

Effect of Information of Communications and Technology on Economic Sectors of using Growth Accounting Approach

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Abstract: ICT investment in recent years has increased incrementally in different sectors of countries. Government tries to deploy ICT as a improving and fastening tool in their economic growth. This research measures empirically the effect of ICT on the economic growth of different economic sections of the IRAN through modified growth accounting approach. We used modified Cobb-Douglas as our production function. The model is made up with capital investment and labor force. Capital investment is dividing by physical capital and ICT investment. The analysis is based on panel data covering a sample of 7 economic sectors during the period of 2003-2012. we used an econometric approach to estimate the contribution of model components. Growth accounting results indicate that labor has the most contribution in the growth of each sector, but contribution of ICT investment in the output growth has increased during the recent years. Based on the model output, we can confirm the hypothesis, which implies sectors with more investment in ICT; have more contribution of ICT in their growth.

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1. Introduction

Increasing man-made disasters like wars, regional conflicts and natural disasters in the last century, lead to increasing risk and uncertainty on supply chain performance of mankind into a new era of technology in this century that is made quickly their life change. This new communication tools, information and new processes in science and technology, the entire realm of human life that surrounds. Undoubtedly, in any period of human history as well as today's rapid information flow is not widespread. Therefore, some of the most important features of this historical period, development and Specials importance of knowledge, the contemporary era have called Information Explosion Age that is biggest revolution in information technology.

Today, in light of the development of information processing, information are available in certain centers, so that everyone in every place can aware by just a number Telephone, personal computer, newspaper from last Information and research at research centers around the world. Information through mass media have been reached to people, to the world Make familiar surroundings, and it adds to the knowledge that the customs, traditions and is familiar with the culture of other nations (Elena, 2007).

Information and Communication Technology (ICT) is achieved from the interaction of three distinct computer, information and communication. Governments, industries and economic enterprises continuously expend large amounts of resources in

information technology and related technologies for gain hoping. The broad applications of information technology and increasing investments in ICT And changes ICT for Organizations, institutions and communities create especially in developing countries is a principal concern. ICT makes capabilities and opportunities for managers in managerial processes such as planning, organizing, directing and controlling the poses and makes the virtual world, internet, intranet, extranet, networks and other products. Such systems and economic systems affect every country in the world. ICT is not only a choice but a necessity of developing policy, so governments must inevitably increase timely service capabilities together technological advances in ICT (information and communication technologies). To achieve this goal we require innovation and technology innovation and transfer of knowledge (UNIDO, 2001).

Promoting the use of ICT in economics and business lead to increase the flow of information and reduce search costs, greater access to information, reduce and eliminate the constraints of the market, increasing the number of suppliers of goods and high power of choice of consumers. The expansion ICT make reduction of production costs (due to economies of scale in production) and the possibility of expanding the market, increase productivity and provide increased employment. Nowadays, information and communication technology as one of the new platform in this rapidly affect the investment on human life in general at this domain. The effect is clear in all social aspects of human life including the

impact of the economy that is the development of the information technology in the development of information technology, the findings of increased These countries' economic performance and improve organization performance, the new emerging markets, the micro variable the lid off of what the other countries of Empathy of the following is the type of strategy are given about information technology adoption. ICT in the developing countries can be a major factor in the important access for higher stages of development. Since the developing economy do not work in optimum or sufficient conditions thus to introducing this technology make potential of information and communication that is given in the work for these economies into larger economic development rejection to be more quickly to the floor.

Bakhshi and Larsen (2005), in a study are explored the effect of technological progress in ICT and economic growth in England during the years 1976-1998. The results show that advances in technology ICT will increase labor productivity in the long run from 20 to 30 percent. The results show that one permanent increase in the growth rate of technological progress in ICT lead to increasing ratio of investment to GDP and decreasing the depreciation rate, while increasing the return on investment in this sector is making increase in spending and depreciation rates. Heshmati and Young (2006), in their study investigate the contribution of ICT on economic growth in China during 1977-2002. Their results indicate that ICT Has a significant positive effect on economic growth in China and this country has benefited from investing in ICT. Elena et al., (2007), using a linear model, examined the effect ICT on economic growth in OECD for the period 1980-2004. The results show the positive impact of ICT on economic growth. Jukka and Matti (2007), in an article entitled "ICT and productivity growth in Finland" using 1995-2005 data reached the positive impact of ICT on economic growth in this country. Becchetti and Di Giacomo (2007), in their study investigate the impact of ICT on growth of GDP per capita in selected countries of the world with two different methods. In the first approach ICT is considered as physical capital to improve the quality of other physical assets. In the second method, telephone, the number of Internet users, the number of personal computers and... that increasing the labor productivity have been considered as indicators of ICT. Results indicate that both methods of information and communication technology can improve the growth. Ketteni et al., (2007), in their study investigate the role of information technology on economic growth for OECD during the years 1980-2004. The results show that initial income, human capital and expenses IT have a nonlinear effect on the

