The Study of Differences between E-commerce Impacts on Developed Countries and Developing Countries, Case Study: USA and Iran

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Abstract

This study determines the impact of E-commerce (EC) on some of important economic criteria including total factor productivity(TFP) of Iran country as a developing country in comparison with US standard as a developed country through analyzing and calculating interrelated issues. The model is based on both econometrics and growth accounting approach to fill the gaps of previous studies. On the first step, this research fulfills the gap of economic growth by transforming the US and Iran e-commerce model to parametric model and providing statistical analysis. On the second step, the two parametric models are compared to each other. The results showed that the impact of e –commerce on Iran could be even stronger than that on US as a developed country because the scope for reducing inefficiencies and increasing productivity is much larger in Iran. The results also are showing that although during the last decade E-commerce has always been an attentive issue to Iranian governments and Iran made some policies to develop and enhance e-commerce in the country, but statistics are showing the necessity of more comprehensive and organized policies for developing and localizing e-commerce in the way of universal standards accomplishment.

Key words: (EC) Electronic Commerce, Model criteria, (IT) Information Technology, (ICT) Information and Communication Technology, (GDP) Gross Domestic Product

INTRODUCTION

In the recent years, convergence between information and businesses offers new kind of business which is called Electronic- Commerce (EC).it has acted likes to industrial revolution which has entered the world in to the information age. Depending on the way of usage; 1.5 bilion people life and their socio-economic standings are under standings of internet [1]. Findings are showing that the outcome of this technological progress has revolute various economic and business criteria such as productivity, commerce, employment, Gross Domestic Product (GDP) and etc. it has changed the face of business forever and experts considered such revolution as a new global economy. One of the revolution aspects is the basic change which has been occurred in economic relation between governments, companies and people. EC has been accepted as one of the potential   measures which could improve effectiveness and efficiency of the firms operation [2]. It can be a major competitiveness which could lead to the global economic growth [3]. The e-commerce has affected the global economy in many different ways. First of all, it has affected the information technology, and all the economic sectors, all and above ecommerce has enhanced the productivity growth worldwide and this impact will be discussed.

According to eMarketer's latest forecasts, worldwide business-to-consumer (B2C) ecommerce sales will increase by 20.1% this year to reach $1.500 trillion. Growth will come primarily from the rapidly expanding online and mobile user bases in emerging markets, increases in ecommerce sales, advancing shipping and payment options, and the push into new international markets by major brands. Therefore Advancing the Internet revolution is more than ever a key public policy goal. Nowadays Asia and America continents are competing to each other in the online market; This year alone, B2C e-commerce sales are expected to reach USD 525.2 billion in the Asia- Pacific and China will take in more than six of every USD 10 spent on e-commerce in Asia-Pacific in 2014 end and almost three-quarters of regional spending by 2017[4]. Although the country's e-commerce market is second only to the US, but this is not expected to last much longer and beginning in 2016, China will overtake the US in spending [5]. The strength of sales in emerging markets is due to their large populations coming online and buying there for the first time. Asia-Pacific will claim more than 46% of digital buyers worldwide in 2014 end, though these users will only account for 16.9% of the region's population. Penetration will also be low in Central and Eastern Europe, Latin America, and the Middle East and Africa. According to the findings refer to Middle East and North Africa (MENA region) which has been reported by Hamburg based secondary research Journal in late 2013, B2C E-Commerce presently accounts for less than 1% of total retail sales in the region, as there are obstacles to overcome to prepare the way for the boom. Contrary for now, North America and Western Europe are the only regions where a majority of residents will make purchases via digital channels [6]. According to the significant statistical differences in annual EC application and due to the place and importance of Iran as a developing country in the Middle East from various aspects especially economic aspects, the researcher is going to study the role of

E-commerce in developing business as an important economic feature in each country comparatively. The results of the study will explore the reasons of the US prominence in EC technology application comparing to Iran and could be helpful for decision makers to choose more scientific approaches for EC development in Iran.

A. E-COMMERCE Definition

E-commerce is a very broad concept and does not have a clear cut definition. Even today, some considerable time after the so called 'dot com/Internet revolution', electronic commerce (e-commerce) remains a relatively new, emerging and constantly changing area of business management and information technology. E-commerce is usually associated with buying and selling over the Internet, or conducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network [7]. E-commerce as it is commonly known is the use of technology to conduct financial transactions online [8]. E-commerce can occur within and between three basic participant groups − business, government, and individuals (see Figure 1).
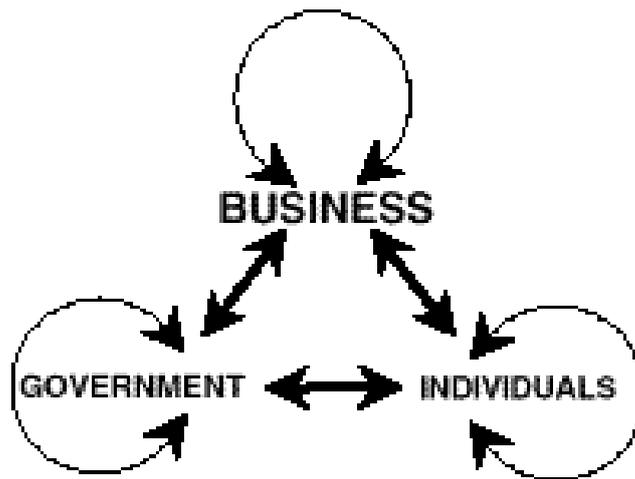

Fig. 1 schematic view of E-Commerce relation to EC service provider (government), business and consumer (individuals or companies).

B. E-commerce Market Models

1.   Business to Business (B2B)

B2B e-commerce is simply defined as e-commerce between companies. This is the type of e-commerce that deals with relationships between and among businesses. These transactions are usually carried out through Electronic Data Interchange or EDI. About 80% of e-commerce is of this type, and most experts predict that B2B e-commerce will continue to grow faster than other EC segment.

2.   Business to Customer (B2C)

Business to Customer or B2C refers to e-commerce activities that are focused on consumers rather than on businesses. Commerce between companies and consumers

involves customers gathering information; purchasing physical goods (i.e., tangibles such as books or consumer products) or information goods (or goods of electronic material or digitized content, such as software, or e-books); and, for information goods, receiving products over an electronic network [9]. It is the second largest and the earliest form of e-commerce. Its origins can be traced to online retailing (or e-tailing).

3. Customer to Business (C2B)

The recent model refers to e-commerce activities, which uses reverse pricing models where the customer determines the prices of the product or services [9]. There is increased emphasis on customer empowerment. A concrete example of this when competing airlines gives a traveller best travel and ticket offers in response to the traveller's post that she wants to fly from for example New York to Tehran.

4. Customer to Customer (C2C)

It refers to e-commerce activities, which uses an auction style model. There is little information on the relative size of global C2C e-commerce. Customer to Customer e-commerce activities consists of person-to-person a transaction that completely excludes businesses from the equation [10,11]. A popular example for this model is C2C sites such as eBay indicate that this market is quite large. These sites produce millions of dollars in sales every day.

