A Study on the Impact of Electronic Commerce on Economic Growth

Hamid pursoleymani[1], Soheila pursoleymani [2]

[1.] IT Management, Lloydstec academy iran office, England
[2.] Bachelor of Engineering Technology Computer – Software, Islamic Azad University Sirjan Branch, Iran

Abstract: This paper seeks to investigate the impact of electronic commerce on the economic growth. This paper is regarded as an applied research in terms of objective and a descriptive Delphi survey in terms of data collection which aims at getting consensus of experts familiar in this regard. To prove main and subordinate hypotheses, Pearson tests have been applied. The relation between subordinate variables and economic growth has been analyzed through using regression method and EViews software. This paper has first gathered the related literature and then principles of economic growth. Having designed the proposed conceptual model through credible references, data required for calculations were gathered by experts through using data pertaining to Statistical Center of Iran and other related state organizations. The main result of this paper reveals that infrastructure and services variables in the electronic commerce have a significant relation with economic growth in Iran.

Keywords: Electronic commerce, economic growth, ICT, IT

1. Introduction

Advances in information and communication technology during last two decades and expansion of its application in different economic and social arenas have brought about a new season of interactions among people, entities, companies and governments. New concepts are emerging in the economic and commercial literature. Business traditional methods are being reviewed and in the light this development, new economic carriers and activities are emerging. Some regards the above mentioned development in information and communication technology as the greatest technological revolution following industrial revolution and some other calls it new economy or digital economy (Mokyr, J., 1997). Due to its comprehensive presence, availability at relatively low costs, user friendliness, flexibility and attractiveness, internet as a global network and a pre-requisite of electronic commerce is changing business traditional methods. This technology has presented new models for buying, selling and providing services to the customers and is offering a new definition of buyer-seller traditional relationship. Also this technology has caused changes in the methods relating to production, distribution, search and exchange of goods and services, and it can increase speed of institutes and entities reaction to the market signals and provide consumers with better services. Definitions offered for electronic commerce are different with regard to the activities and transactions considered in these definitions and the communication infrastructures in which these activities and transactions are carried out.

This matter has led to different results to be obtained from researches carried out in the international level as regards the effect of electronic commerce (Nakayama, Y., 2002). Interaction between technology and business process is the key to understand the effects that electronic commerce may have on economic transactions and finally on the whole economy. The thing that differentiates electronic commerce from traditional commerce is essentially a method or a path through which information is processed and exchanged between buyer and seller. In the electronic commerce, information is exchanged through a digital network or other electronic channels rather than direct contact of persons. Electronic commerce may create a sale, marketing, or additional distribution channel besides traditional trade channels or create new goods, services and markets (Melicioni, V., 2002).

2. Literature Review
2.1 Theoretical Principles

Since electronic commerce is a part of developments extensive process that is created by information and communication technology (ICT), i.e. information technology (IT) besides communications; so usually a single economic literature and experimental evidence is used to investigate their economic effects particularly their effects on economic growth (GDP). And the only difference is in replacing general measurement criteria proper for each of them in the mathematical relations. Empirical studies exist in all levels including small workshops, factories, entities, and national and international

industries. Although Cobb-Douglas production function is the infrastructure of most models, flexible forms including transom function as well as cost functions such as generalized Leontief have been used. Many studies have been carried out regarding the relation between ICT and international commerce in some countries of the world. (Melicioni, V., 2002), he depicted that the expertise of a country in ICT has a positive relation with growth of its export share, and a negative relation with growth of its import share. He has investigated the effect of ICT on the share of export market in 12 OECD member countries during 1981-1994 through using an econometric model.

Some regards all commercial and financial transactions that are carried out electronically including Electronic Data Interchange (EDI), Electronic Fund Transfer (EFT) and all activities pertaining to credit- debit cards as the electronic commerce. Some other confines electronic commerce to retail sale to consumers in which transaction, payments of goods and services are carried out through internet. According to one definition, electronic commerce is trading goods, services and information through computer networks including internet (Turban, E., et al., 2002). OECD member countries have made extensive efforts to provide a standard definition and measure the electronic commerce. Based on criteria of these countries that are applied as an international standard in many countries,three aspects namely network (broad and limited definition), processes, and actors must be taken into account when defining electronic commerce. Research requirements and necessary indices are classified into three stages namely technical readiness, intensity, and impact.

Electronic commerce framework has been comprised of three higher levels.