economic growth of these countries. Martines et al., (2007), in a study evaluate the role of ICT on Spain's economic growth during 1995-2002 using a dynamic general equilibrium. The results are that ICT in Spain has a significant impact on productivity growth and investments in other sectors have negative impact on productivity. On the other hand, in these periods, productivity growth and total factor productivity in Spain are negative. All these results suggest that productivity growth is consistent with the Spanish economy. Dedrick et al., (2008), in a study evaluated the impact of ICT diffusion on economic growth in 44 developing countries during 1985-1999. The results show that wealth is one of the important factors affecting investment on IT and factors driving diffusion in developing countries than in developed countries are different. The availability of capital resources (loans and foreign aid), complementary assets and the degree of economic openness and foreign investment are considered as important factors influencing investment IT in developing countries. Christos et al., (2009), in a study entitled "from Investment in ICT to Greece economic growth: growth accounting approach" assess the impact of ICT on economic growth using data from 1996 to 2003. The results show that ICT plays positive and significant in determining economic growth in this country.

2. Material and Methods

In this study for investigation of ICT effect we use Solow's Expanded Function. In this approach, production is function of ICT capital, non-ICT capital and labor. If the production function of the Cobb - Douglas is considered, we have:

$$Y = A(t) F(K_n, K_{ict}, L_t)$$

In the above equation, A is Technology, K is Non-ICT capital stock of physical in fixed price K_{ICT} is Capital stock, L is labor. To investigate the effect of ICT indicators, the indicators used in the communications sector investment. To derive the above equation, the following equation is obtained.

$$\dot{Y} = \dot{A} + \alpha_n \dot{K}_n + \alpha_{IT} \dot{K}_{IT} + \alpha_L \dot{K}_L$$

For estimation of this model we use Panel Data approach. The population are seven sectors of the economy including agriculture, industry, construction, mining, water, electricity and gas services, financial institutions, money and communication.

Data used for these sections are as below for the years 2004 – 2011 and we use these statistical sources.

- World Bank database WDI 2008.
- Portal of the Central Bank of Iran, the economic accounts.
- Statistical time series of economic / Social statistics in Management and Planning.

- Data from the International Monetary Fund.
- World Information Technology and Services Alliance (WITSA).

Research objectives include the following:

- Role of ICT in the process of economic growth.
- Factors affecting growth countries, with priority given to ICT.
- Determining the role of technology in national production.

3. Results

Simple regression between ICT Development Index and the ICT Price Basket shows a strong correlation between the price of ICT and the level of development of ICT (Figure 1). In other words, the price of ICT is one of the factors determining the level of enjoyment. Higher ICT development index are associated with lower prices and vice versa. ICT in countries where prices are higher than marginal have little difference in their ICT development index.

Among these countries, Cuba has a significantly different trend. ICT access and use in Cuba is similar to other countries. But due to the sub-index of skills is very different states of the same skills. Because of this that differences in skills not directly related to ICT price basket, so this country is shown separated from the general trend of the data.

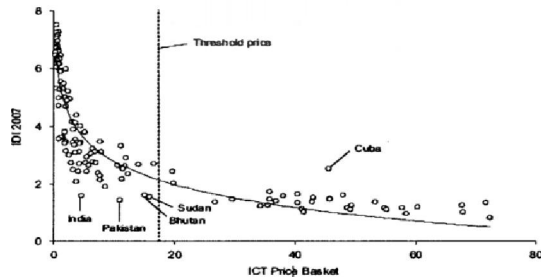


Figure 1: Relationship between ICT development index and Price basket of ICT

The correlation coefficient between ICT development index and per capita national income in 2007 is 0.93. In 5 years, the relationship between these two variables is improved and the coefficient of determination has increased 80 percent in 2002 to 82 percent in 2007. In other words, economic growth in 2007 has greater reaction compared with 2002. These findings are confirmed with arabcam (2005). He claimed that the relationship between ICT and GDP Per period (2003-1995) has been strengthened.

Oil-exporting countries such as Kuwait, Saudi Arabia, and Jerusalem are appeared less than expected. These countries use economic development strategy based on natural resources. According to the

income level of the countries, there is great potential for development based on ICT.

Housman test concluded that the random effects model is better. The model’s marginal coefficients which are real variables are displayed in Table 1.

