



Providing a Three-Dimensional Model for Implementation Challenges of E-commerce in Iran

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Abstract: Aims: This paper aims at highlighting the importance of e-commerce adoption in Iran and refers to its technical, social-cultural and managerial implementation challenges, and by providing a ranking for each dimension of these challenges, wants to know solving or at least minimizing the adverse effects of which one has the most influence on implementation of e-commerce in Iran.

Study design: Quantitative research design.

Place and Duration of Study: Iran, in 2013.

Methodology: In this research system dynamics approach was used and the necessary data collected from previous researches, then analyzed by VENSIM software. Since the most of projects in Iran are short-term projects, a 5 year interval used for data analysis with the change rate of 20%. Because 20% is the lowest rate that best represents the effects of applied changes.

Results: Data analysis showed that reducing every dimension of each challenge by 20% will have a great effect on the implementation of e-commerce in Iran.

Conclusion: The research findings revealed that the shortage of internet service providers (as a technical challenge), Officials and decision makers' lack of familiarity with the structure and function of e-commerce (as a social-cultural challenge) and lack of strategic management (as a managerial challenge) are the most important implementation challenges of e-commerce in Iran

Keywords: E-commerce, Dynamic Systems, Social challenges, Cultural challenges

1. INTRODUCTION

The modern era which is known as the information and wisdom age, is heralding a new world with new ways to use information and knowledge [1]. Information technology is the number one leader in this era. This means every country's economic, political, cultural and scientific authority equals the country's level of mastery and utilization of this technology [2].

Information technology is defined as collecting, organizing, storing and publishing information such as audio, video, text or figures which is done by computerized and telecommunicative tools [3]. This technology, known as one of the latest achievements of modern humanity, has not only undergone profound changes, but also is rapidly influencing patterns of life, ways of research, education, management, transportation, security, hygiene and the most important one, which is business [2]. A large number of studies have been done to identify barriers of E-commerce in developed countries in recent years. But e-commerce has not received enough attention in Iran and conducting scientific researches on this issue has been ignored.

One of the factors which prevents e-commerce development is using separated automation systems in various departments in an enterprise, especially in the accounting firm. For instance, it's possible for the production department to have an automation system but eventually, that department submits its information to the warehouse or accounting department in the form of a hard copy. These sections must take necessary actions to re-enter information to their system by spending time, money and possibility of making mistakes because there does not exist coordination and integration between the software of different departments. In such cases

it can be argued that the automation system per se in every department will not be able to help develop the clerical procedures[4].

One of the newspapers with a wide circulation read “until either companies or individuals haggle while shopping and otherwise they feel they have been swindled, we can’t expect e-commerce to develop rapidly and eventually until time is not considered that valuable in our culture, there is no reason to follow e-commerce or any other electronic phenomenon”[5].

In the first international conference of knowledge and information technology which was held by Amir-Kabir university, information technology and computer engineering faculty in the IRIB conference hall, it is also mentioned: In Iran due to lack of legal grounds for the use of e-commerce such as documents, electronic signature, lack of electronic transmission of funds, lack of basic e-commerce network and the hardware and software associated with it in Iran, insufficient awareness of e-commerce enterprises in small and big institutions and last but not least, lack of knowledge and culture of using e-commerce and the internet, have caused many problems for this system. It is hoped that a good infrastructure for the development of this new trade science, foreign trade and the forth export-reliant development plan is provided by imminent approval of the e-commerce and e-learning law [6].

EIU has ranked 60 countries regarding the state of e-commerce in 2012. In this ranking which actually shows the ease and availability of e-commerce in different countries, two overall indexes of business environment and communication have been used. For the index of business environment, 70 different criteria such as the extent of economy, the prospects for political stability, regulatory environment, tax policies and the degree of business and investment freedom have been used. According to this index Iran’s rank is 3 out of 10 which means its total rank is 59[5].

Tadbir educational and scientific journal, No 145 states: The other index is communication in which some criteria such as the extension of the telephone network and other criteria which determine the state of internet access like the cost of internet connections, the literacy rate etc. have been used. According to this index Iran’s rank is 3 out of 10 and means its total rank is 56. Generally speaking the index of ease and e-commerce availability has ranked Iran as number 58 out of 60 countries [5]. So, conducting researches and more investigations in this field is crucial for Iran. But the real question is that how it is possible to implement e-commerce in an economy that its technical, cultural, social, banking, legal, customs, managerial, financial and economic infrastructures have not developed enough? [7]. For instance pay attention to the following points:

1- E-commerce is an international system and until Iran continues life like an island and far from international relations; traders, goods consumers and services are imprisoned inside the country and can’t adapt themselves with international conditions. Therefore Iran can’t develop in the field of e-commerce [8].

2- Definitions of e-commerce and e-business are specific definitions and they need to be accepted. Accordingly, if we could operate according to accepted international standards, we would take steps towards e-commerce globally [9].

3- Our main weakness is that if we accept the standards and rules of international trade but don’t perform well in practice and do not act according to the rules of international commerce, our name will be on the black list [10].

Hence, in this study the challenges in implementing e-commerce, such as technical, social-cultural and managerial challenges are centralized and some subdivisions are considered for each subset too.

Dimensions of technical challenges:

- 1- Lack of broadband internet connection [11]
- 2- Local experts’ low level of technical knowledge [11]
- 3- Shortage of internet service providers [12]

Dimensions of social-cultural challenges:

- 1- Improper development of the proper use culture of e-commerce [11]
- 2- Managers’ low awareness of the objectives of e-commerce [13]
- 3- Consumers’ low awareness of the benefits of e-commerce [12]

4- Officials and decision-makers' lack of familiarity with the structure and function of e-commerce [11]

Dimensions of managerial Challenges:

1- Lack of strategic management [1]

2- E-commerce managers and decision-makers' Too much job rotation [4]

3- Lack of senior management commitment among government and non-governmental organizations [13]

In this paper an attempt has made to measure the highest and lowest weight of the factors by Vensim software. This software can predict the rates of changes in the next few years. Since no independent study has addressed e-commerce implementation challenges via system dynamics approach, this study has attempted to fill the void of the research.