C. Effective Issues on the Development of E-commerce

The World Wide Web was developed as a way of dispensing documentation within the large research laboratory at CERN in Geneva. At that time the originator of the technology, Tim Berners-Lee, did not realise at that stage how it would expand and become a major component of our economic infrastructure. Regardless of the two main problem of this technology; space problems and stateless servers, web based technology for business has affected the Development of E-commerce in different ways during the last decade which the more important issues are:

1. Taxation
2. Security
3. Privacy
4. Profitability
5. Content
6. Participation in new international standards development

D. Impact of E-commerce[12]

1. Impacts on Businesses

E-commerce is leading a structural change in commerce. It impacts businesses in a variety of ways. It reduces operational costs at various stages of business activities, enlarges market scope, lowers barriers to entry and consequently intensifies competition. For existing companies, e-commerce also introduces the need for additional skills[13]. The variety of impacts that e-commerce has on businesses leads to a question about the global magnitude of the impact of e-commerce on industries. Indeed, some of the impacts might be beneficial for businesses (e.g. lower operational costs), whereas some others may lead to a temporary productivity drop (e.g. demand for

new skills) over the short term. Graphically, the impacts of technologies that enable e-commerce on businesses are summarized in Figure 2.

2.   Impacts on Consumers

   In today's e-commerce environment, consumers are faced with more complex transactions and products, which are increasingly being supplied in a digital format. At the same time, consumers are now willing and able to access, compare, and share vast amounts of product and price information provided by businesses and other consumers on a growing number of e-commerce and other Internet-based platforms [14]. Some of the key benefits of the Ec for the consumers are:

- Wide range of products at lower price.
- Better access to products (New distribution channels for existing products)
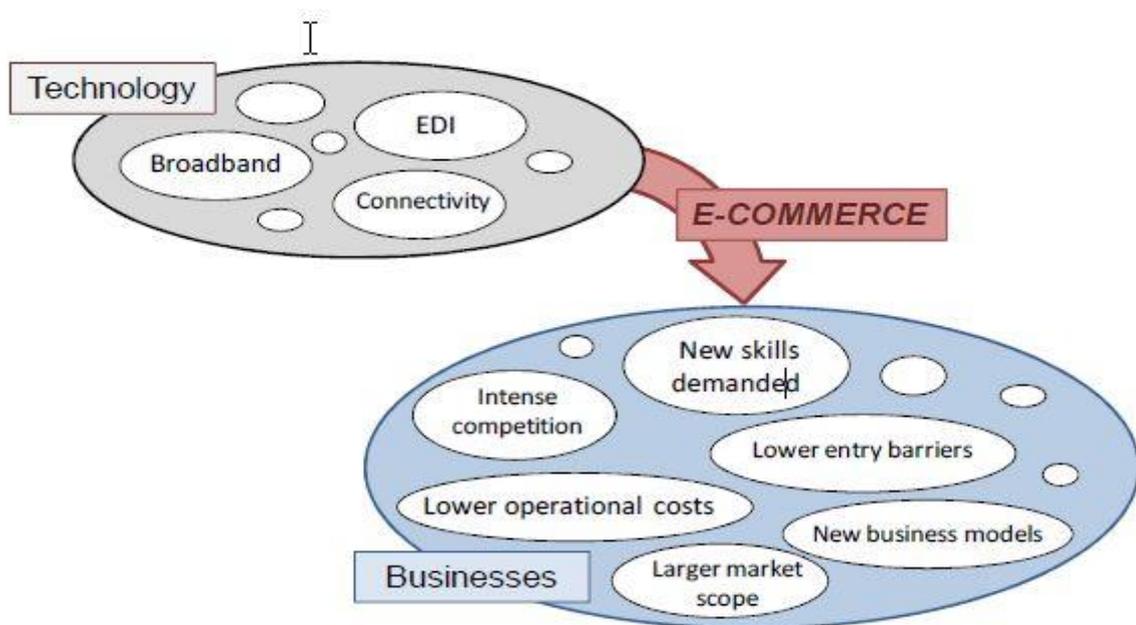- Time savings through improvements in consumer welfare (Fig. 3)

Fig.2 Technologies' impacts which are enabling E-Commerce on businesses;

   Existing surveys and quantitative studies find that businesses that rely on e-commerce tend to be more successful compared with their peers with limited e-commerce usage. It should be noted, however, only a part of these impacts can be quantified.3 B2C e-commerce transactions can create considerable value for consumers in areas such as time savings and ease of use, even if these benefits cannot be captured by traditional measures such as the system of national accounts [15]. Certain effects, although significant and observed, cannot be economically measured and expressed in economic value terms. Together, these impacts translate into a significant improvement in individual utility, and on aggregate, into a global improvement in consumer welfare.
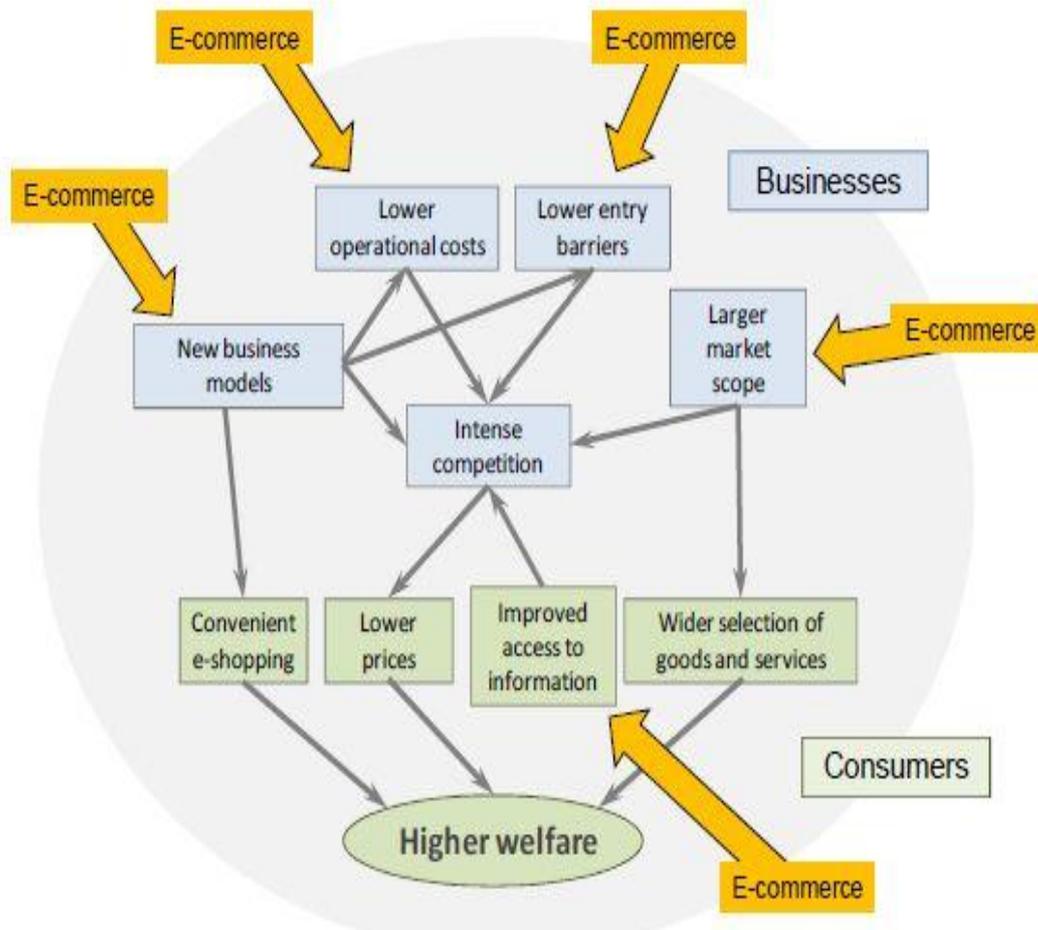
Fig.3 The schematic model for studying E-Commerce impacts on consumer welfare

