The Impact of Investment in ICT Sector on Foreign Direct Investment: Applied Study on Egypt

Amany Fakher
Associate Professor of Economics and International Trade.
Faculty of Commerce & Business Administration.
Helwan University, Cairo, Egypt.

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ABSTRACT

The world is rapidly moving from resource-based economy to knowledge-based economy. Globally, a new concept, known as "New Economy" was introduced which reflects on the rapid growth of information and communication technology (ICT). Now, ICT is the key driver for growth using many tools, one of which is FDI. This paper deals with the effect of ICT investments on economic development through its impact on foreign direct investment (FDI) both theoretically and empirically, it investigates the effect of ICT investments on FDI in Egypt during the period 1995-2013, within the hypothesis that, ICT investments have a positive effect on FDI. The results indicate that there is an insignificant positive relationship between ICT investments and FDI, the result can be related to the weakness of the ICT infrastructure in Egypt, which makes the technology in this stage the result of investment not a cause. Accordingly, we cannot ignore the traditional and non-traditional determinants of FDI, but the industrial wages (IWL) and good governance (GOV) may play a key role to support these determinants by acting as an umbrella to them. The results suggest the need for further developments in the Egyptian ICT sector and an increase of ICT investments.

Keywords: Information and Communication Technology (ICT) Investment, Foreign Direct Investment (FDI), New Economy.

1. INTRODUCTION

The world economy has been a much-change place in the twenty- first century, as the world is rapidly shifting from resource-based economy to knowledge based economy. In the knowledge global economy, information and communication is the main determinates of competitiveness for firms and countries rather than traditional determinates (Oshikoya & Hussain, 2000). The rapid progress in ICT and increase in economic globalization within international production network have created new opportunities for developing countries to participate in global production thereby helping these countries to increase competitiveness.

Globally, competitiveness does not only include economy liberalization but also the relative importance of ICT sector in the economy. Hence, there will be many challenges for developing countries to develop and maximize the benefit of ICT sectors in these countries. The characteristics of ICT sector are different from that of other sectors in the economy, especially in the competition, which continue to decline in products prices. Hence, developing countries must make efforts to reduce prices and improve efficiency in order to win and share in the world market (Hounie et al., 1999).

The United States was the first beneficiary from the ICT sector due to reduction in the barriers of trade, investment and high competition since the 1980s, which is important to lower the cost in the ICT sector.

During the last three decades, there are many studies that focus on examining the impact of ICT investment on economic growth, the results of these studies are mix and not well understood. On the other hand, there are few studies on the relationship between ICT investments and FDI flows. In the scope of globalization, the impact of ICT investments on FDI is of great importance in economic studies. Although, there is a causal relationship between ICT investment and FDI flows, the results from most studies on developed countries have found strong evidence that ICT investment has effect on FDI flows, while there is limited evidence on the effect of FDI on ICT investment, (Chandra, 2007).

The main objective of the present study is to provide an assessment of empirical evidence on the effects of ICT investments on development through its impact on FDI flows in Egypt, within the hypothesis that, ICT investments have a positive effect on FDI and the future flows of FDI largely depends on ICT investments.

Following the introduction, the rest of this paper is organized as follows: Section 2 provides the literature review and it is divided into two parts, the first deals with information technology and economic growth, the second explores the relationship between ICT investment and FDI. Section 3 provides trends of information technology globally and in Egypt, the empirical model of the study is presented in section 4, the results and discussion in section 5 and conclusions are given in section 6.

2. LITERATURE REVIEW
2.1 Information Technology and Economic Growth

Solow (1956) first mentioned the importance of technology as one of the determinants of growth beside traditional determinants represented in labor and capital. He further explained that labor and capital alone cannot achieve economic progress in any country and that the key source of growth is technological progress under the assumption of constant return to scale, diminishing returns to each input. The Solow model is known as the exogenous growth model because he did not explain where it came from or how it could be accelerated. Thus, Solow's model was an impossible tease.

Romer (1990) introduced technology as an endogenous variable. According to this model, human capital plays a key role as one of the factors of production, as capital accumulation directly leads to the accumulation of knowledge and theory which are key factors for growth. Unlike traditional growth theory, the model assumes increasing returns in the production of new ideas and some form of monopoly power to cover the cost of inventing new knowledge, also the technology increase investment return in the long run (Maré, 2004).