1.1 E-commerce

History of e-commerce depends on its definition. A first guess is that the first trade by phone or fax was the first e-commerce transaction. But today's e-business practices were formed in the 1960s and based on "electronic data interchange" which means the electronic exchange of standardized documents from one computer to another computer[14]. Electronic exchange of information provided electronic transmission of business documents for companies in a manner that minimizes the need for human intervention in the process [15]. The electronic data interchange can be considered the father of modern e-commerce [16]. Because message transmission technology reduces paper use, increases the automation of business processes (organizations had a low level in all business processes in the past), improves the efficiency of this process over time, and changes it to an integral part of the trade[17]. However, what can be called the traditional e-commerce is not limited only to Electronic data interchange but to a broad range of various forms of messaging, encoding and sending video files along with mailing documents[18]. Over time and by creation of storing tools, marketing public and organizations access to data processing and development of telecommunicative technology and computer networks provided further opportunity for development, which trade players found it very useful. One of the major trends in the development of e-commerce has been the computer hardware dramatic cost reductions and more importantly, it is a global standard for hardware development. Such a process is called "integrated standardization of Open Integrated Systems". There is also such a trend about software standards, but software standards are not as integrated, united and compatible as hardware standards[19]. The next thing after the integration and standardization is creating network opportunities and the ability to connect a variety of computer systems. Thus, communication networks, such as ARPANET in 1960s, have played important roles in information sharing and communication. It is interesting to know that the internet breakthrough began in 1972 AD when the first ARPANET email was used to develop the new technology. This phenomenon led to creation of a new version of the protocol of data transfer scheme, called "Transmission Control Protocol / Internet Protocol"[20]. Internet emergence provided new forms of commerce such as Internet services[21]. Today, thanks to dramatic cost reductions, compliance, flexibility, hardware and software standards and global interchange of data with low costs, it is provided for the general public. Basis meaning of e-commerce defines as simply fast, inexpensive and easy performance of data transactions via the Internet [22]. In general, the formation processes of e-commerce are divided into the following five steps:

The first stage - The advent of private networks:The first steps to start e-commerce were taken in 1970s and 1980s by some governments and famous international businessmen who tried to develop information exchange and its security. In this regard, private networks and electronic data interchange in the area were limited to the primary standards for the first-generation of e-commerce. However, the high cost and complexity of the system hampered its development and only a small number of organizations, including financial firms used it[23].

The second stage - the creation of email and chat:This stage dates back to the late '80s and early '90s in which the first generation of e-mail and chat communications such as news emerged. At this point, the web was spread among academics and members of the academic and research centers [6].

The third stage - The advent of Browsers:In 1995, the emergence of Web browsers based on Hyper Text Transfer Protocol took place as one of the most essential parts of home pages and Web sites in that year and it is considered as the third stage of the development of e-commerce[6].

The fourth stage - starting retail sites:This stage began in the mid-1990s and during this stage first dot-com sites started retail e-commerce to work for small business trading. As a result, larger companies became encouraged to enter the e-commerce and to offer their products and services on the web and it is called the first step to the actual development of e-commerce [6].

The fifth stage - defining models of e-commerce:Late 1990s, is the beginning of this stage during which the great merchants and organizations understood that e-commerce Model of Trading - Trading like the Business Model of Trading - Consumer can be activated and used. Therefore the web was introduced as a key venue for the first-generation markets, auctions, transactions, Trade - Trade and Trade – Consumer commerce was used by the consumer [6].

E-commerce has faced enthusiastic support from human societies over the past few years. Nowadays you cannot find someone who is unfamiliar with the word e-commerce. Newspapers, radio and television publish daily issues relating to e-commerce, and then persons and experts discuss them from different angles. Companies and organizations which present goods or services are trying to change the logical and physical structure of their organization in the field of e-commerce along with the flow of global charges[15]. Technological advances are rapidly changing the communities to societies based on knowledge every day. Development of information and communication technology has created an opportunity for institutions to do their business quickly. Progress achieved in the late twentieth century has caused a great revolution in business and has formed e-commerce. In other words, e-commerce has transformed the lives of people in developed countries. Developed countries have embraced e-commerce, and its issues and problems have been introduced gradually and companies have taken a big step to solve these problems. In addition to developed countries, developing countries are also planning for the development of e-commerce. This new technology due to its applications and activities is very diverse, and different agencies have different definitions for it. E-commerce is a multidisciplinary phenomenon which is linked with both advanced concepts of information technology and on the other hand, with topics such as marketing, sales, finance, economic and legal issues. So there are different interpretations for it. Some people think e-commerce means doing business without the use of paper documents and some consider it as advertisements on the internet and even as a synonym for the internet. Some other people think that e-commerce is ordering and purchase of goods and services by a computer. All perspectives above cover the concept of e-commerce, but these definitions do not show the full picture of e-commerce [19]. The definition of Lynch and Lindkuist defines e-commerce this way: “E-commerce refers to the exchange of goods and services and the ability to make money using the Internet” [24].

1.2. Benefits of E-commerce:

Compared to traditional business based on paper documents, e-commerce has certain advantages over the traditional business. Some of these important advantages are listed here:

- Delay in preparing and submitting documents is lost
- No need to re-enter data into a computer system and its low cost
- Accelerate the flow of information in the Winning
- An email sender is informed immediately as the receiver receives emails.
- Limitations of time and space disappears
- Reduction of goods cost and services
- Increased competition
- Participation of SMEs in international dealings
- Increased sales in companies and organizations due to participation in new markets worldwide.
- Reduction of social costs such as commuting, traffic reduction, crowded streets and reduction of air pollution[7].