LITERATURE REVIEW

A. E-Commerce History

The beginning of the E-Commerce refers to 1960 decade, when Electronic Data Transformation Technique was introduced for electronic transferring of governmental, military and commercials documents. It was nothing at first unless a simple information system. The statistics issued from 500 company shows that 34% of them have applied EC for advertising their products and 80% applied it for the advertisement at next year and the interesting point is that more than 220 billion dollars has been transferred through EC at the end of 2001 by different companies in the world which more than 50% of these companies situated in the United States [16]. Forrester Research Institute and others announced that online B2C has been in the range of $300 billion to $800 billion in 2004, up from $515 million in 1996. For 2004, the total of B2C and B2B was in the range of $2,500 billion to $7,000 billion [17]. At the beginning of the 2000s, electronic methods were used much more frequently to purchase/order goods and services than to receive orders, and significantly fewer firms sold goods online compared to those that made purchases online (OECD, 2004). More than a decade later in 2011, this is still the case [Fig. 4]. As online shopping technology continues to grow,

the industry revenue has been exploding. The Fig.5 shows the annual United States e-commerce revenues from 2002 through 2012, and then the forecasted revenues from 2013 through 2016. The revenues were taken as averages between the U.S. Census Bureau and Statist a. In the past ten years the electronic commerce industry revenue has quintupled, even despite the economic downturn. As shown in the above chart, the forecasted revenues of the electronic commerce industry are expected to continue to rise aggressively. In 2013 the revenue has been forecasted to increase by 17%, and then 22% in 2014 [18]. The forecast slows down a bit in 2015 with an increase of 8%, and then again into 2016 with a 7% increase. Although the forecasted revenue does slowdown in 2015, it is still a solid increase (Statista, 2013). This slower growth could possibly be due to the increase in mobile commerce revenue, which will be later discussed. In 2011, e-commerce represented about 14% of the total turnover of EU27 non-financial enterprises, up from about 9% in 2004. In the United States, m-commerce reached 16% of the business sector turnover (excluding some service activities), doubling with respect to the beginning of the decade (Appendix A, Figure 6). The efficiencies enabled by e-commerce have also been welcomed by businesses and consumers during the crisis as shown by the percentage of e-commerce transactions among total transactions continuing to climb.

B. *Mobile Commerce*

After computer systems development and World Wide Web, Mobile technologies have had a great impact on the way we communicate and interact. Although, mobile devices are no longer just a communication medium. The rapid growth and innovation of mobile technologies has established a new kind of technology-based commerce known as mobile commerce, or "m-commerce". M-commerce is the use of a mobile smart-phone or tablet to interact in some way through the wireless internet. It has had a significant affect on both consumers and modern businesses- as it improves efficiency, allows for entirely new activities and operations, and provides unlimited opportunities (Haghirian, Madlberger & Tanuskova, 2005) [19].

As consumers and retailers become more comfortable with mobile commerce technology, growth rates will continue to accelerate. With such rapid advancement there is potential for the growth of m-commerce to exceed the growth rate and importance of electronic commerce (Lee & Benbaset, 2003). Although revenues of the mobile commerce industry are only a small percent of those from the electronic commerce industry, they are still growing at a substantial rate. The following chart (fig. 4) shows the annual United States E-commerce (including both smart-phones and tablets) revenues from 2009 through 2012, and then the forecasted revenues from 2013 through 2016. Consumer-targeted mobile commerce made its first major debut in the late 2000's. As shown in the chart above, the m-commerce industry collected about $1.21 billion in revenue in 2009, and twice as much in 2010. Since then, the industry revenue has skyrocketed, beginning with a 563% increase into 2011 and an 81% increase in 2012. E-commerce revenues are forecasted to rise by 56% in 2013, 36% in 2014, 31% in 2015, and 27% in 2016 [20]. This forecast reflects the actions of a few different

consumer trends. The number of smart-phone users is continually rising, along with their behavioral acceptance and adaptation to m-commerce. As cultures continue to become more fast-paced, consumers have become more dependent on mobile devices due to their reliancy, efficiency and convenience. These two aspects of consumers' behaviors have created a major positive impact for the mobile commerce industry and its revenues [21] (Siwicki, 2013).

C. The place of E-commerce in Iran

Nowadays, ICT and especially EC, becomes a common issue in both developed and developing countries. Some developing countries are experiencing great contribution of ICT on the economic growth and some studies show the impressive impact of EC in terms of productivity growth [22]. This transforming technology has not had the same result in developing countries. For example, Malaysian economy is input-driven instead of being TFP driven, according to Malaysian ministry of economy latest statistical news [23]. Therefore, it is impossible to expect the same result of ICT and EC usage in different developing countries. The existing literatures on developing countries are mostly about the contribution of ICT on different economic factors. Unfortunately there is no enough information and grouped statistical data on this erea in Iran contrary to developed countries, and most of studies are based on upstream issues which are e-readiness, adoption and diffusion [24, 22]. yet there are limited reported studies and research on downstream aspect of EC, namely impact. Although, some studies [25, 26] have benn done based on EC, lack of concern on quantitative approaches is visible. Therefore, there is a gap between empirical and theoretical studies on downstream issues on EC in developing countries like Iran. Yet, there is no comprehensive study about the impact of EC on economic factors in these countries including Iran. This issue reveals the importance of having individual research on each country. Statistics are needed to evaluate the extent EC makes a difference in terms of efficiency of the economic parameters and also EC development parameters in each country.

D. E-Commerce and Economic Parameters

In the recent two decade countries' economy EC becomes important for enterprises in their economies and development; the basis of this approach refers to Over two centuries ago, when the term productivity was used by Quesnay (1766) and from that time it has been applied to various situations in different levels in relation to economic systems [25]. According to Quah [26] knowledge-driven new economy can effect production (supply side) and consumption (demand side). The growth accounting model assumes that investment in ICT has its impact on output through capital-deepening. In fact, EC is a part of the widespread transformation process which is created by information and communication technology. Therefore, EC is part of investment in ICT. Cohen and Kallirroi [27], concentrated on the basic elements of ICT, emphasized and reminded that they are also applied to EC project evaluation. The first wave of empirical analysis on the impact of ICT or EC on the economic growth showed no signs of

computer's direct impacts on the macroeconomic or industrial growth. The growth accounting methodology has been used in many studies related to direct effect of ICT or EC on macroeconomic levels in developed countries likes USA. Since, ICT goods and services are both the ICT industries' output and inputs [28] production and using the ICT, increases the productivity in the industrial and economic sectors that do not produce ICT and hence increase total productivity (spillover effects). The methodologies for measuring ICT share in productivity growth are mainly based on the initial work of Solow [29], Jorgenson and Griliches [30] which accordingly have been expanded by Oliner, Sichel[31] and Jorgenson and Stiroh [32]. One of these methodologies is Inclusion of e-commerce measures, such as, sale, purchase and sale and purchase over computer mediated networks in economic models [33,34,35].