Since the 1990s, there are many studies that focused on the impact of technology on productivity (Hitt & Brynjolfsson, 1996; Van Ark, 2005; Chun & Nadiri, 2008) and on development and growth (Jorgenson & Stiroh, 1995; Mansell & Wehn, 1998; Pohjola, 2001; Papaiounnou & Dimelis,2007), the results of these empirical studies are different from those of developed and middle or low income countries. The results show that there is positive and significant effect of ICT on productivity, but less significant for most middle and low income countries (Pilat & Frank, 2001). In general, the ICT investment can influence economic growth through different channels; it allows

information flow, market expansion, more efficiency, increase productivity and then increase in new capital and foreign direct investment.

2.2 ICT AND FDI

For the past twenty years, there have been growing studies on the impact of ICT investment on FDI especially in developing countries. Most of the studies that examined the effect of ICT on FDI either take ICT directly as a location determinant for promoting investment or indirectly within the impact of ICT on other determinants that has impact on investments. This study is concerned with the impact of ICT on FDI as a tool to promote and attract investments.

Some studies which suggests that ICT encourages FDI depend on the increasing use of new ICT tools (e.g. internet users, internet hosts and mobile phone) which can pull more FDI by reducing the cost in search and through "just in time" managements that lead to reduction in production cost within increasing competition which increases productivity and more FDI (Gani & Sharma, 2003; Choi, 2003). Through, "just in time "the ICT has made positive impact on productivity and on FDI by reducing time lag between demand and production and making direct and continues link between producers and consumers (OECD, 2008). Also the positive impact of internet users on FDI can be explained through positive network externalities; that means new internet users can add value to the total value of all users as a result of decrease in the cost per user of network which clearly shows in applied studies on developed countries and some emerging countries; at the same time, it can explain the insignificant effect of ICT investment on FDI in many developing countries as a result of negative network externalities, which means that the increasing number of users leads to increase pressure on available connections, causing internet congestion (Ko, 2007).

Internet-based technology has become the key player for information in the world, investors depends on ICT (internet) for information services to know the best opportunities and location. The multilateral investment guarantee agency (MIGA) is a famous online services that is specialized in promoting FDI by offering all technical assistance for investors (opportunity of investment and measure of promotional activity, risks and offering insurance etc). MIGA is a cheaper and quicker source of providing investors with the information they need such as online tool and the millions of investment especially small and medium investments, in general it plays an important role of attracting FDI for all countries especially in developing countries. In recent years, the most important innovative tools used by investment promotion intermediaries (IPIs) which numbered more than 500 worldwide is concerned in offering marketing plan, aftercare program, disseminating information, researching on the internet, contacting relevant agencies and evaluating investment promotion campaigns. Now ICT can play a key role in investment promotion worldwide (OECD, 2008).

The revolution of ICT has changed the patterns of world trade, which in turn, has changed the patterns and trends of FDI in the economy world. Since the 1990s, the phenomenon of international fragmentation of production has expanded due to information technology revolution and technological innovations in communication which allows the division of the product into two or more steps in different locations and has led to the reduction in cost of transportation in trade of parts and components (Jones & Kierzkowski, 2001). The key player of trade in parts and components is multinational enterprises (MNEs) within vertical foreign direct investment (FDI). Since the mid 1990s, about two-third of the world trade involved MNEs through vertical

integration which can be achieved through intra-firm trade or arm's-length trade by contractual relations (Broadman, 2005). Most of the MNEs depend on the distribution of products between its different branches in different countries according to comparative advantage in these countries, where they get the lowest cost of goods production taking advantage of the international production network. All of these processes and transformations basically depend on progress in ICT which has contributed to reducing the cost of services link as an essential determinant for these investments.

On the other hand, increase in ICT investments also have impact on "horizontal FDI" taking advantage of the breadth of the market in host country especially in the big markets to produce manufacturers and services, where growing ICT is used to manage supply chain (Heshmati & Addison, 2003).

Indirectly, ICT can have effect on FDI through other determinants of FDI. Increasing ICT infrastructure and logistical support with reducing negative externalities of ICT tools will have effects on domestic and export markets, which can be considered as one of the attracting factors to export-oriented FDI. Also, the growth of internet has led to greater transparency, which is a key for good governance and reduction in corruption which has become one of the main determinants of FDI. In the democratic countries, the distribution of power is more transparent than protecting the rights of property owners and lowering FDI risk which increases the ability to attract FDI especially in developing countries (Louis et al., 2012).