1.3. Exogenous prerequisites of establishment and institutionalization of e-commerce:

- Having an accurate and fast banking system which can be accessed via the internet without the need for physical presence.
- Issuance of credit cards and using the electronic transfer system of documents by the banking system.
- Legislation of domestic laws compatible with international laws regarding customs formalities, taxation system and electronic banking.
- Creating a standard system to allocate the products' commercial code.
- Creating a legal and formative system and definition of the intellectual property rights.
- Social security
- Definition of individual rights in relation to confidentiality of personal information
- Development of general technologies such as communication and software engineering of the required technical knowledge to support e-commerce.
- Establishing fast and reliable lines of communication by a competitive price system reduce the cost of telecommunicative services and also reduce the cost of electronic communication
- Creating a legal framework to implement the e-commerce
- Acceptance of electronic document by judiciary (which are as valid as paper documents)
- Introducing the authorities who issue the certification of digital signature in Iran and authentication verification of the buyer and seller by these authorities

1.4. Barriers of e-commerce development:

It will not be useless if we refer to the results of some researches which have been done in some eastern European countries about the barriers of e-commerce development. The barriers are listed according to their importance[3]:

- Lack of security in financial and credit resources in electronic banking, 38%
- Formability of private transactions, 32%
- Lack of information security (financial & technical), 29%
- Lack of legal support in relation to internet dealings, 17%
- Lack of trust in online transactions by customers which often leads to higher costs, 16%
- Lack of clarity about the debt and obligations of internet companies (lack of awareness of debt risk) 13%
- Lack of a comprehensive framework to regulate the rules and resolve disputes in e-commerce, 13%
- Lack of e-commerce culture at the national level, 9%

Certainly as it's clear, the mentioned barriers are not completely independent from each other and sometimes they overlap each other. However, it can be argued that the main problems limiting e-commerce growth in developing countries are as follows: lack of information security and lack of legal coverage in relation to financial transactions, which must be solved and improved to help development of e-commerce[25].

1.5. E-commerce in Iran:

In the past two decades, significant developments have appeared in the field of information technology and communication systems. These changes have caused some less developed countries like Iran to recognize the new fields and create a comprehensive plan to make good use of this opportunity to acquire a development spurt and by increasing the rate of the economic growth, decreases its distance with developed countries and even start competing with them. Nowadays e-commerce is placed in the center of attention worldwide and Iran is joining this flow inevitably[11]. Iran has one percent of the world's population and also one percent of the planet's land area but it only has one third of a percent from the share of the economy. The cost of goods

in world trade is about six trillion dollars in recent years which has grown between 89 to 125 percent. From this size of global business, about 4 trillion dollars is done by e-commerce every year, which shows an equation of 2 to 3 between e-commerce and total global business. It is all because of advantages of e-commerce. By using e-commerce, about one quarter or 250 billion dollars would be saved and we can estimate this figure about 300 million dollars for Iran's foreign business every year. Therefore, given the high rate of growth of e-commerce and Iran's immunity from this share of world trade, Iran's share will definitely decrease even more [26]. In Iran implementation of e-commerce projects have been done or are being done as it follows[7]:

A - Customs ASYCUDA Project in Iran customs: Iran has tried a lot to mechanize goods clearance procedures. ASYCUDA system was introduced to Iran by the United Nations Conference on Trade and Development. The system which includes its new version was approved by the customs officials and Iran experts. 1375 Contract between Iran and the United Nations Development Program in collaboration with the United Nations' development plan to implement the ASYCUDA system was signed for 18 months. In this project, all customs offices are connected to each other by one computer system and all the related forms and methods will be corrected. If this project is implemented completely and the banking system joins it too, traders will not have to visit the customs offices for their goods clearance rather they can do all the related procedures by their own computers[7].

B - The Swift project in banking: Swift is an international network of interbank relations. The Institute is run as a cooperative company and member banks own Shares and the members pay membership fees to cover the cost of Posts and also all members are involved in managing the institute. The Swift institute was established by 239 banks from 15 countries in Bruxelles in 1973 and by this system all foreign subsidiaries inside and outside the country are connected to each other by a computer system and all financial relations, payments, credit transfer, etc. are done by this system. The Central Bank of Iran, Melli, Saderat, Tejarat, Mellat, Sepah joined Swift in 1372 and the Export Development Bank of Iran was connected to the network in 1376[7].

1.6. Factors hindering the development of e-commerce in Iran:

Economic and cultural poverty of the society and people's low level of awareness of information technology in Iran[6]. Lack of an appropriate culture to face e-commerce phenomenon, and ordinary people who spread rumors and wrong thoughts to block e-commerce growth; both have replaced some other commercial phenomena like network marketing (which is not that related to e-commerce) and also negative reactions of businessmen. Units of physical distribution and customers with e-commerce have created a big barrier which do not let e-commerce grow[6].

In Iran even the political elites don't have enough knowledge about this modern revolution in commercial transactions. However, everybody knows it's an irresistible choice which separates Iran's economy from tradition and connects it to modernity. Training consumers about the opportunities and benefits of e-commerce and how to use the internet and computers, is a basic condition to create requests for new technologies and e-commerce. Training highly skilled workforce in e-commercial departments is considered as one of necessities of e-commerce. Therefore lack of a proper implementation by the relevant agencies in the society, to develop public awareness of the issues of information technology, is considered a serious obstacle. Managers must provide necessary trainings in relation to functional grounds for their clients and audience, and give them to users in a variety of ways. Technically speaking, people who want to start e-commerce in their own organization are always recommended to provide the staff with a special notification. It is your duty to recognize the capacities and capabilities of your organization and in addition to great management of expectations, try to turn people into potential customers [6].

-Demographic factors (such as age, middle aged upwards, in efficiency and income generation in the society)

Increasing age in the general level of the society, decreases the society and individuals' motivation in replacing traditional transactions with the modern ones. Such societies are not much interested in changing models of economic efficiency[10].

- Considering time as worthless in the Iranian folklore

One of the most important cultural problems in Iran is ignoring the culture of “time is money” or “every moment is a treasure” in the society. Although it has been emphasized a lot in our culture. Until time is considered as a worthless category in our society, novel ideas which help to save time will be ignored as well[5].

