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ICTs and the Economic Performance of MSMEs in Palestine

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Dedication

I'm certain that teachers have a positive role to play in the development of their students. However, at some point in life you must begin to listen to yourself; you must take the knowledge that you have been provided with and you must develop it further - you have to have the original thoughts. If you believe in yourself, if you have a dream and this dream is powered with passion and love for what you do, there is no way that you will not succeed.

When you finally arrive at the end of something you start to think about the beginning, you start to think of all the people who stood with you, and you start to feel that you should do something for them; something you believe will reflect the kindness they showed you. I have always been surrounded by good people from a great many nations, religions, philosophies, schools of thought and schools of economics. This diversity has added much to my knowledge, and I will always be grateful to them.

Thank you my family, my friends, my teachers and always thanks to you my God for everything. Thanks a lot.

Wajeeh Amer

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Abstract

At present, numerous Palestinian enterprises are facing the challenges generated by an increase in the availability of goods imported from foreign markets. These challenges come in addition to the difficult operating environment that has resulted from the occupation. In response to these hurdles, many Palestinian enterprises have begun to implement new strategies in order to enhance their competitiveness. One of these strategies is investment in Information and Communication Technology (ICT). In recent years, many Palestinian businesses have started to adopt ICT in their administrative activities, production processes and even in regards to their marketing and public relations. A key contributing factor to this trend has been the diffusion of ICT usage within the Palestinian Territories and a general improvement in the quality of the domestic ICT sector.

The primary objective of the proposed research is to develop a comprehensive understanding of the impact of ICT on the performance of enterprises (MSMEs) in Palestine. The project will include an assessment of how ICT is contributing to business development and the economic growth in Palestine more generally. Particular attention will be paid to the link between ICT and micro – small and medium Palestinian enterprises. A preliminary literature review indicates that several studies have already found a positive link between ICT adoption and the success of MSMEs. Indeed, it is almost universally acknowledged that there is a positive link between MSMEs, employment creation, poverty alleviation and economic growth.

Our descriptive and quantitative analysis of the data on the use of ICT in MSMEs in Palestinian enterprises shows that investment in ICT is one of the significant determinant of value added of enterprises among other input factors. However, investment in specific tools of ICT in our study does not have any significant impact on enterprise performance and in some cases has even a negative impact on it. The results indicate that there are substantial technical inefficiencies in Palestinian enterprises in the industrial sector. Given the existing technology, firms could increase their performance by around 2% if they used, or spent more on, ICT tools.

The proposed thesis will be organized as follows: section (1) will include an introduction and a summary of the study's objectives. Section (2) will contain an overview of the Palestinian economy in addition to an overview of the MSME sector and ICT sector. In Section (3) the theoretical framework, literature review, methodology, statistical results and concluding remarks are presented.

Chapter One

1.1 Introduction & Background

Information and Communication Technologies or ICT are identified as the tools, systems, operations, and processes that are concerned with the various kinds of data processing for the sake of extracting useful or meaningful information out of them to be used by people and institutions to achieve development.¹ ICT includes computer networks, the Internet and its applications, telecommunication technologies and systems both fixed and mobile and their applications.

The great expansion of ICT that has taken place during the last decade has set the stage for a new age of opportunities and challenges in many regions. ICT provides speedy, inexpensive and convenient means of communication. According to the World Bank (2006), “firms that use ICT grow faster, invest more, and are more productive and profitable than those that do not.”

ICT was expected to change the economic structure of nations, but any change in economic structure cannot be visible unless the noticeable technological changes are experienced in two major components of an economy, i.e. the manufacturing and the service sectors. The adoption of ICT technologies in many developed countries was found to have a positive effect on the organization's performance. But not all countries are taking advantage of this kind of revolution in the same way and at the same pace.

As is well known, micro, small and medium-sized enterprises (MSMEs) are major constituents of an economy and represent an important driver of employment creation and income generation for many low income households. The organizational and technological changes in these firms are expected to have significant impacts on national economies. Proponents of globalization argue that it will open a window of opportunities for MSMEs while the networking capabilities of ICT suggest that MSMEs can augment their competitiveness in global markets.