The impact of ICT investment on FDI has become an important area of study. A lot of empirical studies have suggested the positive and significant impact of ICT on FDI in developing and developed countries (Heshamti & Addison, 2003; Gholami et al., 2003; Gani & Sharma, 2003; Louis et al., 2012; Leitao & Baptista, 2011; OECD, 2008; Chandra, 2007). Although, a lot of studies have suggested that ICT has a significant causal relationship with FDI, this conclusion is not shared by Heshmati & Addison (2003), the authors concluded that increase in ICT investment leads to increase in the FDI inflows, but the causal relationship between ICT and FDI is not clear in developed countries and the direction of the relationship goes from FDI to ICT in developing countries. They turned this result into ICT capacity in the countries, where developed countries already has a large ICT capacity which causes inflow of FDI compared to developing countries which need to build up the capacity of ICT to attract more FDI.

3. TRENDS OF INFORMATION AND COMMUNICATION TECHNOLOGY 3.1 Global Spending Trends of ICT

The world has become a much-changed place in the past six years since the release of Digital Planet in 2009. There is rapid growth and spread of ICT infrastructure by countries, public and private organizations. Global spending on ICT sector has been rapid since 2003 with the exception of 2009 which recorded a great decline of 3.0% for resetting the industry growth. However, the spending rates have increased again to 4.7 trillion dollars by a growth rate of 6.3% in 2013 (WITSA, 2010) (see Table 1).

Table 1: Global ICT Spending by US$ in Trillions and Percent Change

Year	US Trillions $	Percent Change
2003	2.4	-
2004	2.7	12.3
2005	2.9	7.8
2006	3.2	8
2007	3.5	6.8
2008	3.7	8.5
2009	3.5	-3
2010	3.8	7.4
2011	4.1	8.7
2012	4.4	7.3
2013	4.7	6.3

Source: WITSA (Digital Planet 2010).

ICT spending grew in all regions during the period 2004-2013. The exception was only during the recessionary period, where the global spending on ICT decreased by 3.0%, led by declines in the Americas (-4.4%), Europe (-6.9%) and increase in Asia-Pacific (+2.4%), Middle East (+6.6%) and Africa (+2.1%). As indicated in Table 2, the Americas grew at 5.9% per year from 2009 through 2013. Also, Europe region achieved a significant increase in spending on ICT sector. While Asia-Pacific posted a compound annual growth of 9.5% as a slower growth rate, the Americas maintain its little superiority over the other regions as the largest market for ICT product and services (34.6% in 2013). However, Asia-Pacific's share of the market raised from 28.8% in 2009 to 31.1% in 2013 (UN Report, 2011) (see Table 2).

Table 2: Global ICT Spending by Region (US$ in Trillions)*

Year	Americans	Asia-Pacific	Europe
2004	1.1	.7	.9
2005	1.2	.7	1
2006	1.3	.8	1.1
2007	1.3	.9	1.3
2008	1.4	1	1.4
2009	1.3	1	1.2
2010	1.3	1.1	1.4
2011	1.4	1.2	1.5

| 2012 | 1.5 | 1.3 | 1.6 |
| 2013 | 1.7 | 1.5 | 1.8 |

Source: WITSA (Digital Planet 2010).

*Due to the small size of the Middle East and African ICT markets relative to other   regions, these markets were aggregated with Europe for this table.

As a percentage of total GDP, ICT spending remained relatively stable from 2004 to 2006. From 2007, this percentage began to be negatively influenced by financial crisis which was influential on the decisions of investors and then on ICT spending as a percentage of GDP (see Table 3).

Table 3: ICT Spending as a Percent of World GDP (Percentage)

Years	(%)
2004	6.56
2005	6.56
2006	6.56
2007	6.20
2008	6.15
2009	6.28
2010	6.20
2011	6.40
2012	6.35
2013	6.30

Source: WITSA (Digital Planet 2010).

## 3.2 Global Development Trends of Information And Communication Technology

Figure 1 shows that there is a continuous increase in all indicators of global ICT development from 2001 to 2014. This increase concentrates on mobile telephone users which increase from 17 to 95.5 per 100 inhabitants and internet users which increase from 8 to 40.4 per 100 inhabitants. Developed countries occupy the largest households with Internet access in the world by 78.4% in 2014; while the percentage was 31.2 in developing countries in the same year (see Figure 2).