Van Leeuwen and Wiel [36] tried to justify the difference between results based on the growth accounting and econometrical model, by defining and adding the ICT spillover variable as a separate independent variable. According to the researchers, ICT can increase industrial and economic growth through three well-known mechanisms: First, rapid increase in technical improvement in ICT related industry can have considerable share in growth, providing that ICT related. industries expand more rapidly than other sectors. Second, ICT can be a stimulant for labor force in production process. Low prices of ICT related goods and services, can encourage its use and this cause capital deepening and increases labor productivity. Third, by spillover effect of technology, ICT can increase industrial productivity. Waldron and Criscuolo [37] studied the impact of various measures of e- commerce on productivity in a research titled e-commerce and productivity. This research is very similar to the work done by Clayton *et al* [35]. at firm-level in England. It covers only the manufacturing sector due to the lack of information on the capital stock in services sector. They found a positive effect on firms' total productivity associated with use of computer networks for trading. However, there is an important difference between e-buying and e-selling in their study. E-buying has positive impact on output growth while e-selling typically has negative impact. They claim that this is likely due to pricing effects, since at least part of the gain from investment in electronic procurement by firms comes from the ability to use the price transparency which is offered by e-procurement to secure more competitive deals. According to the literature there is still a gap in studies and researches on the impact of EC in developing countries [40, 41 and 22] including Iran. The results of the growth model estimations with ICT investments as an explanatory variable using Panel Data method in the context of the OPEC member countries by Hosseini Nasab show that ICT has significant effect on the economic growth of these countries [42]. The coefficient measuring the effect of the ICT investment on economic growth was positive, indicating that ICT investments had a positive impact on the economic growth of the OPEC member countries. However most of the researchers believe that the lack of information about the impacts of E-Commerce on the macroeconomic and firms' productivity is itself a barrier to develop the EC industry in these countries [38,39]. Therefore comprehensive researches are needed to explore lacunas, weaknesses and potentials for

the EC investments in these countries including Iran. In Iran there is a intensive willing that support local investments on good potentials of EC. Thus scientific and statistical based researches especially in the comparative forms are essential to elaborate gaps between Developed countries' standards, on the top of them USA as a mother of EC industry, and developing countries' standards. Since Iran has good potentials for the EC investments, the researcher is about to evaluate EC impacts on Iran macroeconomic parameters comparing to the United sates' mentioned parameters through the comparative study.

MATERIALS AND METHODS

E-commerce nowadays dedicates almost the whole of the business area in the world to itself. The EC models don't make the same degree of impact on economic growth in countries. As it mentioned in the last sections the more ICT sub structures are developed, the users including businesses or customers as end users' numbers will be more. However the impacts' sizes of the various models of the E-Commerce on various country economy criteria are different. Researches shows that B2B has positive impact on gross national productivity (GNP), total factor productivity (TFP) and other macro economy criteria [58,].

E. Research Variables and Case Study

As stated in the literature, one way to study the impact of EC on macroeconomic parameters is to introduce appropriate measures of EC in the form additional explanatory variable as independent variables which are from the dummy variable kinds. EC models make different extents of macroeconomic effects on developed and developing countries' economy. Due to each model complicated effects in different situation and more importance of the B2B in comparison with other models in relation to economic growth, the researcher is going to choose B2B as an independent variable. According to economic growth model which used by Criscuolo and Waldron [54], Clayton et al. [47] and Erken et al. [55], Elsadig [23,49,50,51,52,53], the most important macro econometrics are as below [54, 55]:

- Total Factor Productivity (TFP)
- Employment growth
- Export growth
- Profits growth
- Growth in expert market share
- Unit value growth of output
- Unit value growth of exports
- Value added growth
- Increased capital intensity
- Contribution to output of broadband deployment
- Creation of consumer surplus

- Improvement of firm efficiencies

In this research due to lots of complications refer to calculating some dependent variables' statistical data and different parametric methods which are needed for estimating some other above variables, the researcher has chosen TFP and GDP as more important determinant variables for economic growth and evaluate them through parametric and semi parametric methods. The selective variables, GDP and TFP are from the best clear signs for the economic growth measurement [56,58,60]. Therefore in the next part the observations results including the effects of B2B model on TFP and GDP as dependent variables for both USA and Iran during a 12 years study period (2001 to 2013) are comparatively analyzed through the next parts' tables.

F. Data Collection and Research Method

Data collections about USA as a mother of IT services and E-Commerce industry is not a difficult job, because legitimate regulated reports exist, but as mentioned before, the lack of quantitative and comprehensive data about ICT impacts on business and economy development in Iran is a barrier for the studies on EC impacts on macro level parameters of the economy in this country. However during the fourth 5 years development program Iran's government has made more focus on ICT and EC technologies in the country. Some of more important actions in this area are:

- Codifying E-Commerce Bylaw and proportionating it to international standards.
- Preparing initial and lawful basis for EC applications in the country
- Developing public educations for applying EC in governmental public service such as E-Banking and E-Government Services
- Developing cultural basis for using electronic services in the country
- Developing more supports including endowing financial facilities and authorities for non-governmental firms which supplying electronic general services such as developing Police+ 10 associations, IT and ICT services supplier companies and etc.
- Developing internet network local hardware such as broad band services, ADSL, WIMAX, GPRS and etc.

Therefore collecting data about last decade Iran's EC improvements and their effects on macro economy criteria has been mainly made according to government reports about various IT sections' development; the researcher has grouped data and then checked their compatibility through a regular library study set time. The grouped tables for both country data has been brought separately as below:

1)   Business to Business model impacts on macro econometrics

Most B2B applications are in the areas of supplier management (especially purchase order processing), inventory management (i.e., managing order-ship-bill cycles), distribution management (especially in the transmission of shipping documents), channel management (i.e., information dissemination on changes in operational conditions), and payment management (e.g., electronic payment systems or

EPS)[59].According to previous studies E-Marketer projects has shown an increase in the share of B2B e-commerce in total global e-commerce from 79.2% in 2000 to 87% in 2004 and to more than 95% in 2012 [56,59,60]. The most impact areas of the B2B model include TFP, GDP, Employment Growth, and Value Added Growth.