- Incorrect government decisions in dealing with new phenomena (such as the Internet and satellite) as well as in international relations (such as financial and banking sanctions against Iran)

One of the problems of current Iranian society is the one way reaction and deletion of all modern phenomena, because they may be inconsistent with religious rituals. However, experience has shown that overtime the community and government have had no choice but to accept them under certain conditions, to overcome apparent barriers of growth and development of national interests. This way of thinking makes replacement of traditional commerce with e-commerce harder because it creates many obstacles. Also the duration of operation and the advent of progress signs will be much longer. Economic sanctions have also had great destructive effects on the development of e-commerce infrastructure, such as limiting or banning the use of international credit cards such as Master cards, Visa cards, etc.[6].

- Lack of proper development of funding infrastructure

Lack of modern infrastructure, finance and accounting fields in economics which is one of the e-commerce arms, and lack of networking and communication equipments, which are necessary for fast and easy access to the Internet, have caused a lot of obstacles in the development of this phenomenon. Infrastructure networks such as the Internet, mobile phones, etc. cost a fortune in Iran and they are very time-consuming. Quick and easy access to broadband Internet as one of the most important substrates for use in e-commerce is not readily available. Lack of fast and cheap access to the Internet decreases users' willingness to engage in commercial transactions online[6].

The conditions are ideal for the beginning of e-commerce, but definitely we will face shortages and many problems to keep up with the progress. Thus deficiencies and problems must be resolved in the following areas:

- A - Preparation of the underlying network and satellite communication
- B - Preparation of speed and quality of internal and national network
- C - High speed Internet access
- D - Local relevant and suitable content
- E - Access to hardware and software facilities
- F - Preparation of support services
- G - Compatibility with international standards

2. METHODOLOGY

The research methodology is based on overall stages of the dynamic system in a way that at the outset of the study, by studying and investigating the current status of the system, it has been attempted to identify the system variables. Then we studied the behavior of the variables in the system and got the experts' opinions through oral interviews and the relations between variables were identified and classified. The necessary data and initial values of the variables gathered from previous researches and studies. After statement of the dynamic hypothesis, the related causal diagram was drawn and after reviewing and revising, the rate and state model have been developed. Simultaneously, with the function of the dynamic system approach in resistant factors against changing the rate and state model, complete mathematical formulas and the mathematical model have also been formed.

2.1. Modeling of dynamic systems

Modeling stages and solving a problem using a dynamic system approach is as follows: [27].

2.1.1. Modeling

A - Identification of the system being studied: This step will answer these questions: What is the problem? What do we want to study and why is it important for us? What are the key variables and main concepts of the system? What is the time scope to solve the problem? From when to when? How has been the behavior of the main variables of the system in the past, and how is it predicted to be in the future?

B – Drawing the causal diagram:These are based on the assumptions of modeling method and any possible way such as diagrams of policy structure, causal loop diagrams, diagrams of rate and state and other modeling tools[27].

C- Determining the system structure and pattern of behavior: Dynamics of the system depends on the structure and behavior of the systems that are composed of interrelated feedback loops, causal diagrams and the annular flow of dynamic modeling. Dynamic modeling of annular flow is a simple way to display the ring structure before developing the system equations. The causal loop diagram identifies key issues and it has nothing to do with distinguishing the nature of interrelated variables[27]. Causal loop diagrams play two important roles in dynamics of the system:

- 1 – It helps the modeling as the basic structure of the assumption during formulation of the model.
- 2 – It presents a simple illustration of the model.

The analyst is able to interact with the structural assumptions of the model by using these two roles [27].

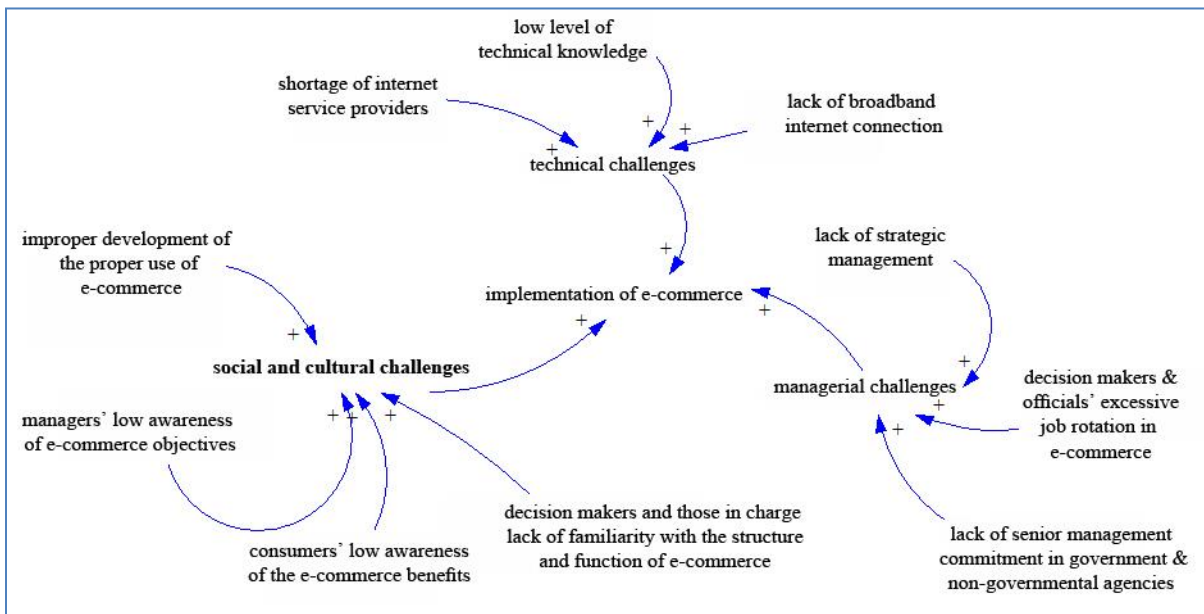


Fig. 1. Cause and effect diagram

According to this diagram, improper development of the proper use culture of e-commerce, lack of broadband internet connection, shortage of internet service providers, local experts' low level of technical knowledge, decision makers' lack of familiarity with the structure and function of e-commerce, managers' low awareness of the e-commerce objectives, the lack of senior management commitment in government and non-governmental organizations, too much job rotation among managers, the lack of strategic management and the consumers' low awareness of the e-commerce benefits, are the effective factors influencing implementation of e-commerce and also each of these factors influences other factors in turn.