Table 1: Final model coefficients

Variable	Coefficient	Value P
LK	0.78 (0.05)	0.000
LKICT	0.09 (0.06)	0.001
LL	0.96 (0.06)	0.000
C	-3.7 (0.3)	0.000
Houseman test	0.46	
R ²	0.95	

This study confirms the findings of other studies, including those that contribute most to the growth of output per unit of labor is owned, non-ICT capital stock in the model coefficient, which is 0.09 compared to 0.07 the previous research shown, indicating growth. These results indicate that in recent years, investment in telecommunications in various economic sectors have been growing rapidly. Due to the coefficients obtained from the model, the contribution of each independent variable on economic growth and also technological progress and growth of each sector was calculated in table 2.

Table 2: Measurement of different components in each sector growth

Sector	Growth Average	ICT Capital	Non - ICT	Labor	TFP
Industry	0.11	0.01	0.04	0.05	0.01
Agriculture	0.16	0.02	0.04	0.07	0.03
Transportation	0.17	0.02	0.05	0.08	0.01
Water, Electricity, Gas	0.08	0.01	0.02	0.04	0.005
Construction	0.07	0.01	0.10	-0.05	0.01
Communication	0.15	0.01	0.03	0.08	0.03
Finance	0.07	0.013	0.02	0.036	0.007

The results show that the maximum growth of TFP is related to agriculture and communication. In construction sector, labor has Negative growth and may be due to the crisis in the housing industry and reduce its absorption. Transportation in the above sections have averagely more growth rate that share of ICT in this sector is 0.02 that this indicates that the investment in the ICT sector has had much influence on the development. Agricultural productivity growth is high, perhaps due to entry of agricultural machinery and other equipment, using new methods of planting in this sector. These coefficients can be good signs in

areas prone politicians are good for investment. Lowest average growth units are owned buildings, financial institutions, utilities, and gas. We can say that the financial sector to some extent has been affected by the global financial crisis in recent years. Similarly, in the construction sector due to rising prices of housing materials, the purchasing power has decreased. Water, electricity and gas have been witness to these events have shown similar effects.

4. Discussions

With the development of information and communication technology in the country, all sections of society have access to the modern technologies and strategies to promote modern technologies with high productivity in society. Domestic use of this technology coupled with the development of information and communication technology in the country, which has increased the supply of human capital in the economy, is an important factor in the development of the processes of the export expansion products and services Technology. In considering these issues, adopting a strategy in relation to information and communication technology for large countries is different with case of small countries. Transfer to large countries where economic growth is important, the internal use of the technology can be a more effective strategy of economic development to the strategy of expanding exports of goods and services information and communication technology can be. By adopting this strategy, the sustainability of the industry and economy of the community is protected against external shocks. While the extent of the economic importance of small countries that do not adopt a policy of expanding exports of ICT products and services take more advantage. Therefore, a national strategy for the governments of countries to expand the IT development of communication and in Among these strategies is to adopt a strategy for the internal use of information and communication technology, and especially our great states would be the most effective strategy.

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References

1. Pohjola, M (2002). "The new economy: Facts, impacts and politics", *information economics and policy*, 14, pp. 13-144.
2. Kuppasamy, M (2009). "Whose ICT investment matters to economic growth: private or public? The Malaysian perspective", *EJISDC* 37,7, 1-19.
3. Pohjola, M (2001). "Information technology and Economic Growth: a cross Country analysis", *Information technology and Economic development*, Oxford university press, pp-242-256.
4. World Information technology service Alliance (2008), *Digital planet 2008*, WITSA.
5. Mankiw N. Gregory, David Romer and David N Weil (1992). "A Contribution to the Empirics of Economic Growth", *Quarterly Journal of Economics*, 107, 407-437.
6. Jorgenson, D. and Nomura K, (2005). *The Industry Origins of Japanese Economic Growth*, Working Paper 11800, 2005. At: <http://www.nber.org/papers/w11800>.
7. Jorgenson, D., W, (2001): *Information Technology in the US Economy*, *American Economic Review*, 2001, 91,1-32.
8. N. Gregory Mankiw; David Romer; David N. Weil. (1992). *The Quarterly Journal of Economics*, Vol. 107, No. 2, pp. 407 to 437. Stable URL.
9. Solow, Robert M., (2012): "Technical Change and the Aggregate Production Function," *Review of Economics and Statistics*, August 1957, 39 (3), 312 - 3 20.
10. Qiang, CZ-W., Pitt A., Ayers S.; (2003): "Contribution of information communication technologies to Growth", World Bank, November.
11. Khuong, Vu Minh; (2004). "ICT and Global Economic Growth, Contribution, Impact, and Policy Implication"; Thesis for degree of Doctor of Philosophy in the subject of Public Policy; Economics department; Harvard University; June.
12. Based on findings from Van Ark et al. (2003) and Lee and Khatri (2003), World Bank.
13. Kretschmer, T. (2012), "Information and Communication Technologies and Productivity Growth: A Survey of the Literature ", *OECD Digital Economy Papers*, No. 195, OECD Publishing.

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