MODEL for ESTIMATION TFP

We use the semi-parametric estimator from Olley and Pakes (1996) to estimate (TFP) at the plant level for each group of plants that operate in the same sector, defined at the four digit level of disaggregation. A key issue in the estimation of production functions is the correlation between unobservable productivity shocks and input levels, which yields inconsistent estimates under Ordinary Least Squares (OLS). The reason is that the variable input factors and thus their choice can be affected by the current value of the unobservable productivity shock. In other words, the variables of input factors are likely to be correlated positively with the error term. This results in an upward bias of the coefficients on the variable input factors, like labor and material, under OLS [61, 62]. The reason is that the variable input factors and thus their choice can be affected by the current value of the unobservable productivity shock. As an alternative, Olley and Pakes developed a semi-parametric estimator that uses investment as a proxy for these unobservable productivity shocks. An advantage of this approach is that it also controls for endogenous exit from the sample, which is assumed to occur when productivity falls below a threshold. In particular, plants with more capital, such as importers, are likely to allow for greater reductions in productivity, making the exit threshold a decreasing function of capital. Following Olley and Pakes, we estimate a Cobb-Douglas production function, taking the logs of equations below which we denote by small letters.

$$y_{it} = \beta_0 + \beta_{is}ls_{it} + \beta_{lus} + lus_{it} + \beta_k k_{it}$$
$$+\beta_m m_{it} + \omega_{it} + \mu_{it} \quad (1)$$
$$e_{it} = \omega_{it} + \mu_{it} \quad (2)$$

The error term, e_{it}, has two components, a white noise component, μ_{it}, and a time varying productivity shock, ω_{it}, which is known to the firm, but not to the econometrician. It is a state variable that can have an impact on the choices of inputs, which leads to a simultaneity problem. Pakes (1994) shows that the investment function, $l_{it} = l_t(\omega_{it}, k_{it})$, which is a function of two state variables, capital and productivity, is monotonically increasing in productivity. Inverting the investment function gives an expression for productivity as a function of capital and investment,

$$l_{it} = l_t(\omega_{it}, k_{it}) \quad (3)$$

Substituting equation (3) into (2) allows estimation of the variable input coefficients using nonparametric techniques. In a second step, the survival probability of a plant is predicted from a nonparametric probit regression and, finally, the coefficient on the state variable, capital, are recovered using semi parametric nonlinear least squares. Substituting the unobserved productivity term out in equation (2) gives a partial linear model:

$$y_{it} = \beta_l l_{it} + \beta_m m_{it} + \alpha_t(i_{it} + k_{it}) + \mu_{it} \quad (4)$$

In the first stage we obtain consistent estimates of β_l and β_m. We use a series estimator using a fourth order polynomial in investment and capital to identify the coefficient on capital we model survival as a function of capital and investment. The TFP estimated input coefficients obtained from estimating equation (2) with OLS, and with Olley-Pakes for both country are reported in appendixB, Table 2 . The productivity measure used here is a productivity index which is constructed by creating a deviation of output t and input from the group mean in the reference year (2003 in this paper); therefore according to Pavcnik(2002) and Aw et al (2001) the productivity measure can be written as follow:

$$\ln\text{TFP: } y_{it} - \bar{y}_{03} - \hat{\beta}_{ls}(\text{ls}_{it} - \bar{l}\,\text{s}_{03}) - \hat{\beta}_{lus}(\text{lus}_{it} - \bar{l}\text{us}_{03}) - \hat{\beta}_m(m_{it} - \bar{m}_{03}) - \hat{\beta}_k(k_{it} - \bar{k}_{03})$$

$$(5)$$

where $\breve{y}_{03}, \bar{l}\,\text{s}_{03}, \bar{l}\text{us}_{03}, \bar{m}_{03})$ and $\bar{k}_{03}$ are the respective group means of the logarithms of real sales, skill labour, unskilled labour, materials and capital and

$\hat{\beta}_{ls}, \hat{\beta}_{lus}, \hat{\beta}_m, \hat{\beta}_k$ are the estimates obtained from Olley&Pakes method.

DATA and PRELIMINARY ANALYSIS

According to data collected from Iran Statistics Center, Financial Information Processing of Iran (FIPIRAN) and Iranian Trade Development Organization (ITDO, Official information system of the ministry of Economy, Mines and Trade which so called YARANESH)[63, 64, 65] , the production imports rate has been increased to three-fold during a decade from 2001 to 2011 and the export rate has been increased to ten-fold. Although the average growth of total real exports in Iran's various manufacturing industries during the years 2001 to 2011 has significantly developed, from 4.224 to 43.975 billion Dollars (USD), but the trade deficit has awfully reduced from about 38 Billion USD at 2011 to 18 billion USD at 2012 and then to about 12 billion USD at 2013 which is very close to the trade deficit of the year 2001 which has been resulted by economic sanctions against Iran's oil and gas industries. The table including complete export& import procedure of the country from 2001 to 2013 which has been taken from the Iran Customs' statistics presents in the appendix B, table1. Since one of the E-Commerce triangle (as mentioned in the section A or the EC definition) is the 'Government" as a general and international concept and due to its' critical role in providing ICT bases including IT and information infrastructures (II) from one side and information applications (IA) such as E-Banking and commercial solutions from another side, it can be concluded that if governments cannot play fulfill their appropriate role in this triangle circuit, for any reason, the EC confronts to difficulties and problems [8,41,53,57]. For the better understanding of decisive impacts of the EC models on TFP as an important criterion in economic growth, in the next section we will dealt with to the comparative export analysis of Iran and USA during last years.

RESULTS AND DISCUSSION
G. Export Status Analysis (Iran and USA)

As mentioned in the last section, in the recent years the Iran's trade deficit has reduced back to the beginning of the last decade; also in the definition of the E-Commerce, in the introduction, was mention that EC as an important application of ICT is including all commercial and financial transaction which are made electronically. Therefore it is cleared that all processes such as Electronic Data Interchange (EDI), Electronic Found Transfer (EFT), and all other electronically financial transactions are from the EC kind [58]. In the retail processes which are grouped in other three EC models (B2C, C2C and C2B) except of B2B, the EFT procedure often is made through popular credit cards, but when we come to B2B the procedure is different. For B2B, financial exchanges are often made through Society for Worldwide Interbank Financial Telecommunication (SWIFT) which was established on 1973 to facilitate secured valuable transactions through electronic interbank financial exchanges [53, 57, 58]. Nowadays More than 10,000 banking organisations, securities institutions and corporate customers in 212 countries trust us every day to exchange millions of standardised financial messages. Therefore SWIFT can be considered as a mother of EC financial exchanges. In the United States almost all international exchanges including exports & imports are made through SWIFT and it shows the great role of B2B model in US economic growth. According to Pavcnik and Aw et al resulted equation for the productivity measurement which was discussed in section II, the calculations for the US economic growth based on TFP shows 1.8 % increase on 2010 compared to the year 2000 [66]. Amador and Coimbra have applied TFP equations for both USA and Canada 3 economic decade and found that both countries recorded a TFP acceleration after the

mid 1980s, following declines in the previous decades. in their research [67]. In addition, the inputs accumulation gave a relatively stable contribution for GDP growth throughout the sample period. These findings all are true about other G6 group countries which they have chosen as sample. According to Bureau of *Economic* and Business Affairs (EB), Department of Commerce reports, the US TFP growth has shown 0.8 % yearly during 1997-2006 and 0.7 % increase for the year of 2012 which their initial increase was mainly resulted by the ICT revolution in last decades of 19 century and its' accomplishment by applying the full capacity of technology for this electronic commerce in the international cooperation. The table 2 in the appendix B shows Iran and USA TFP and GDP from 1997 to 2013 comparatively.