Figure 1: Global ICT development (2001-2014).
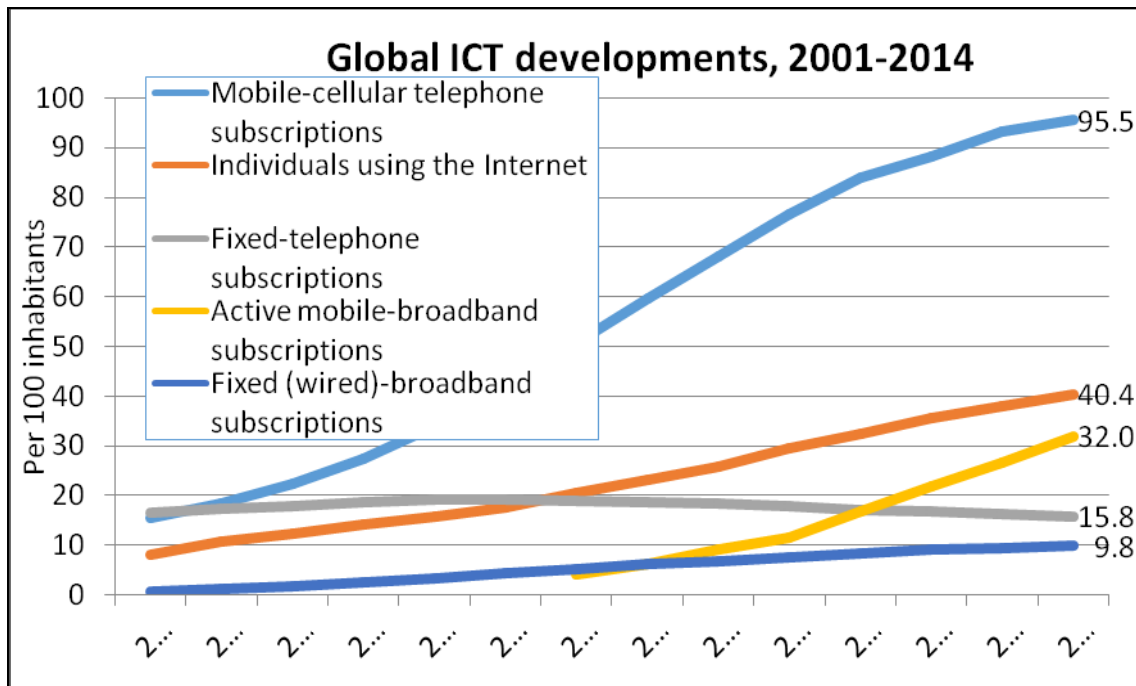
Source: ITU World Telecommunication /ICT Indicators database

Figure 2: Percentage of households with Internet access by level of development (2002-2014).
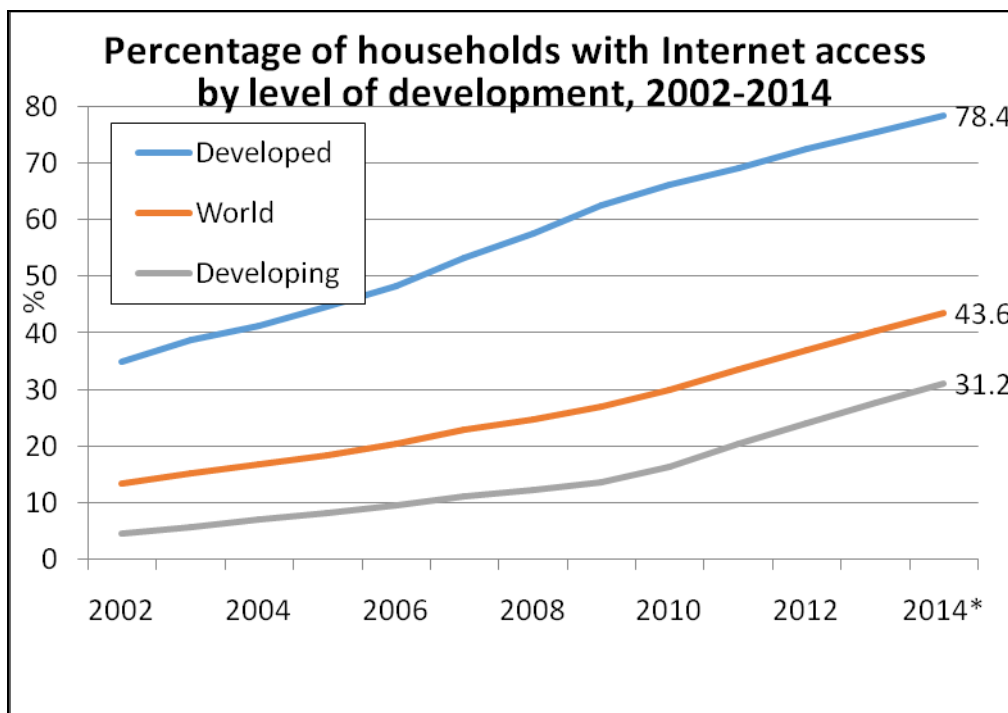
Source: ITU World Telecommunication /ICT Indicators database.