Several studies (Lal, 2004, Drew, 2003) have found positive impacts of the adoption of ICT by MSMEs. The positive link between MSMEs and employment creation, poverty alleviation and economic growth is universally acknowledged (Beyene, 2002). This fact is largely applicable to Palestine as well.

In general, ICT can be of significant benefit to enterprises as it can be used to stay in contact with outside spheres and assist in keeping track

¹ PCBS definition of ICT.

of customers and suppliers. ICT opens up huge marketing opportunities by enlarging the market size, increasing the competitiveness and quality of services, and staying informed about competitors and suppliers. ICT enhances operation efficiency in enterprises and interaction with other bodies and agencies, in addition to providing better accountability and efficiency. ICT is also known to be a very effective means of cost saving and controlling expenses.

In the Palestinian context, ICT has also a special role to play in breaking up the barriers and blockades imposed on Palestinians by the Israeli authorities, without which communication with the outside world would be impossible, and extremely difficult to synchronize activities and cooperate.

More importantly, with the onslaught of globalization, the challenges facing the SME sector are ever-growing and getting more and more complicated. MSME's flexibility and adaptability are key determinants when taking advantage of the promises of globalization. More particularly, usage of ICT and technology upgrading is paramount to competitiveness and achieving optimum efficiency. Assessing the impact of ICT on economies and societies is critical to national and International ICT policymaking. Much of the interest in developing an ICT industry, or promoting use of ICT by businesses and individuals, has been based on the potential of ICT to improve productivity and economic growth, and provide social benefits.

At present, numerous Palestinian enterprises are facing the challenges generated by an increase in the availability of goods imported from foreign markets. These challenges come in addition to the difficult operating environment that has resulted from the occupation. In response to these hurdles, many Palestinian enterprises have begun to implement new strategies in order to enhance their competitiveness. One of these strategies is investment in Information and Communication Technology (ICT). In recent years, many Palestinian businesses have started to adopt ICT in their administrative activities, production processes and even in regards to their marketing and public relations. A key contributing factor to this trend has been the diffusion of ICT usage within the Palestinian Territories and a general improvement in the quality of the domestic ICT sector.

However, most studies on the economic impact of ICT focus mainly on a limited number of developed countries. Most of these studies have been undertaken to analyze productivity gains of the economy at large or at the sectorial level, but few studies have tried to analyze the impact of ICT at the firm level. Very few studies have tried to analyze the impact of ICT on the economies of developing countries. The main reason is that the underlying data necessary to carry out these studies is not available

(Abdelkader, 2006). Available data on ICT adoption is still rough in developing countries, especially at the enterprise level. However there is relatively little empirical data pertaining to MSMEs in Palestine and more particularly regarding the extent to which they have adopted ICT in their businesses.

1.2 Objectives of the Study

The primary objective of this research is to develop a comprehensive understanding of the impact of ICT on the performance of enterprises (MSMEs) in Palestine. The project will include an assessment of how ICT is contributing to business development and economic growth in Palestine more generally. Particular attention will be paid to the link between ICT and micro, small and medium Palestinian enterprises. A preliminary literature review indicates that several studies have already found a positive link between ICT adoption and the success of MSMEs. Indeed, it is almost universally acknowledged that there is a positive link between MSMEs, employment creation, poverty alleviation and economic growth.

The thesis will be organized as follows: section (1) includes an introduction and a summary of the study's objectives. Section (2) contains an overview of the Palestinian economy in addition to an overview of the MSME sector and ICT sector. In Section (3) the theoretical framework, literature review, methodology, statistical results and concluding remarks are presented.

Chapter Two

2.1 Overview of the Palestinian Economy:

The Palestinian economy has witnessed many ups and downs, mainly due to the general political situation, which has had a large impact on economic activity.

Palestine experienced rapid economic growth between 1994 and 1999, with GDP Growth averaging over 10% per year. Growth slumped following the outbreak of violence in 2000, with the Palestinian economy experiencing one of the worst recessions in modern history², GDP growth declined sharply during the peak years of the 2nd Intifada, 2000-2002. However, it resumed growth in 2003 and by the end of 2005, GDP increased by 6%. Therefore, GDP growth was well below potential despite substantial foreign aid and institutional reforms carried out by the Palestinian Authority within the framework of the PRDP. The continued isolation of the occupied Palestinian territory under a tight Israeli closure policy and blockade of Gaza has further fragmented the economy. As a result, real GDP is estimated to have grown by only 2 per cent in 2008, leading to a 1.2 per cent decline in per capita GDP. The cumulative effect is a 34 per cent drop in real per capita GDP between 2000 and 2008.