CONCLUSIONS

This paper has analyzed the effects of E-Commerce models on economic growth of the USA as a developed country and Iran as a developing country comparatively. All statistics are showing the decisive and important role of EC model (B2B in this study) in increasing economic growth criteria (TFP and GDP in this study) for both initial steps of the EC development in both countries. The economic growth in the USA has been accomplished more intensively than Iran, because EC information infrastructures such as network broadband, hardware and electronic financial exchange instruments has been progressed faster than developing countries such as Iran. The rapid

accomplishment of the information technology, information infrastructures and information applications causes USA to be close more the stability of the ICT and consequently EC impacts on the economic growth; therefore the more slowly procedure of the GDP and TFP development is visible during the last years of the study period. In Iran economic statistics, there is a shock is visible in the output data for all commercial statistics including exports& imports and also the macroeconomic criteria statistics including GDP and TFP which refers to the economic sanctions against oil&gas industries and also SWIFT as the main financial instruments in the EC; therefore money exchanges has confronted various problems and thus the export and import procedure has been reduced. Because of the problems such as SWIFT and other sub structures in the ICT area which has not been yet accomplished completely in Iran, future studies is essential to plan applicable strategies for providing at least regional alternatives for the SWIFT and secured financial exchanges ans also for a more comprehensive and specially domestic IT and ICT substructures between Middle east and Islamic countries to facilitate electronic exchanges in the size of B2B trades.
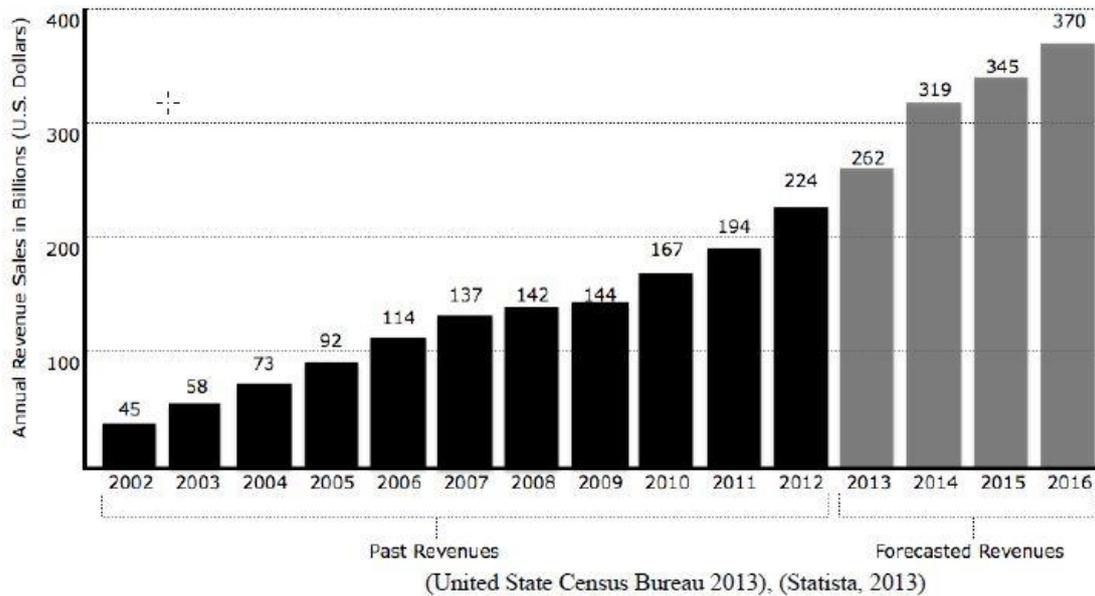
APPENDIX A

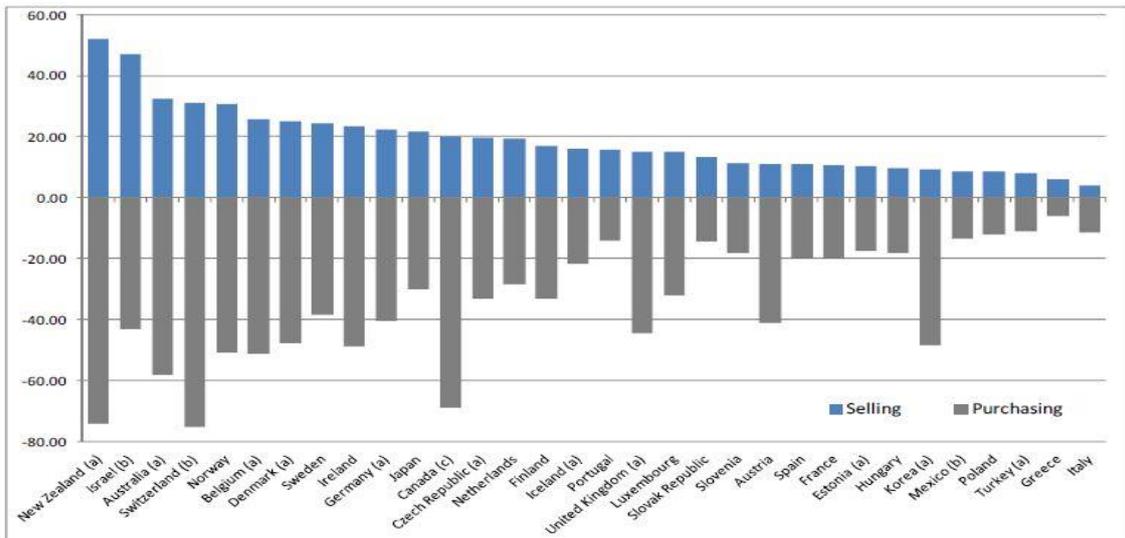**Fig.4 Annual United states E-Commerce revenues from 2002 to 2012**

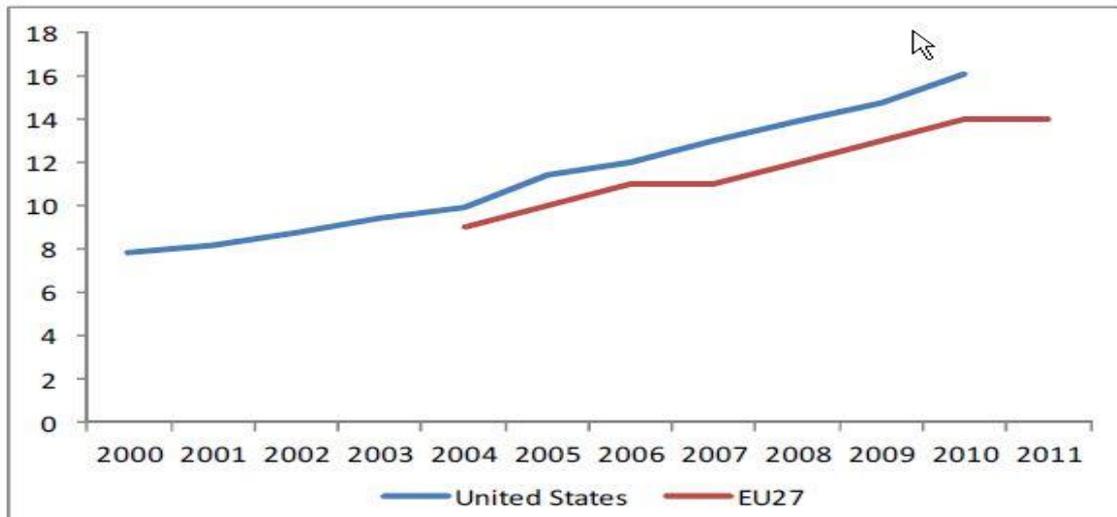**Fig 5. Business performing electronic sales /purchases**