3.3 Egyptian Trends of ICT

Since the 1990s, the Egyptian ICT sector has been growing and the government has considered ICT sector as a key player for economic and social development, it has prepared several programs through various institutions (the Egyptian ministry of ICT, smart village, Cairo contact centers park) to create a competitive market in the ICT sector. On the other hand, the government is focused on development of human capital related ICT market' growing, also the government proceeded to the liberalization of the sector and didn't put restrictions on foreign capital participation in the sector. Egypt has achieved significant progress in information technology outsourcing (ITO) and Business Process Outsourcing (BPO) sectors. Egypt is ranked among the top 20 in Global Services Location Index (GSL), Egypt occupies the 10th position worldwide. The decline in the rank of Egypt from 4th in 2011 to 10th in 2014 shows that there was no noticeable change in the score due to the achievement of some countries with significant growth in ICT sector like Mexico, Indonesia, Brazil, Philippines and Thailand (Table 4). In A.T. Kearney's Global Services Location Index, Egypt is the leader in the Middle East and North Africa region and 10th worldwide.

Table 4: Global Services Location Index (GSLT), Top 20 Countries - 2014.

Rank	Country	Financial Attractiveness	People Skills & Availability	Business Environment	Total score
1	India	3.14	2.71	1.10	7.04
2	China	2.26	2.54	1.36	6.15
3	Malaysia	2.72	1.43	1.84	5.98
4	Mexico	2.67	1.61	1.61	5.90
5	Indonesia	3.15	1.56	1.16	5.87
6	Thailand	3.01	1.42	1.44	5.75
7	Philippines	3.06	1.48	1.21	5.65
8	Brazil	1.81	2.25	1.63	5.69
9	Bulgaria	2.99	0.97	1.66	5.62
10	**Egypt**	**3.20**	**1.36**	**1.06**	**5.62**
11	Poland	2.28	1.39	1.87	5.54
12	Vietnam	3.30	1.14	1.10	5.54
13	Chile	2.35	1.29	1.89	5.53
14	United States	o.49	2.88	2.15	5.53
15	Lithuania	2.73	0.93	1.87	5.52
16	Sri lank	3.30	1.05	1.16	5.51
17	Germany	0.94	2.13	2.39	5.46
18	Romania	2.74	1.15	1.56	5.45
19	United Arab Emirates	2.21	1.13	2.05	5.39
20	Jordan	3.11	0.91	1.36	5,34

Source: Global Services Location Index (GSL), 2014.

Until 1998, there were more concentration of ICT in the public sector in Egypt, it represent an average of 98.5% from total ICT GDP. In 2000, the private sector began to play an important role in ICT sector, where the growth rate reached 151% in 2000 compared to growth rate in the public sector, which amounted to 10% in the same year. From 2006, the growth rate of both public and private sectors was increased due to applications of the rules of liberalization officially according to the WTO agreement, followed by government strategies for the development of the ICT sector. Characterized by each sector, the ratio of GDP and growth rate showed relative stability from 2010 to 2014, with an average contribution of 66.5% to total ICT GDP in private sector and 33.5% in public sector (see Table 5).