Causal loop diagrams are very useful in many situations, although they have some limitations which makes it possible to abuse them. One of the most important limitations of the causal loop diagram is its inability in the structure of state variables and flow of the system [27].

2.1.2. Simulation of the Model

This section consists of the following steps: Formulating the simulation model, determining initial values of the variables and estimating their potential, test of the model compatibility and the real behavior of the system and sensitivity analysis of the model against different behaviors of the system[27].

2.1.3. Illustration of the rate & state diagram along with the flow & availability diagram:

The main objective of the flow chart is representing the accurate flow structure of the system in the form of the structure of detailed and delicate policies, to facilitate making a mathematical model for simulation. This diagram is the most complete and accurate one in modeling dynamics of the system and does not have the weaknesses and limitations of other diagrams. The following diagram distinguishes sub-physical system from data files and classifies all kinds of variables and functions[27].

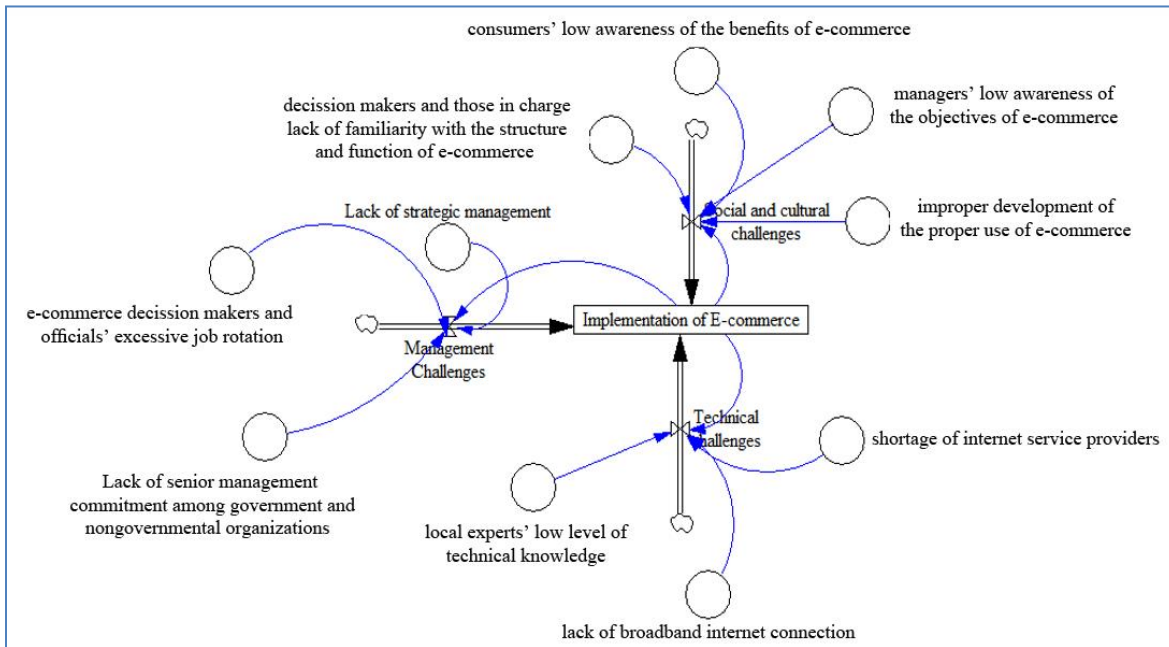


Fig. 2. Rate and state diagrams

This diagram is made up of three main elements which are state, flow and information[27]. However, there is an essential point which states the base of this thought and it says there is a possibility to illustrate any kind of process and system by these three main elements. In fact these three main elements make the triple elements of systems modeling. Unlike the causal diagrams, this diagram is able to display the variables which change over time and it also shows their growth rate. In this diagram, a rectangular stands for the state variable and a bow or upside down tap stands for the flow variable[27].

2.2. DataAnalysis

E-Commerce is a state variable that has to face many challenges in the way of being implemented. Including social and cultural challenges, managerial challenges, technical challenges and all these factors are considered rate variables. Each of these factors are influenced by other factors that are considered covariates. Every covariate is considered to have a rate, which is recommended based on conducted researches or surveys from the experts. In this paper the rate is estimated. Since Iran is a developing country and duration of the projects are short-term, the time required and defined in the software is 5 years. Since there is not much time for the process, the rate of 20% is considered in analysis of the data. Furthermore, 20% is the lowest rate that best represents the effects of applied changes.

E-commerce implementation is obtained by using the following formula in the software: Management Challenges + Social and cultural challenges + Technical challenges)

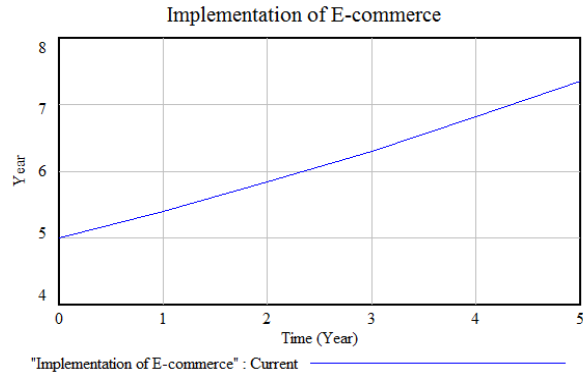


Fig. 3. Implementation of e-commerce

2.2.1. Social and cultural challenges:

This part is influenced by aspects such as the improper development of the proper use culture of e-commerce, managers' low awareness of e-commerce objectives, consumers' low awareness of the e-commerce benefits and decision makers and those in charge lack of familiarity with the structure and function of e-commerce.

Social and cultural challenges in Vensim software are obtained using the following formula:

$$\begin{aligned}
 & \text{"Implementation of E – commerce"} * (\text{" Consumers' low awareness of the benefits of e – commerce"} \\
 & * \text{" Improper development of the proper use of e – commerce"} \\
 & * \text{" Managers' low awareness of the objectives of e – commerce"} \\
 & * \text{" managers and decision makers' lack of familiarity with the structure and function of e"} \\
 & \text{– commerce"})
 \end{aligned}$$

If the rate of the improper development of the proper use of e-commerce is reduced by 20% in the next 5 years, from 28% to 8%, appropriate use, or the development of e-commerce will be boosted by 20%, and it will have a significant impact on the implementation of e-commerce.