1. Infrastructure: it consists of hardware, software, and databases that are applied in the form of www services in the internet or EDI or other forms of sending and receiving messages in the internet or other value added networks.
2. Services: it includes sending and receiving messages and a wide range of services that provide the stage of finding and presenting information (in its commercial format if necessary) and searching for potential partners as well as negotiation and agreement regarding commercial exchanges.
3. Products and structures: supplying directly commercial goods and services dependent upon information for customers and trade partners, cooperation and sharing internal and external organization information and organizing an electronic market environment and chain of supply and support.

2.2 Research Background

In general, all systems of electronic payments including debit cards, stored value cards (SVC), electronic cash, electronic cheque, and all kinds of protocols proposed in this regard, payments tools or in the other words electronic money are somehow regarded as the new economy and will influence economic growth and development.

(Blinder, A. S., 1995) electronic monetary systems influence monetary systems by two possible ways.
1. Change in the money supply due to changes in monetary multiplier,
2. Change in cash flow speed in long time and consequently change in the general price level and interest rates.

(Berentsen, A., 198), the effect of digital money on the money supply depends upon how money is created. He believes that electronic money is regarded as a substitute for volume of currency held by the public and since existing moneys held by people constitute a part of money supply, changes in demand for moneys held by people influence the whole money supply. The maximum effect that can be expected is in the limited definition of money. (Patrick Holly, J.R., 1996) progress of electronic payment systems technology brings about modification of monetary system and therefore increases in using money. Intersection of money supply and demand changes by income and interest rate levels due to reduction of transaction costs and increase of payment systems efficiency. This matter causes transmission or movement on the LM curve. However, these changes depend upon the type of progress and its effects. (Joilson, D., 2001), he determines three main factors of demand for digital money; first, the inherent need to have different forms of money. From his point of view, governments supply only one type of money and this is the market that creates different types of money or quasi money including cheques, credit cards, etc. to fulfill different needs. Thus heterogeneous needs create heterogeneous demands. Second, reduction of transactions costs. This can be observed properly by studying the history of development of various forms of money since its creation by now. Third, increase in the number and volume of electronic private transactions or electronic commerce. (Wadhwani, S.B., 2000), the research carried out in England in 1999 reveals that the prices of goods supplied in the internet have a remarkable difference with their prices outside the internet. (Goldman, S., 1999), online supply of goods and services saves

2 to 40 percent of total costs of inputs. However, this reduction of costs differs from one industry to another. Totally, the general price level is reduced 4 percent on average.

3. Methodology

This paper is an applied research in terms of objective and a descriptive- Delphi survey in terms of data collection which aims at getting consensus of experts familiar with the subject of paper. To prove main and subordinate hypotheses, Pearson tests have been applied. The relation between subordinate variables and economic development has been analyzed through using regression method and EViews software. This paper firstly gathers literature relating to the electronic commerce and then principles of economic growth. Having designed the proposed conceptual model through credible references, data required for calculations were gathered by experts through using data pertaining to Statistical Center of Iran and other related state organizations.

3.1 Hypotheses

The dependent variable in this paper is economic growth with GDP index, and independent variables pertaining to the electronic commerce are namely infrastructure, services, and products of electronic commerce.

- Main Hypothesis

There is a significant relation between electronic commerce and economic growth of Iran.

- Subordinate Hypotheses

1. There is a significant relation between infrastructure of electronic commerce and economic growth of Iran.
2. There is a significant relation between services of electronic commerce and economic growth of Iran.
3. There is a significant relation between products of electronic commerce and economic growth of Iran.

Reliability between economic growth of Iran (with GDP annual rate index) as the dependent variable and electronic commerce as the independent variable in the main hypothesis will be tested through unit root test (EViews software).

3.2 Conceptual Model

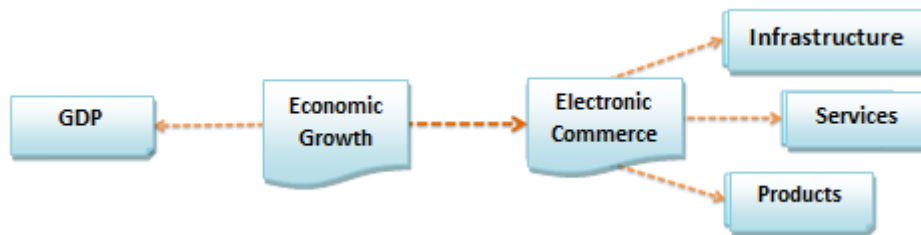Figure 1 depicts the research conceptual model with regard to the variables.