Table 5: ICT GDP in public and private sectors in Egypt (1995-2014)

Year	ICT GDP of public sector (current price, million EGP)			ICT GDP of private sector (current price, million EGP)		
	ICT GDP	Growth rate (%)	Percentage of total ICT GDP	ICT GDP	Growth rate (%)	Percentage of total ICT GDP
1995/1996	2602	14.7	98.7	35	16.6	1.3
2000/2001	4140	10	82.4	882	151.2	17.6
2005/2006	6895	8.36	57.5	5115	40	42.5
2010/2011	13422	9.3	33.6	26597	6.5	66.4
2011/2012	13942	3.9	33.4	27779	4.4	66.6
2012/2013	14844	6.5	33.4	29663	6.8	66.6
2013/2014	16104	8.5	33.1	32485	9.5	66.9

Source: Ministry of Planning, Egypt, 2014.

The investment in ICT sector has witness an increase in Egypt since the mid-nineties and even in 2014, the total investment in ICT increased from 554 million EGP in 1994 to 21514 million EGP in 2014. During the period 1994-1997, while the private sector witnessed a "null growth rate", the public sector was responsible for investment in the ICT sector; the private sector started growing by a growth rate of 21.3% in 1998 which was doubled to 42.3% in the following year. The decrease in the rate of ICT investment in the public sector since 2007 was due to increase in the role and the importance of private sector in ICT, on the other hand, it is due to the political and economic instability in Egypt since 2011 (see Table 6).

Table 6: ICT investments amount and growth rate of Public and private sector in Egypt (1994-2014, Million EGP)

Years	Public sector investment in ICT				Private sector investment in ICT		
	Total ICT investment	Total ICT investment	Growth rate (%)	Percentage of total ICT investment	Total ICT investment	Growth rate (%)	Percentage of total ICT investment
1994/1995	554	554	-	100	0	-	0
1995/1996	645	645	16.42	100	0	0	0
1996/1997	745	745	15.50	100	0	0	0
1997/1998	1917	1512	103	78.8	405	-	21.2
1998/1999	2549	1469	-2.8	57.6	1080	166.7	42.3
1999/2000	2113	1604	9.2	76	509	-52.8	24
2000/2001	2761	1756	9.5	63.6	1005	97.4	36.4
2001/2002	2645	921	-47.5	34.8	1724	71.5	65.2
2002/2003	3177	1566	70	49.3	1611	-6.5	50.7
2003/2004	4880	2396	53	49.1	2484	54.2	50.9
2004/2005	6310	2026	-15.4	32.2	4284	72.4	67.8
2005/2006	7603	2260	11.5	29.7	5343	24.7	70.3
2006/2007	9631	814	-64	8.4	8817	65	91.6
2007/2008	13340	1566	92.4	11.7	11774	33.5	88.3
2008/2009	13964	2142	36.8	15.3	11822	0.4	84.7
2009/2010	19451	2195	2.5	11.3	17256	46	88.7
2010/2011	16922	728	-66.8	4.3	16194	-6.1	95.7
2011/2012	14157	479	-34.2	3.3	13678	-15.5	96.7
2012/2013	13097	427	-10.8	3.3	12670	-7.3	96.7
2013/2014	21514	747	75	3.4	20767	64	96.6

Source: Ministry of Planning, Egypt, 1994-2014.

Table 7 explains that there is a big difference in the volume of trade in information and communication technology goods in Egypt in both exports and imports since 2000. The export of information and communication technology goods has increased from 5 in 2000 to 88$ billion in 2008. On the hand, the import has increased from 582$ billion in 2005 to 1.951$ billion in 2008. The decreased in both export and import of ICT goods in Egypt in 2009 was affected by the global financial crisis, although there was heavy concentration in trade of ICT services (especially in export). In 2011, the increase of export resumed again but at low levels as a result of political and economic instability in 2011. In 2013, there was a significant increase in both

export and import, which is expected to double in the coming years in accordance with the strategic plan of communication and information (see Table 7).

Table 7: Trade of information and communication technology goods in Egypt (2000-2014).