Fig.6 annual United States m-commerce (including both smart-phones and tablets) revenues from 2009 through 2012, and then the forecasted revenues from 2013 through 2016.
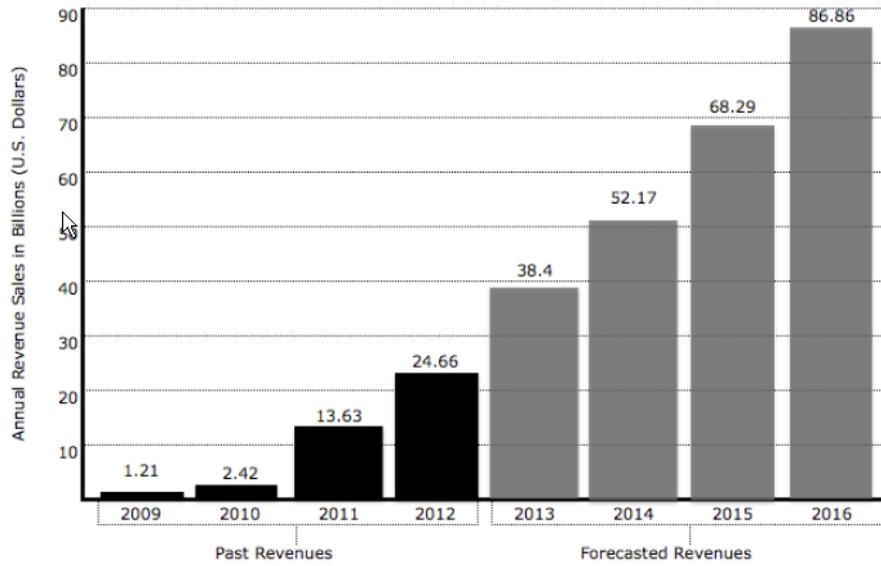
Fig.7 Value of E-Commerce transactions as a percentage of business sector turnover in the EU 27and the United states

APPENDIX B.

Table1. Full statistics procedure of import& export of the Iran country from 2001-2013

Year	Import	Export	Trade deficit
2001	18.120	4.224	13.896
2002	22.275	4.608	17.677
2003	26.598	5.972	20.626
2004	35.388	6.847	28.541
2005	39.247	10.474	28.773
2006	41.723	12.997	28.726
2007	48.439	15.312	33.127
2008	56.042	18.333	37.709
2009	55.278	21.891	33.396
2010	64.450	26.551	37.833
2011	61.808	43.975	17.893
2012	53.348	41.335	12.033
2013	12.909	12.536	3.73

Table2. Comparing TFP and GDP growth changes (%) of US and Iran from 1997 to 2013

Country	Criterion	1997-2006	2007-2011	2011	2012	2013
USA	TFP	0.8	0.1	0.6	0.7	0.4
Iran	TFP	1.1	1.0	-0.4	-5.5	-4.0 to 2.1
USA	GDP	2.1	1.2	1.3	0.9	0.9
Iran	GDP	0.4	1.9	0.3	-4.2	-2.8

REFERENCES

[1] UNCTAD. 2013.T. Fredriksson, E-commerce and Development Key Trends and Issues, Workshop on E-Commerce, Development and SMEs; 8-9 April 201, WTO, Geneva, Switzerland; pp. 13-15

[2] J.Humphery, R. Monsell, D.Pare, H.Schmitz, 2003, ''The Reality of E-commerce with Developing Countries'' MEDIA@LSE, Mar. 2003 ;23-25

[3] C.Cottam, 2013, E-Commerce, UW-L Journal of Undergraduate Research XVI; pp 8-9

[4] Li, Y. & Yeh, Y. (2010). Increasing Trust in Mobile Commerce Through Design Human Behavior, 26(4), 673-684. [online]. Available: http://www.sciencedirect.com/science/article/pii/S0747563210000063

[5] Statista (2013), U.S. Retail E-Commerce Revenue from 2010 to 2016. [Online]. Available: http://www.statista.com/statistics/182736/revenue-forecast-for-e-commerce- retailers-in-the-us/

[6] United State Census Bureau (2013), Latest Quarterly E-Commerce Report. [online]. Available: http://www.census.gov/retail/

[7] W. Wang, I. Benbasat,2007, Recommendation Agents for Electronic Commerce: Effects of Explanation Facilities on Trusting Beliefs. Journal of Management Information Systems. 23 (4), 217-246

[8] Z. Mohamed El Gawady, 2005, The Impact of E-commerce on Developed and Developing Countries Case Study: Egypt and United States. Misr University for Science and Technology Faculty of Business & Economics Giza-Egypt.

[9] E-Commerce Models. [online]. Available: http://www.eservglobal.com/uploads/files/index.pdf

[10] E-Commerce, Wikipedia; the Free Encyclopedia. [online]. Available: http://en.wikipedia.org/wiki/E-commerce

[11] E-Commerce and E-Business/Concepts and Definitions, WIKIBOOKS; Open Books for an Open World. [online]. Available: http://en.wikibooks.org/wiki/E-Commerce_and_E-Business/Concepts_and_Definitions

[12] OECD. 2005. Economic and Social Impact of E-commerce.

[13] OECD. 2013. Electronic and Mobile Commerce, Digital Economy Papers No. 222

[14] OECD. 2013. Electronic and Mobile Commerce, Digital Economy Papers No. 228

[15] Directorate for Science, Technology and Industry, Organisation for Economic Co-operation and Development, DSTI/ICCP/IE/IIS, 26-Jul-2013

[16] OECD. 2009. Foreign Direct Investment by Emerging Market Multinational Enterprises, the Impact of the Financial Crisis and Recession and Challenges Ahead.[online]. Available: http:// www.oecd.org/investment/gfi-8

[17] Electronic Commerce, 2012.[online]. Available: http://www.wiley.com/college/turban/0471073806/sc/ch09.pdf

[18] The Alberta Government Revenue Outlook. 2013. Operational Plan, Fiscal Plan for 2014-2017.[online]. Availabe: http://finance.alberta.ca/publications/budget/budget2014/fiscal-plan-operational-plan.pdf

[19] P., Wen, H. Lim, 2005, "Consumer-based m-commerce: Perception of Mobile Applications". Computer Standards & Interfaces",27(4),pp.347-357. [online]. Available: http://www.sciencedirect.com/science/article/pii/S0920548904001254

[20] United State Census Bureau, 2013, Latest Quarterly E-Commerce Report. [online]. Available: http://www.census.gov/retail/

[21] Mobile Commerce, Wikipedia; the Free Encyclopedia. [online]. Available: http://en.wikipedia.org/wiki/Mobile_commerce

[22] OECD. 2004. ICT and economic growth in developing countries.

[23] Elsadig, Musa. Ahmed. 2006. The Effects Of Human Capital On Malaysia's Manufacturing Productivity Growth, International Business and Economics Research Journal, 5: 49.

[24] UNCTAD. 2007, Information Technology Policy Program. Chapters 6,7

[25] G. Maryam, 2009, E-commerce adoption model in Iranian SME's: investigating the causal link between perceived strategic value of e-commerce and factor of adoption, University essay from Lulea/Business Administration and Social Sciences,2009, paper 15.3.7, p. 76

[26] W. Tangen, F.Stefan, Demystifying Productivity and Performance, International Journal of Productivity and Performance Management, 2005, 54(1), p. 34-46.

[27] D.Quah,. 2002. Digital Goods and the New Economy. London School of Economics and Political Science (LSE), Discussion, pp: 38-46.

