude → Intention to use	0.800	20.66	01/0>	Confirmed
11	Intention to use → Actual use	0.816	30.17	01/0>	Confirmed

Source: Provided by authors.

About the relationship between two variables (perceived ease of use of E-commerce and perceived usefulness) with attitude, we can say that these two variables have a significant positive impact on attitude variable, because significant coefficient or t-statistic is located out of negative range of 2.58 to positively range of 2.58. In addition, according to the obtained coefficients between attitude and desire (intended use) variable it can be said that at 99% confidence level, attitude variable has a positive significant impact on Intention (intended use) variable. Also according to the obtained coefficients between the variables of Intention (intended use) and actual use we can say that at 99% confidence level, Intention (intended use) variable has a positive significant impact on actual use variable. The main research hypothesis test results are provided in Table (4).

## 5. CONCLUSIONS AND RECOMMENDATIONS

This research has tried to consider challenges and barriers to E-commerce acceptance in small and medium sized enterprises in the industrial city of Bushehr city (Iran). After studying theoretical literature and literature review in this field, hypothesis and research conceptual model was designed and then was tested through structural equation modeling by help of smart PLS software.

As Table 4 shows, all variables derived from theoretical and empirical literature are confirmed as barriers of electronic commerce acceptance (organizational barriers, technical barriers and environmental barriers) by collected data, so that a their significant number obtained desirable level. In other words, the barriers of electronic commerce acceptance (organizational barriers, technical barriers and environmental barriers) have significant impact on perceived ease of use and perceived usefulness. These findings are consistent with research results of Ghorbani et al. [21], Thulani et al. [13], Kartiwi and McGregor [4], Kapurubandara [43], Arendt [6], Sarlak et al. [34], Harindranath et al. [35], Ghobakhloo [23] Kiyanjooori et al. [29], MacGregor & Vrazalic [38], Chitura et al. [37], Marasini et al. [36], Lawrence [12], Abid et al. [39], Moshabbaki et al. [42], and have confirmed them.

Another finding showed that perceived ease of use of E-commerce (with a path coefficient of 0.322) has positive and significant impact on its perceived usefulness. These findings are also consistent with the findings of scholars such as Sanayei et al. [9], Dash et al. [30], Celik and Yilmaz [31], Lee and Kim [16].

The simplicity and ease of use of technology has various reasons. Low complexity of technology, staff training or hiring staff with technical skills, security of electronic systems, government support and coordination with customers and suppliers in the use of electronic interaction tools, can create simplicity and ease of use of technology and adopters perceive that its use because of the convenience and easiness, improve their performance and profitability. Research findings suggest that perceived ease of use of E-commerce (with path coefficient of 0.439) and its perceived usefulness (with path coefficient of 0.482) has a positive and significant impact on the attitude to electronic commerce acceptance. These findings are consistent with research results of Sanayei et al. [9], Dash et al. [30], Celik and Yilmaz [31], Lee and Kim [16]. The individual's subjective perceptions of whether using new technology is easy enough or not, can create one's belief and subjective perception. The formation of a mentality based on ease of use, or difficulty of using e-commerce, could form a negative attitude to accept it. Also if the condition of using technology increases performance and profitability of the company, it can create perception about its usefulness. Eliminating challenges in this context, can creates perception about its usefulness and effects the mentality of adaptor' attitudes. Another finding of this study shows that attitude about accepting electronic commerce (with path coefficient of 0.8) has a positive and significant impact on the Intention to use it in a business. This finding is also consistent with the results of research of Sanayei et al [9], Dash et al. [30], Celik and Yilmaz [31], Lee and Kim [16]. As creating attitude is an introduction to desire to act in the same direction, so it can be assumed that the individual's subjective perceptions and beliefs effects on his intentions to act or not. Attitude is the result of two variables of ease of use and perceived usefulness that at this stage leads

to practical behavior intention. Another finding of this research shows the effect of people's Intention to use E-commerce (with path coefficient of 0.816) on the actual use of it by decision-makers. This finding fits with research of Sanayei et al. [9], Dash et al. [30], Celik and Yilmaz [31], Lee and Kim [16].

Intention to use is practical behavior intention and the next stage is actual behavior. If the desire and intention is formed positively by the influences of previous variables, leads to acceptance of new technology. On the contrary, if the individual's desire and intent toward technology is negative due to organizational, technical and environmental challenges, so obviously there is not a great desire in this matter. Therefore, actual use or lack of actual use of new technology systems is influenced by the individual's Intention.