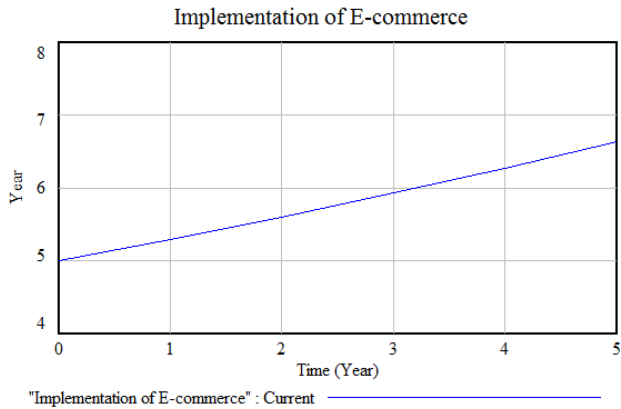


Fig. 4. Reducing the rate of improper use culture of e-commerce

If the rate of managers' low awareness of the objectives of e-commerce is reduced by 20% from 39% to 19%, in other words, rate of managers' awareness of the objectives of e-commerce is reinforced by 20% over the next 5 years, and its impact on the implementation of e-commerce is relatively well.

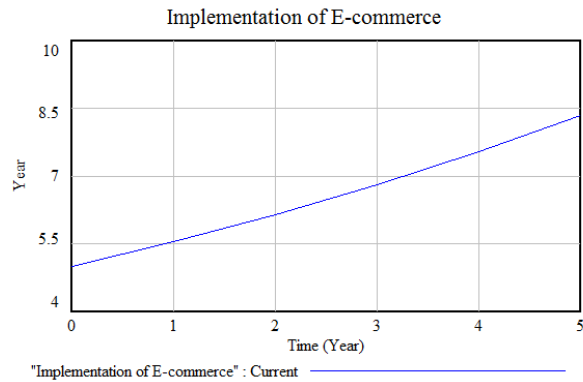


Fig. 5. Reducing the rate of managers' low awareness of e-commerce objectives

If the rate of consumers' low awareness of the benefits of e-commerce is reduced by 20% from 49% to 29%; or in other words, if consumers' awareness of the benefits of e-commerce is boosted by 20% over the next 5 years it will improve the effectiveness of this category, and its impact on the implementation of e-commerce is relatively well.

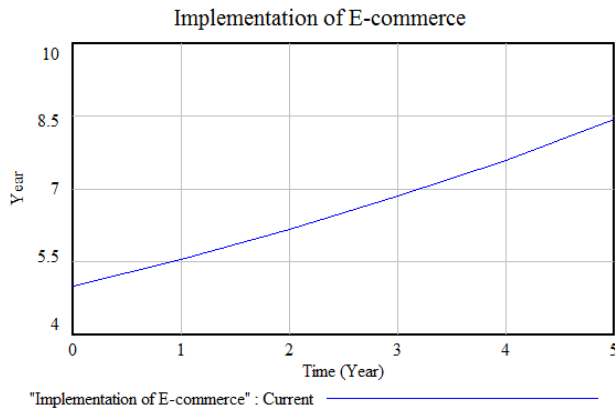


Fig. 6. Reducing the rate of consumers' low awareness of the benefits of e-commerce

If the rate of lack of familiarity of decision-makers responsible for the structure and function of e-commerce is reduced by 20%, from 58% to 38%; or in other words, if the rate of officials and decision-makers' familiarity with the structure and function of e-commerce is increased by 20%, it can influence the implementation of e-commerce pretty well.

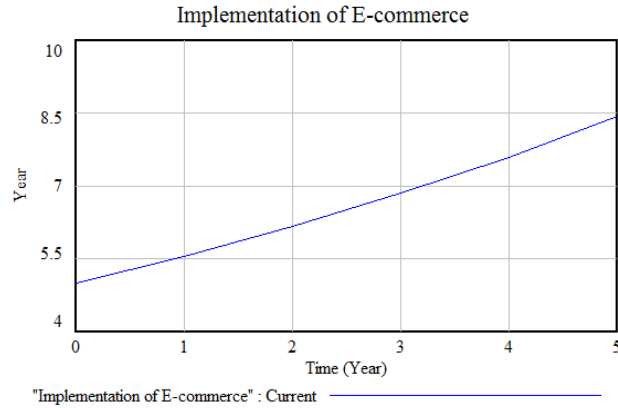


Fig. 7. Reducing the rate of officials and decision makers’ lack of familiarity with the structure and function of e-commerce

2.2.2. Managerial challenges:

Managerial challenges are achieved by using this formula in Vensim software: "Implementation of E-commerce"*("officials and decision makers’ too much job rotation in e-commerce"*"Lack of senior management commitment in government& non-governmental agencies"*Lack of strategic management)

If the rate of lack of strategic management is reduced by 20%, from 35% to 15%; or in other words, if we reinforce the strategic management by 20% over the next 5 years, it will have a significant effect in e-commerce implementation.

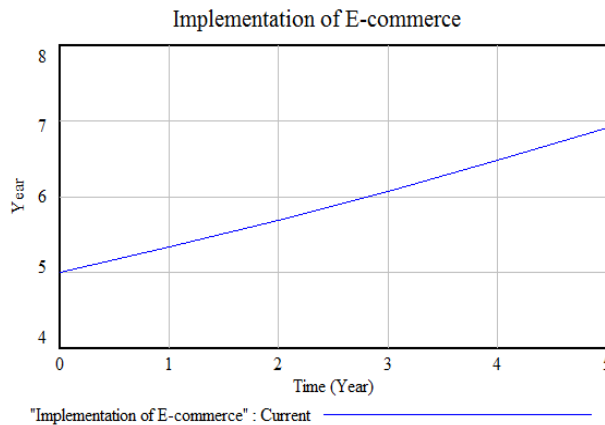


Fig. 8. Reducing the rate of lack of strategic management

If managers and officials’ job rotation in e-commerce is reduced by 20%, from 20% to 0%; or in other words, if the officials and decision makers’ job rotation in e-commerce reaches the minimum in the next five years, it will have a significant effect on e-commerce implementation.