[28] S.Cohen, G. Kallirroi, E-commerce investment from an SME perspective: Costs, Benefits and Processes, The Electronic Journal Information Systems Evaluation, 2006, 9(2),pp 45-56.

[29] Pohjola, M., 2001. Information Technology, Productivity and Economic Growth: International Evidence and Implications for Economic Development. OUP Catalogue, Oxford University Press, number 9780199243983, December

[30] Solow, R.M., 1957. Technical change and the aggregate production function. Review of Economics and Statistics, 39: 312-320.

[31] Jorgenson, D.W. and Z. Griliches, 1967. The Explanation of productivity Change. Review of Economic Studies, pp: 34.

[32] Oliner, S.D. and D.E. Sichel, 2000. The Resurgence of Growth in the late 1990s: Is Information Technology the Story. Federal Reserve Board, Washington, DC.

[33] Jorgenson, D.W., K.J. Stiroh, R.J. Gordon and D.E. Sichel, 2000. Raising the Speed Limit: U.S. Economic Growth in the Information Age. Brookings papers on Economic Activity, 1: 451-476.

[34] Atrostic, B.K. and Nguyen, Sang, 2005. Computer Investment, Computer Networks and Productivity. Working Papers 05-01, Center for Economic Studies, U.S. Census Bureau.

[35] Farooqui. Shikeb, 2005. Information and Communication Technology use and productivity. Office for National Statistics, Economic Trends, pp: 625.

[36] Clayton, T., C. Criscuolo, P. Goodridge and K. Waldron, 2004. Enterprise E-commerce: Measurement and Impact. The Economic Impact of ICT - Measurement, Evidence and Implications, OECD, Paris, pp: 241-260.

[37] Van Leeuwen, G. and Wiel, H. Van der, 2003. ICT, Innovation and Macroeconomic growth, CAED Conference, London.

[38] Criscuolo, C. and K. Waldron, 2003. E-commerce and Productivity. Economic Trends, pp: 600.

[39] Mohamad, Rosli. and Ismail, Noor Azizi, 2009. E-commerce practices among SMEs: a review of major themes and issues. Business e-Bulletin, 1(1): 7-13.

[40] Mohamad, Rosli. and Ismail, Noor Azizi, 2009. Electronic Commerce Adoption in SME: The Trend of Prior Studies, Journal of Internet Banking and Commerce, 14: 2

[41] Singh, Sumanjeet. 2008. Impact of internet and E-commerce on the labor market. Indian Journal of Industrial Relations (IJIR), 43(4): 633-644.

[42] Singh, Sumanjeet. 2008. Impact of e-commerce on economic models; little to lose; more to gain. International Journal of Trade and Global Markets, 1(3): 319-337.

[43] Hossein nasab, Ebrahim. and Aghaei, Majid. 2009. The Effect of ICT on Economic Growth: Further Evidence. International Bulletin of Business Administration, ISSN: 1451-243X Issue 5.

[44] Elsadig, Musa. Ahmed. 2008. Foreign Direct Investment Intensity Effects on TFP Intensity of ASEAN 5 plus 2. Journal of Economic Development, 33: 2.

[45] Kendrick, J.W., 1961. Productivity Trends in the United States. Princeton, NJ: Princeton University press.

[46] Denison, E.F., 1962. The Sources of Economic Growth in the United States and the Alternative before Use. Supplementary Paper, Committee for Economic Development, New York, pp: 229-255.

[47] Denison, E.F. and P. Edward, 1979. Accounting of Slower Economic Growth; the United States in the 1970s. Washington, DC: Brooking Institution.

[48] Jorgenson, D.W., F.M. Gollop and B. Fraumenri 1987. Productivity and US Economic Growth. Amsterdam, North Holland.

[49] Dollar, D. and K. Sokoloff, 1990. Patterns of productivity growth in South Korean manufacturing industries 1963-1979. Journal of Development Economics, 33: 309-327.

[50] Elsadig, Musa. Ahmed. 2008. ICT and Human Capital Intensities impact on ASEAN5 Productivity. The Journal of Knowledge Economy and Knowledge Management, Volume IV Spring.

[51] Elsadig, Musa. Ahmed. 2008. Foreign Direct Investment Intensity Effects on TFP Intensity of ASEAN 5 plus 2. Journal of Economic Development, 33: 2.

[52] Elsadig, Musa. Ahmed, 2009. Capital Productivity Determinants; East Asian Perspectives. Int. J. Sustainable Economy, 1: 3.

[53] Elsadig, Musa. Ahmed, 2010. Human capital and ICT per Capital Contribution East Asian Productivity Growth. International social Science Review. Vol. 85, No.1and2.

[54] Elsadig, Musa. Ahmed and Ridzuan Rahim, 2012. The impact of ICT on East Asian Economic Growth: Panel Estimation Approach. Journal of the Knowledge Economy, DOI 10.1007/s1313-012-0096-5.

[55] Criscuolo, C. and K. Waldron, 2003. E-commerce and Productivity. Economic Trends, pp: 600.

[56] Erken, Hugo, Donselaar, Piet and Thurik, Roy. 2009. Total Factor Productivity and the Role of Entrepreneurship. Tinbergen Institute Discussion Paper.

[57] W.Milberg, D.Winkler. Economic and social upgrading in global production network, International Labor Review, 2012, Vol. 150, No. 3-4

[58] R. Katz, Impact of the broadband on the Economy, ITU broadband Jpurnal, 2013. Vol. 130, No. 1

[59] H. Kiani, the impacts of the E-Commerce on macro economy criteria, IEEE Journal Complex , 2005, paper 19.8.4, p. 119.

[60] M.Jhons. (2014). WIKIMEDIA home page on WIKIBOOKS. [online]. Available: http:// http://en.wikibooks.org/wiki/E-Commerce_and_E-Business

[61] M.Hajian, H.Sadeghi,B. Javaheri. Total factor Productivity and Efficiency in Iranian Crop Production: A None Parametric Approach, Apex Journal International. 2013. Vol. 2(2), pp. 033-043

[62] S. Olley, A. Pakes, "The Dynamics of Productivity in the Telecommunications Equipment Industry", 1997, paper 64. 12.63, p.98.

[63] A.Abbasian,N.Mehregan, 2008, " The measurement component of Total Factor Productivity", Archive SID. Online. [Available]: www.sid.ir/archieve

[64] Mechanized system for the export rewards of the Ministry of industry, Mines and trades.[Online]. Available: http://yaranesh.tpo.ir/UserPanel.aspx

[65] Financial Information Processing Center of Iran (FIPIRAN). [online]. Available: http://www.fipiran.com/

[66] Iran Statistics Center. [Online]. Availabe: http://www.amar.org.ir/default.aspx

[67] R. Shackleton, Total Factor Productivity Growth in Historical Perspective,2013, Working Paper Series; Congressional Budget Office, Washington, D.C.). [online]. Available: http: //www.cbo.gov/.../44002_TFP_Growth

[68] J. Amador, C. Coimbra, TOTAL FACTOR PRODUCTIVITY GROWTH IN THE G7 COUNTRIES: DIFFERENT OR ALIKE?, 2007, Working paper, Economics and Research Department; Banco de Portugal. Av. Almirante Reis no. 71, 1150-012 Lisboa