### 5.1. Practical suggestions

According to the findings of this study, the following practical recommendations are offered to SMEs as well as a supplier of technologies related to e-commerce:

1. Informing managers and corporate decision-makers about the benefits and opportunities of E-commerce can cause the perception about the usefulness of this technology. Offering a variety of newsletters, booklets and books in this field to managers as well as holding seminars and conferences can be effective in this matter.
2. Motivating and encouraging innovation in the company, both at the level of managers and the employees should be on the agenda of companies.
3. As the cost is considered one of the main barriers to acceptance, companies can engage in this regard via financing through bank loans. Installment buying of hardware and software is also effective in the field. In addition, the companies should know that the cost in this area is a kind of investment and financial benefits of E-commerce can cover its costs over time and then the company benefits from cost savings achieved in the traditional manner and thereby gradually reduces its costs and achieve greater profitability.
4. In the field of insufficient technical skill of staff, it is suggested that after assessment of the educational needs, by holding training courses, offering pamphlets and books and holding technical workshops in this field they should be trained and be ready to accept and work with technology. This research finding suggests that environmental barriers have impact on ease of use and perceived usefulness of E-commerce. Therefore, companies should seek to create conditions in order to eliminate environmental barriers to influence individuals' perception. For this purpose, the following suggestions are offered.
5. Regarding to application restrictions by the partners and suppliers, it is recommended to companies to primarily study the issues and problems of partners and suppliers in electronic commerce acceptance and according to it, encourage them to take action in this regard. In addition, the use of mandatory policies in this area can be effective for partners and suppliers.
6. After identifying the problems of customers, E-commerce technology suppliers should offer necessary training in this field and enable their customers in this regard. Using electronic interactive procedures in a simple available, cheap and convenient manner and also creating confidence in electronic interaction with the company can motivate customers to use E-commerce.
7. It is recommended that companies should turn to electronic marketing and identify their customers at the national as well as international level by using e-commerce. Also they should introduce themselves and their products and services with a massive advertisement on the Internet. Convenience and ease of use of electronic interaction and possibility of vast marketing in this area can increase market share and access to untouched parts of the market.

8. E-commerce technology providers can collaborate and synchronize with company to make changes. Helping organizations to conduct business in accordance with the provided technology, introducing a variety of hardware and software that is consistent with the company's activity can be of great help to these organizations. In addition, providing training in the field of a variety of offered technologies applications, methods of application and using software, providing guarantee and after-sales service can also motivate companies to accept E-commerce.
9. Problem of electronic systems security especially in the field of commercial applications is very important. Because, there is the possibility of financial losses and dissemination of confidential information. Technology providers need to deliver defect-free electronic systems as much as possible and ensure the accuracy of their functions. Informational and financial security of software systems and maintaining physical quality of hardware systems can motivate companies to apply E-commerce systems.
10. The findings suggest that perceived ease of use of E-commerce and its perceived usefulness has impact on the attitude to accept e-commerce. Creating perception in adopters about technology ease of use and its usefulness is the responsibility of businesses, governments, as well as suppliers of E-commerce. Companies should create perception of easy use through creating awareness, funding, creating passion for innovation and finding solution to make up for lost time. Also government paves the way for adopters by financial support, setting up the infrastructure and developing legislation and regulation. Technology providers should make use of electronic commerce technology easy by flexible production, training, installation and repair and other services and also increasing the security of produced services.
11. The findings of this study suggest that attitude toward the use of electronic commerce effects on Intention (intention to use). Providing advertising, training, showing the results of other companies and even advanced countries in this area can change companies' attitudes toward technology.
12. The findings of this study suggest that Intention (intention to use) to use E-commerce has impact on actual use of E-commerce. It should be noted that the tendency is intention to use. So we need to take appropriate action to create a positive intention in companies.

## 5.2. Limitations of the study

Doing any research work is accompanied by limitations and this research is not excluded from them. One of the limitations of this study is data collection tool. However questionnaire has its inherent limitations as one of the most common data collection tools of research in the social and behavioral sciences. Also the population of this study is limited to small and medium sized enterprises located in the industrial city of Bushehr city (Iran) and since the number of these companies are low and therefore sample size of this study is small, so we are not sure about generalizing the results of this study.

## REFERENCES

- [1] Marimuthu, M., Omar, A., Ramayah, T., & Mohamad, O. (2011). Readiness to Adopt E-Business Among SMEs in Malaysia: Antecedents and Consequence. *International Journal of E-Adoption*, 3, pp. 1-19.
- [2] Elahi, S., & Hassanzadeh, A. (2009). A framework for evaluating electronic commerce adoption in Iranian companies. *International Journal of Information Management*, 29, pp. 27-36.
- [3] Love, P. E., Irani, Z., Cheng, E. W., Li, H., & Tse, R. Y. (2001). An empirical analysis of the barriers to implementing e-commerce in small-medium sized construction contractors in the state of Victoria, Australia. *Construction Innovation*, 1, pp. 31-41.
- [4] Kartiwi, M., & MacGregor, R. C. (2007). Electronic commerce Adoption barriers in small to Medium-sized Enterprises (sMEs) in Developed and Developing countries: A cross-country comparison. *Journal of Electronic Commerce in Organizations*, 3, pp. 35-51.