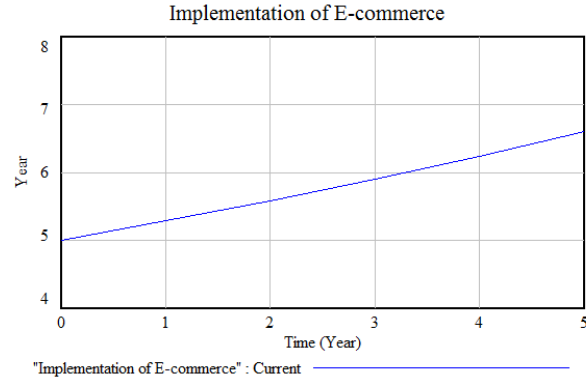


Fig. 9. Reducing the rate of officials and decision makers' job rotation in e-commerce

If we reduce lack of senior management commitment in government & non-governmental agencies by 20%, from 37% to 17%; or in other words, if we reinforce senior management commitment in governmental and non-governmental agencies by 20% in the next five years, it will affect e-commerce implementation significantly.

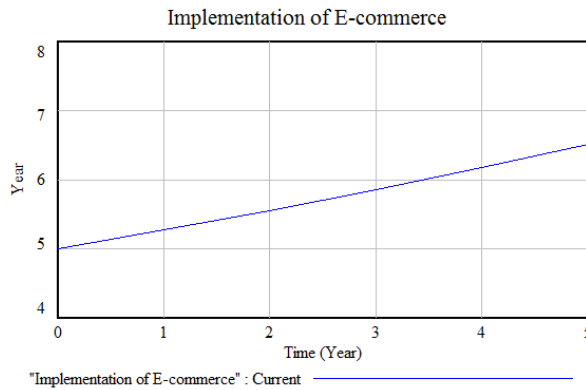


Fig. 10. Reducing the rate of lack of senior management commitment in government & non-governmental organizations

2.2.3. Technical challenges:

The technical challenges are achieved by using the following formula in Vensim software:

"Implementation of E-commerce" * (lack of broadband internet connection * shortage of internet service providers * low level of technical knowledge).

If the lack of broadband internet connection is reduced by 20%, from 27% to 7%; or in other words, if we increase the internet speed by 20% over the next 5 years, it will have a great effect on e-commerce implementation.

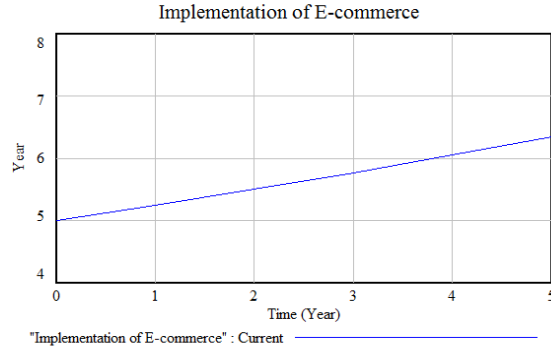


Fig. 11. Reducing the rate of lack of broadband internet connection

If we reduce the rate of local experts' low level of technical knowledge by 20%, from 37% to 17%; or in other words, if we improve technical knowledge of the local experts by 20% over the next 5 years, it will affect e-commerce implementation significantly.

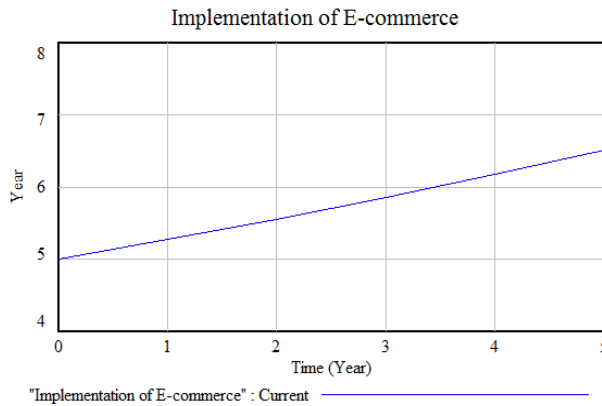


Fig. 12. Reducing the rate of local experts' low level of technical knowledge

If the rate of shortage of Internet service providers is reduced by 20% from 36% to 16%; or in other words, if the number of internet service providers are increased by 20%, over the next 5 years, it will have a very significant impact on the implementation of e-commerce.

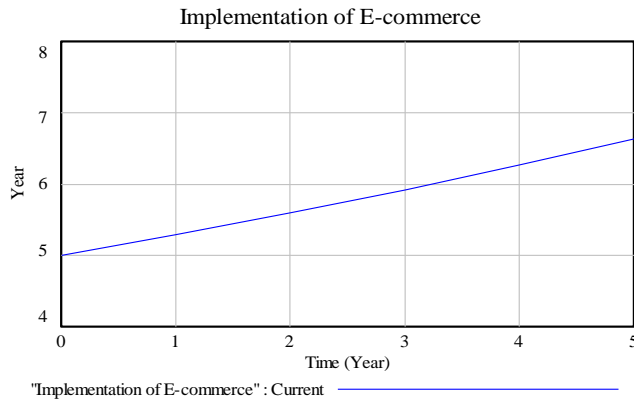


Fig. 13. Reducing the rate of shortage of internet service providers

3. RESULTS AND DISCUSSION

In this paper, by using the dynamic system model, the triple challenges of implementing e-commerce in Iran are described. It's a time when all phenomena are called electronic, it has brought with it many electronic phenomena, among which are e-learning, e-banking, e-government, e-citizen, e-management of relations with customers, e-procurement, e-commerce, and finally a total electronic life[4]. E-commerce is a critical phenomenon which originates from the ICT revolution and it has made profound changes in the way business is done[25]. In this study, the dynamic modeling of the three stages of the system modeling were studied. Causality charting, simulation models, state diagrams and flow rates were studied. And finally the data analysis showed that:

If the rate of improper development of the proper use culture of e-commerce is reduced by 20%, from 28% to 8%, it will have a great effect on implementation of e-commerce.