Figure 1. Research Conceptual Model

4. Findings

4.1 Pearson Correlation Coefficient Results (Main Hypothesis)

Table 1 demonstrates the results of Pearson correlation coefficient for the main hypothesis.

Table 1. Pearson Correlation Coefficient for the Main Hypothesis

Correlation Coefficient	p-value	Result
0.765	0.0000	Approval of hypothesis and a strong direct relation

Correlation coefficient at the significance level of 1% equals 0.765 and p-value equals zero. Thus it can be concluded that there is a significant and strong relation between electronic commerce and economic growth of Iran and this relation is direct.

4.2 Pearson Correlation Coefficient Results (Subordinate Hypotheses)

Table 2 demonstrates the results of Pearson correlation coefficient for the subordinate hypotheses.

Table 2. Pearson Correlation Coefficient for Subordinate Hypotheses

Variables	Correlation Coefficient	Sig	Result
Infrastructure	0.072	0.010	Significant direct relation
Services	0.850	0.029	Significant direct relation
Products	0.482	0.201	Lack of significant relation

Correlation coefficient of the infrastructure variable equals 0.072 and its significance level equals 0.010 and it is less than 5%. Correlation coefficient of the services variable equals 0.850 and its significance level equals 0.029 and less than 5%. This indicates that infrastructure and services variables have a strong significant direct relation with economic growth at 95% confidence level. Also correlation coefficient of the products variable equals 0.482 and its significance level equals 0.201 and more than 5%. It suggests that there is no significant relation between products and economic growth.

4.3 Regression Model Estimation (EViews software)

Variables reliability has been examined through using unit root test of Dickey – Fuller. The process of this test will be elaborated for one of these variables to shorten the results. The reliability test was carried out by using unit root test of Dickey – Fuller for gross domestic product (GDP) variable. The results revealed that this variable is not reliable. Thus test was carried out in the first order difference and variable became reliable in this order. The results are presented in table 3.

Table 3. The results of reliability test by Dickey – Fuller unit root for GDP in the first order difference

Null Hypothesis: GDPhas a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)			
Level		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.804393	0.0000
Test critical values:	1%	-3.626784	
	5%	-2.945842	
	10%	-2.611531	
*MacKinnon (1996) one-sided p-values.			

As shown in the table, t-statistic (-5.80) is less than the estimated critical values (at all levels). So it can be concluded that this variable (in the first order difference) is reliable. The results of the above mentioned tests in the first order difference of the model time series are presented in table 4 for all model variables.

Table 4. The results of Dickey – Fuller test for variables time series data

Variable	Dickey – Fuller statistic	MacKinnon Maximum Critical Value	Result	Degree
GDP	-2.61	2.30	Unreliable	I(1)
D(GDP)	**-3.62**	**-5.80**	Reliable	
Infrastructure	-3.610	-1.476	Unreliable	I(1)
D(Infrastructure)	**-3.615**	**-6.060**	Reliable	
Services	**-2.611**	**-4.55**	Reliable	I(0)
Goods	**-3.621**	**-8.42**	Reliable	I(0)

Source: research findings

The symbol D in the table denotes the first order difference of variables. So except for GDP and Infrastructure that are reliable in the first order difference, the rest variables are at the reliable level.

Thus the final result of reliability tests specifies that variables become reliable either at the level or at the first order difference. Table 5 depicts full specifications of the estimated model.

Table 5. Econometric Model Estimation by Ordinary Least Squares

Dependent Variable: Economy development (ED) Method: Least Squares Included observations: 30				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Infrastructure	0.024798	0.006465	3.835548	0.0007
Services	0.018687	0.001758	2.390977	0.0190
Goods	0.019395	0.046360	0.418355	0.0791
C	222.4721	32.07422	6.936166	0.0000
R-squared	**0.846442**	Mean dependent var		721.4000
Adjusted R-squared	0.840263	S.D. dependent var		258.6724
S.E. of regression	63.22275	Akaike info criterion		11.25477
Sum squared reside	103925.0	Schwarz criterion		11.44160
Log likelihood	-164.8216	F-statistic		**153.1526**
Durbin-Watson stat	**1.914299**	Prob (F-statistic)		0.000000

Source: EViews Output

1) t-statistic reflects that infrastructure variable (with respect to the given variables) is effective on the economic growth of Iran ($t = 3.83 \geq 1.96$, p-value $= 0.0007$); so by one unit increase in the electronic commerce, economic growth increases by 0.025 unit. Also in the services variable, by one unit increase in the electronic commerce, economic growth increases by 0.019 units.