- [5] Maryeni, Y., Govindaraju, R., Prihartono, B., & Iman, S. (2012). Technological and organizational factors influencing the e-commerce adoption by Indonesian SMEs. 6th International Conference on Management of Innovation and Technology, IEEE, *PROCEEDING*, INDONESIA, pp. 1716-1726.
- [6] Arendt, L. (2008). Barriers to ICT adoption in SMEs: how to bridge the digital divide? *Journal of Systems and Information Technology*, 10(3), pp. 93 - 108.
- [7] Ali, A., Rahman, M., & Ismail, W. (2012). Continuance Intention to use Accounting Information Systems among SMEs in Terengganu, Malaysia. 3rd International Journal of Services Economics and Management Predicting, Indonesia, pp. 1040-1056.
- [8] Jagoda, K. (2010). The Use of Electronic Commerce by SMEs. *intrepreneurial*, 1, pp. 36-47.
- [9] Sanayei, A. ; Fathi, R. , & Sadeghian, M. (2010). *E-commerce adoption by SMEs managers in Esfahan city using technology acceptance model*. Sixth International Conference on Information and Communication Technology Management. Tehran: Institute for Technology Management. pp. 1-13. (In Persian)
- [10] Movahedi, M. (2012). Determination of the deployment of E-commerce in small and medium enterprises. *Journal of Business Research*, Issue 58, pp. 33-75. (In Persian)
- [11] Ghobakhloo, M., Sabouri, M., Hong, T., & Zulkifli, N. (2011). Information Technology Adoption in Small and Medium-sized Enterprises; An Appraisal of Two Decades Literature. *Interdisciplinary Journal of Research in Business*, 1, pp. 53-80.
- [12] Lawrence, J. E. (2011). The Growth of E-Commerce in Developing Countries: An Exploratory Study of Opportunities and Challenges for SMEs. *International Journal of ICT Research and Development in Africa*, 2(4), pp. 15-28.
- [13] Thulani, D., Chitura, T., & Langton, R. (2010). Electronic Commerce Benefits and Adoption Barriers in Small and Medium Enterprises in Gweru, Zimbabwe. *Journal of Internet Banking and Commerce*, 15(3), pp. 1-17.
- [14] Raymond, L. (2001). Determinants of Web site implementation in small businesses. *Internet Research*, 11 (5), pp. 411-424.
- [15] Scupola, A. (2009). SMEs' e-commerce adoption: perspectives from Denmark and Australia. *Journal of Enterprise Information Management*, 22(2), pp. 152-166.
- [16] Lee, S., & Kim, D. J. (2013). Driving factors and barriers of information and communication technology for ebusiness in SMEs: A case study in Korea. *IADIS International Conference e-Society*, Spain, pp. 163-171.
- [17] Badi, A.; Ghanimat, A., & Ghanimat, S. (2011). *Study of consumer behavior in online marketing based on the Technology Acceptance Model (TAM) with an emphasis on customer loyalty*. National Conference on Information Technology and Economic Jihad, Kazeroon, University of Salman Farsi in Kazeroon, pp. 1009-1023. (In Persian)
- [18] Mpfu, K., Milne, D., & Mathys, L. W. (2012). ICT Adoption and Development of E-business among SMEs in South Africa. *CSDMS*, 9, pp. 1-20.
- [19] Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: A comparison of tow theoretical models. *Management Science*, 35(8), pp. 982-1003.
- [20] Masrom, M. (2007). Technology Acceptance Model and E-learning. *12International Conference on Education*, Sultan Hassan al Bolkuh Institute of Education, Darussalam: Universiti Brunei, pp. 1-9.
- [21] Ghorbani, M.; Khaldif, F., & Shoukatfadaei, M. (2011). *Prioritizing organizational barriers of using E-commerce in agriculture industries in mazandaran province*. First National Congress of Agricultural Science and New Technologies, Zanzan University, pp. 1-5. (In Persian)
- [22] Porter, C., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, 59(1), pp. 999-1007.
- [23] Ghobakhloo, M., (2013). Barriers to Electronic Commerce Adoption Among Small Businesses in Iran. *Journal of Electronic Commerce in Organizations*, 9(3), pp. 48-89.
- [24] Lawrence, J. E., & Tar, U. A. (2010). Barriers to ecommerce in developing countries. *Information, Society and Justice*, 3(4), pp. 23-35.
- [25] Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences* , 14(3), pp. 273-315.
- [26] Afshar Jahanshahi, A., Rezaei, M., Nawaser, K., Ranjbar, V., & Pitamber, B. (2012). Analyzing the effects of electronic commerce on organizational performance: Evidence from small and medium enterprises. *African Journal of Business Management*, 6 (12), pp. 6486-6496.
- [27] Klopping, I. M., & McKinney, E. (2002). Extending the Technology Acceptance Model and the Task - Technology Fit Model to Consumer E - Commerce. *Information Technology, Learning, and Performance Journal*, 4(3), pp. 35-48.
- [28] Yar-Ali, M. (2009). *Consideration of main E-commerce barriers by small and medium enterprises (Case Study: Industry of Khuzestan province)*. Master's Thesis, School of Management, Tehran University. (In Persian)