If the rate of managers' low awareness of e-commerce objectives is reduced by 20%, from 39% to 19%, it will have a great effect on the implementation of e-commerce.

If the rate of consumers' low awareness of the benefits of e-commerce is reduced by 20%, from 49% to 29%, it will influence the implementation of e-commerce relatively well.

If the rate of officials and decision-makers' lack of familiarity with the structure and function of e-commerce is reduced by 20%, from 58% to 38%, it will have a great effect on implementation of e-commerce.

If the lack of strategic management rate is reduced by 20%, from 35% to 15%, it will have a significant effect on the implementation of e-commerce.

If the job rotation of e-commerce managers and decision makers is reduced by 20%, from 20% to 0%, it will have a significant effect on e-commerce implementation.

If the rate of lack of senior management commitment in government and non-governmental organizations is reduced by 20%, from 37% to 17%, it will have a significant impact on the implementation of e-commerce.

If the rate of lack of broadband internet connection is reduced by 20%, from 27% to 7%, it will have a very significant impact on the implementation of e-commerce.

If the rate of local experts' low technical knowledge is reduced by 20%, from 37% to 17%, it will have a dramatic impact on the implementation of e-commerce.

If the rate of shortage of internet service providers is reduced by 20%, from 36% to 16%, it will have a great impact on the implementation of e-commerce.

Social and cultural challenges are influenced by dimensions such as improper development of the correct use culture of e-commerce, Managers' low awareness of e-commerce objectives, the consumers' low awareness of e-commerce benefits and decision makers and official's lack of familiarity with the structure and function of e-commerce. There are some banks in the most deprived areas of Iran (although banks play a main role in e-commerce) which have their own customers and don't need the internet, superior technology or credit card for their banking system. The reports show residents in such areas prefer the traditional business and cash money. Another reason which hinders e-commerce in Iran banks is secrecy and non-transparency of banking system[5]. Secrecy shows that natural and legal firms try to evade taxes or reduce its amount. Since all transactions and economic activities are recorded and stored by e-commerce, such a culture in Iran, has faced e-commerce development and electronic transfer of funds with difficulty. Another reason is uncertainty which plays the most important role in adoption of e-commerce. When there is no trust or certainty, no action will be done to improve e-commerce[6]

Using computers is not very common in Iran and people are not familiar with computers as a tool by which business transactions can be carried out over long distances. The role of education in the context of e-commerce in society through the media and even academic institutions is very weak. The lack of efficient and up to date information and useful computer networking business that is not readily available, The lack of provision of telecommunication networks, The lack of information security in e-commerce systems, The lack of confidence in the banking system for handling e-commerce operations, and the unavailability of credit card banks in Iran for public are all important barriers to the creation and operation of e-commerce network[4]. Resistance against change by both the staff and responsible managers has created a lot of problems in implementing e-commerce. Socio-cultural, economic, political and other problems in turn prevent the e-commerce development in Iran[11].

Practical Suggestions:

A- Adopting a strategic approach by senior government managers: Since moving towards e-commerce should be a long process, one way to overcome one of the major challenges in implementing e-commerce is adopting a strategic approach by senior government managers to make fundamental changes.

B- Extension of the correct and effective use of e-commerce through the preparation and cultural context: Iran trade issue and all areas of our business traditionally ends in traditional markets. In this context it is necessary to solve the above problems, the following points are important to consider:

- To make a mutual and logical relationship between e-commerce and traditional business
- Training traders to improve their business culture.
- The replacement of traditional practices with new forms of e-commerce. Changing manual procedures is the first priority.

C- Spreading use of the Internet: To implement e-commerce, using the Internet should be universal and then the low cost equipments and facilities must be exposed to all individuals, and the necessary training must be done at different levels.

D- Quantitative and qualitative development of the expert workforce, in the sector of e-commerce: It means increasing the capacity of schools to train new professionals needed for activities such as e-commerce and information technology-based development projects. Also good standing must be provided for e-commerce in the community, government agencies and universities, in order for e-commerce concepts to be defined properly.

E- Reforming and strengthening the technical infrastructures of Iran: E-commerce infrastructures in the world rely on information technology and telecommunication network, so it is essential to have strong telecommunicative networks. In this context optimizing the telecommunicative infrastructure can lead to improvements in the field of e-commerce.

F- Preparation and adoption of a guaranteed strategic document: It means developing an appropriate model of progress based on information and communication technologies. In order to provide a comprehensive e-commerce as the main platform and tool for economic development, social, cultural and even political power will definitely result in increased national and state politics.

4. CONCLUSION

Three main challenges that are discussed in this paper are technical, social-cultural and managerial challenges. Based on data analyses, each dimension of these challenges are ranked separately in this paper, as follows:

A) Dimensions of technical challenges:

- Shortage of internet service providers (ISP)

- Local experts' Low level of technical knowledge
- Lack of broadband internet connection

B) Dimensions of social-cultural challenges:

- Officials and decision makers' lack of familiarity with the structure and function of e-commerce
- Consumers' low awareness of the benefits of e-commerce
- Managers' low awareness of the objectives of e-commerce
- Improper development of the proper use of the internet

C) Dimensions of managerial challenges:

- Lack of strategic management
- Lack of senior management commitment in government and non-governmental organizations
- Officials and decision makers' too much job rotation in e-commerce

Our ranking for the dimensions of managerial challenges exactly matches with the ranking provided by previous research [7], but in the other two challenges, our ranking differs a little bit. So, as the results and the rankings show us, the technical, social-cultural and managerial challenges top priority dimensions are shortage of internet service providers, officials and decision makers' lack of familiarity with the structure and function of e-commerce, and lack of strategic management. Thus, trying to solve or at least minimize the adverse effects of these problems will have a great influence on implementing e-commerce in Iran.

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