2) The products variable is not effective on the economic growth and the relation is not significant.

3) R-squared value equals 0.846. This value depicts that 84% of changes in dependent variable (economic growth) are explained by independent variables.

4) Durbin- Watson statistic equals 1.91 and it approves the assumption of correlation between model components.

5) High F-statistic (153.1526) indicates significance of the whole regression.

5. Conclusions

Among the main results of this paper, determination of the values of correlation coefficient between dependent and independent variables can be mentioned. Correlation coefficient of the main hypothesis at the significance level of 1% equals 0.765, and one can conclude that there is a significant relation between electronic commerce and economic growth. Correlation coefficients of infrastructure equals 0.072, and correlation coefficient of services equals 0.850 and their significance levels are less than 0.05. Thus there is a significant relation between economic growth and the mentioned variables. Yet with respect to the correlation coefficient (0.482) and significance level (0.201) of the products variable, it does not have a significant relation with economic growth. These

relations can be seen in the econometric model estimation by ordinary least squares too. This estimation reflects that by one unit increase in the infrastructure and services variables, the economic growth increases by 0.025 and 0.019 units respectively.

- Suggestions

1. By supporting the electronic commerce by the public sector in order to increase the economic growth, the rates of infrastructure (0.025) and services (0.019) variables can be taken into account for making operational plans and the impact of these plans on economic growth increase.

2. It is suggested to facilitate and plan data mining for planning of economic growth through using facilities of electronic commerce in the field of tax services, exchange facilities, export and import, etc.

3. To increase markets transparency and to reach full competition competency, the government is suggested to provide the stage of electronic commerce through payment systems and exchange rate acceleration.

4. This plan contains codified integrated economic packages some of which are marketable, these packages vary depending upon selection and they can be elaborated separately. Different types of economic packages are namely,

– Personal economic packages
– Manufacturing and infrastructural economic packages
– Energy carriers economic packages
– International investment economic packages
– Pension deposit economic package

Other researchers are suggested to take below matters into consideration.

1. Looking for other variables effective on the electronic commerce and testing their relations with economic growth and completing the results of this paper.

2. Breaking down the infrastructure variable of the electronic commerce into its components and determining the effect coefficient of each component so as to plan more accurately for economic growth, and apportioning the budget more properly for planners and plans administrators.

3. Breaking down the services variable of the electronic commerce in the public sector into its components and determining the effect coefficient of each component so as to plan more accurately for providing better facilities, more satisfaction and less opportunity costs.

References

1. Berentsen, A., (1998), Monetary Policy Implications of Digital Money, Kyklos (International Review of Social Science), vol. 51, Fasc.1, pp. 89-117.

2. Blinder, Alan S., (1995), "Statement before the Subcommittee on Domestic and International Monetary Policy of the U.S. House of Representatives," Federal Reserve Bulletin, vol. 81, pp. 1089-1092.

3. Goldman, Sachs, (1999), B2B: 2B or not 2B, E-commerce/Internet, Goldman Sachs Investment Research, 14 September.

4. Joilson, Dias, (2001), Digital Money: Review of Literature and Simulation of Welfare Improvement of This Technological Advance, State University of Maringa.

5. Meliciani, Valentina, (2002), the impact of technological specialization on national performance in a balance-of-payments-constrained growth model, Structural Change and Economic Dynamics, vol. 13, pp. 101-118.

6. Melicioni, V., (2002), The Impact of Technology Specialization on National Performance in a Balance of Payments Constrained Growth Model, Structural Change and Economic Dyanamicsvol 13, pp. 101-18.

7. Mokyr, Joel, (1997), "Are We Living in the Middle of an Industrial Revolution?", Federal Reserve Bank of Kansas City Economic Review, Second Quarter, (14), pp. 31.

8. Nakayama, Yuji, (2002), Does E-commerce Always Increase Social Welfare in The long run?, the University of Tokyo, CIRJE- F-144.

9. Patrick Holly, Jr., (1996), The Effect of Technology Growth on Money Supply and Demand: A Co-integration Approach, The Park Place Economist, vol. VII, pp.63-75.

10. Turban, E., King, D., Lee, J., Warkentin, M. Chung, H., (2002), Electronic Commerce 2002: a Managerial Perspective, 2nd Ed. New Jersey: Prentice Hall.

11. Wadhwani, Sushil B., (2000), The Exchange Rate and the MPC: What Can We Do? Bank of England, Quarterly Bulletin.

6/22/2024