Years	Export		Import	
	US$ in million	Percentage of total merchandise trade	US$ in million	Percentage of total merchandise trade
2000	5	0.11	582	4.17
2001	4	0.11	588	4.62
2002	5	0.11	517	4.14
2003	4	0,06	421	3.87
2004	13	0.17	427	3.33
2005	14	0.13	874	4.41
2006	14	0,03	867	4.21
2007	50	0.34	1.159	4.29
2008	88	0.17	1.951	3.70
2009	40	0,15	1.449	3.23
2010	36	0.14	1.987	3.75
2011	41	0.16	2.675	4.2
2012	40	0.15	2.976	4.9
2013	48	0.19	3.879	5.8
2014	62	0.25	4.674	6.2

Source: UNCTAD, update statistics on information and communication technology.

4. THE EMPIRICAL MODEL

The key question in this paper is the extent to which the empirical strategy discussed in the previous section can be good for capturing the partial effects of ICT investment on FDI flows in Egypt based on the theoretical background. The empirical model will be applied on the Egyptian case as specified in the following:

4.1 Dependent Variable

As mentioned above, the dependent variable can be measured by FDI through time series 1995-2013. In the paper represent FDI variable as the ratio of foreign direct investment to GDP.

4.2 Independent Variables

Many traditional factors have been considered in the literature as determinants of FDI like, market size, wage costs, trade barriers, export orientation, openness of developing host countries and other traditional factors. On the other hand, ICT is considered as the main new determinants of FDI, in addition to institutional factors as non-traditional determinants of FDI especially in developing countries.

There are six explanatory variables used to explain the expected changes in the dependent variable.

New factor-ICT investment: This is considered as the main new determinants of FDI. The world is rapidly moving on an economic system based on communication and information technology. The modern ICT infrastructure is not only important for economic growth, but also for participation in global market competitiveness for attracting new foreign direct investment (Gholami et al., 2003). Most of studies that examined the effect of ICT on FDI either take ICT directly as a location determinant for promoting investment or indirectly within the impact of ICT on other determinants that has impact on investments. A lot of these empirical studies suggested the positive and significant impact of ICT on FDI in developing and developed countries, which has been shown in the theoretical part of this study. Therefore, a positive relationship between ICT investment and FDI is expected.

GDP Per capita: The domestic market size is one significant variable which affects FDI in most empirical studies, from the impact of the economic growth rate as long as the foreign investor's goal is profit. On the other hand, the increase in growth rate encourages the FDI which makes the investor to sustain the continuity of its activity and the flow returns (Jun and Harinder, 1996). Therefore, a positive relationship between GDP per capita and FDI is expected.

Inflation Rate: The low rate of inflation is considered a magnet for foreign investor. Countries that have a low rate of inflation is expected to be more attractive to foreign direct investment, due to decrease risk of expense transactions of the foreign investor which will have effect on his expected profit. Also, inflation rate is one economic variable that reflects the economic instability in any country, which adversely affects the level of profitability and the decision of FDI. Therefore, a negative relationship between inflation rate and FDI is expected.

Industrial Wages: Industrial Wages is considered a magnet or the expulsion of the foreign investor. Higher wages reflect higher cost and decreased in the expected return of the foreign investor. Multinational companies prefer to invest in developing countries with low labor costs. Therefore, a negative relationship between *Industrial Wages* and FDI is expected.

Openness of the country: Openness in trade reflects the degree of openness of the country, which can be considered from the main traditional determinants of FDI. We represent a trade variable within the degree of openness in trade. It is defined as the ratio of the sum of exports and imports in Trade to GDP:

Openness in trade = (Exports + Imports) / GDP

Therefore, a positive relationship between openness of trade and FDI is expected.

Institutional indicators: The change in patterns and trends of production towards globalized production has begun to open the opportunities for developing countries to participate in global network production which attract more FDI. For these reasons, a lot of studies are interested on the impact of institutions on FDI especially in developing

countries as non-traditional variables which explain why investment is falling in many of these countries, although there is improvement in economic indicators. Bad quality institution increases the transaction costs loaded in exchange and increase uncertainty about contract and economic governance. We depended on governance index which was constructed for the World Bank by Kaufmann et al. (2002). Indicators from 17 different sources constructed by 15 organizations have been combined including six indicators for governance (Accountability, Rule of law, Control of Corruption, Political Stability, Government Effectiveness and Regulatory Quality). These variables are subjective measures of the Quality of Institutions. All indicator scores have been scaled from –2.5 to +2.5 (Kaufmann et al., 2008).