- [29] Kiyanjori, K.; Rodgarnezhad F., & Nobati, A. (2006). *Offering a Conceptual Model for considering E-commerce barriers in Iran entrepreneurship area (SMEs)*. The second International Conference on E-commerce and international trade, Tehran Novin Afarinane keifiyat, pp. 76-86. (In Persian)
- [30] Dash, M., Mohanty, A., Pattnaik, S., Mohapatra, R., & Sahoo, D. (2011). Using the TAM Model to Explain How Attitudes Determine Adoption of Internet Banking. *European Journal of Economics, Finance and Administrative Sciences*, 36(2), pp. 50-59.
- [31] Çelik, E. H., & Yılmaz, V. (2011). Extending the Technology Acceptance Model for Adoption of E-Shopping By Consumers in Turkey. *Journal of Electronic Commerce Research*, 12(4), pp. 152-164.
- [32] Seyal, A. H., & Rahim, M. (2010). understanding Electronic commerce Adoption in Bruneian SMEs: A replication of the Application of tAM and perceived Strategic value Models. *Journal of Electronic Commerce in Organizations*, 8(1), pp. 32-50.
- [33] Porter, C., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, 59(1), pp. 999–1007.
- [34] Sarlak, M., Forozandeh Dehkordi, L., & Ghorbani, A. (2009). Investigating on Electronic Commerce Acceptance Barriers in Dried Fruits Exporting Companies of Iran. *World Applied Sciences Journal*, 6(1), pp. 818-824.
- [35] Harindranath, G., Dyerson, R., & Barnes, D. (2009). ICT in small firms: Factors affecting the adoption and use of ICT in southeast England SMEs. *16th European Conference on Information Systems*. pp. 1-14.
- [36] Marasini, R., Ions, K., & Ahmad, M. (2008). Assessment of e-business adoption in SMEs: A study of manufacturing industry in the UK North East region. *Journal of Manufacturing Technology Management*, 19(3), pp. 627-644.
- [37] Chitura T, Mupemhi S, Dube T, & Bolongkikit J. (2008). Barriers to Electronic Commerce Adoption in Small and Medium Enterprises: A Critical Literature Review. *Journal of Internet Banking and Commerce*, 13(3), pp. 1-13.
- [38] MacGregor, R., & Vrazalic, L. (2008). The role of gender in the perception of barriers to e-commerce adoption in SMEs: An Australian study. *Communications of the IBIMA*, 4(1), pp. 140-147.
- [39] Abid, A., Rahim, M., & Scheepers, H. (2011). Experienced Benefits and Barriers of e-Business Technology Adoption by SME suppliers. *Communications of the IBIMA*, 11(3), pp. 1-11.
- [40] Apulu, I., & Latham, A. (2009). Information and Communication Technology Adoption: Challenges for Nigerian SMEs. *TMC Academic Journal*, 4(1), pp. 64-80.
- [41] Harindranath, G., Dyerson, R., & Barnes, D. (2008). ICT Adoption and Use in UK SMEs: a Failure of Initiatives? *The Electronic Journal Information Systems Evaluation*, 11(3), pp. 91 - 96.
- [42] Moshabbaki A.; Sarfarza A.; Zare, H. & Shahriyan, M. (2010). Analysis of implementation Barriers of E-commerce in food industry in Iran (Case Study: Food industry of Yazd Province). *Quarterly Journal of Exploring Business Management*, 2(4), pp. 91-74. (In Persian)
- [43] Kapurubandara, M. (2009). A Framework to e-Transform SMEs in Developing Countries. *The Electronic Journal of Information Systems in Developing Countries*, 39 (3), pp. 1-24.
- [44] Hair, F., Ringle M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, 19(2), pp. 139–152.