The true model can be specified in a single equation model as can be seen in the following equation (Eq. 1):

$$FDI_t = \alpha_0 + \alpha_1 ICT_t + \alpha_2 GDP_t + \alpha_3 GOV_t + \alpha_4 INF_{t-1} + \alpha_5 IWL + \alpha_6 OPE + \mu_t \quad (1)$$

Where FDI is the ratio of foreign direct investment to GDP, ICT for ICT investment, GDP stands for gross domestic product per capita (growth rate), GOV for governance indicators, INF for the inflation rate, IWL for Industrial wages, OPE for openness of trade and $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ are slopes coefficients with respect to the variables ICT, GDP, GOV, INF, IWL, and OPE respectively, α_0 is the intercept term, and μ is the disturbance (error) term. The linear form was chosen and OLS is the method of estimation.

5. RESULTS AND DISCUSSION

Table 8 presents the results of estimation influencing ICT investments on FDI in Egypt (1995-2013). The estimation results reveal that there is an insignificant positive relationship between ICT investments and FDI in Egypt during the estimation period. It means that the effect of ICT on FDI is weak and insignificant in Egypt; although, this result is contrary to hypothesis of the research, but it may be due to the weakness ICT infrastructures in Egypt particularly during the estimation period and this result is not different from the results for some other studies on developing countries, where these countries do not have enough ICT infrastructures to attract more foreign direct investment in such countries compared with developed countries.

Accordingly, we cannot ignore other determinants of FDI. GDP variable significantly explains the changes in FDI in the positive direction as the economic theory said, which may play an important role to support these determinants. The estimation results in Table 8 reveal that there is a significant positive relationship between good governance (GOV) and FDI, it means that increase good governance has opened up new opportunities for Egypt to attract more foreign direct investment and rise of competitiveness. As expected, the variable INF has a significant and negative effect on FDI. Industrial wages (IWL) play important role to support traditional determinants of FDI, it has a positive and significant effect on FDI. The importance of IWL variable can be seen in most of the developing countries which moves most of its foreign direct investment to the labor-intensive industries that make it more profitable for the company (such as the abundance of cheap raw materials and low

labor costs).Openness (OPE) may play a key role to support these traditional determinants, it has a positive and significant effect on FDI. Generally, the whole model seems to be significantly accepted based on the value of R^2 (0.87). In addition to the reasonable value of D.W, coefficient of about 1.9 means no autocorrelation or serial correlation.

Table 8: Results of Estimation (Eq, 1) the dependent variable is FDI from 1995-2013.

Variables	ICT	GDP	GOV	INF	IWL	OPE
Coefficient	(0.07)	(1.91)**	(1.76)***	(-0.92)*	(-0.84)***	(2.03)***
T-Statistic	1.07	2.12	3.45	-1.34	-3.15	3.16
$R2$	0.87					
D.W	1.9					

Note: t-statistics are in parentheses, and *, **, *** denotes significance at 10, 5, and 1%, respectively.

6. CONCLUSION

The revolution in information and communication technology (ICT) is moving the economics from resources-based economy to knowledge-based economy, then ICT is the key driver for growth using many tools, one of which is FDI. The objective of the present paper was to study the relationship between ICT investment and FDI in Egypt. ICT has become one of the most important tools affecting FDI either directly or indirectly within the impact of ICT on other determinants that has impact on FDI. Also, the investment in ICT has helped to increase the phenomenon of network production with Multinational Corporation, which takes place in parallel with the growth of ICT.

A model with FDI as a dependent variable and economic factors as independent variables is estimated, by introducing ICT investments as a new variable effect on FDI in Egypt during the period 1995-2013. Although, the paper investigates that there is a weak and insignificance relationship between ICT and FDI in Egypt, but due to the weakness of the ICT infrastructure in Egypt, which makes technology in this stage a result of investment and not a cause which is different from developed countries that owns ICT infrastructure helps to attract foreign investments, is supported by the results of empirical studies on both developed and developing countries.

At the same time, we cannot ignore traditional and non- traditional determinants of FDI like GDP, GOV, INF, OPE and IWL. The results were significant and consistent with the theoretical literature, the industrial wages (IWL) and good governance (GOV) were considered as the main determinants of FDI in the model.

Finally, there is a casual relationship between ICT investment and FDI which may be different in both developed and developing countries independent on ICT infrastructure in these countries. Although, the developing countries need to adopt development policies based on increase ICT infrastructure, it can also improve by encouraging vertical FDI.

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