The figures in Table (1) illustrate the main indicators for the Palestinian economy. However, According to the Palestinian Central Bureau of Statistics (PCBS), in 2008, the total population of the West Bank & Gaza was 3,831,646.

Table 1: Main Indicators in Palestinian Economy

| Indicator | 1999 | 2002 | 2005 | 2006 | 2007 | 2008 |
|--------------------------------|---------|---------|---------|---------|---------|---------|
| Gross Domestic Product (GDP) | 4,511.7 | 3,264.1 | 4,559.5 | 4,322.3 | 4,535.7 | 4,639.7 |
| Growth rate % | 8.8 | (13.3) | 8.6 | (5.2) | 4.9 | 2.3 |
| GDP Per capita | 1,612.3 | 1,070.0 | 1,387.2 | 1,275.4 | 1,297.9 | 1,289.9 |
| Goods Imports | 3,271.4 | 2,423.8 | 2,466.5 | 2,203.8 | 2,093.0 | - |
| Goods Exports | 635.4 | 341.8 | 457.5 | 535.2 | 518.3 | - |
| Unemployment Rate | 11.8 | 31.3 | 23.5 | 23.6 | 21.5 | 26.0 |
| Inflation Rate (%) | 5.54 | - | 3.48 | 3.76 | 1.86 | 9.89 |
| Poverty Rate (%) | 21 | - | 51.5 | 56.8 | 60.1 | - |
| Budget surplus (deficit) after | 28 | (259) | (275) | 34 | 61 | 270 |

Source: MAS, PCBS, PMA 2009.

- Figures between brackets are in Minus.

The contribution of different economic activities to employment has been almost the same since 1999. One third of Palestinian employees are centered in the service sector, while the manufacturing and

² World Bank (2004) Disengagement, the Palestinian Economy and the Settlements, Jerusalem: World Bank.

construction sectors contributed about 12.5% and 11.0% respectively across the same years. The contribution of the agricultural sector to employment has averaged around 15%. On the other hand, the unemployment rate remains high; reaching 26% in 2008 compared with 11.8% in 1999.

The Palestinian economy is traditional in nature and centered on services, agriculture, and some industrial activities. Olives, cereals, citrus, and vegetables are the main agricultural products, with sheep and goats being the principal livestock. Processing of food, textiles, stone cutting and granite are some of the main industries.

Table 2: Percentage contribute of Economic Activity in GDP

| Economic Activity | 1999 | 2002 | 2005 | 2006 | 2007 | 2008 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| Agriculture and fishing | 10.4 | 7.7 | 5.2 | 5.6 | 5.6 | 4.6 |
| Mining, manufacturing, electricity and water | 14.6 | 16.4 | 17.0 | 15.0 | 13.8 | 13.6 |
| Construction | 13.7 | 3.9 | 6.8 | 7.2 | 6.2 | 4.9 |
| Wholesale and retail trade | 11.0 | 11.9 | 9.4 | 9.6 | 9.2 | 10.8 |
| Transport | 5.1 | 5.6 | 5.8 | 6.6 | 7.5 | 8.9 |
| Financial intermediation | 3.7 | 4.2 | 4.4 | 4.3 | 5.2 | 5.4 |
| Other services | 19.5 | 23.5 | 23.0 | 19.6 | 22.2 | 25.2 |

Source: MAS, economic and social monitor, Vol.17, 2009.

2.2 Industrial sector:

The industrial sector witnessed numerous changes between 1994 and 2008, which greatly affected the key components and indicators of such a vital sector in the Palestinian economy. The industrial sector in the Palestinian economy diminished overtime, this is evident in the decline of its share of GDP and employment. In general, the average size of an industrial establishment increased in terms of value added and employment. Also, the share of value added out of output increased overtime which indicates an improvement in the productive efficiency. Labor productivity has increased over time; however, it sharply fluctuates depending on the political circumstances.

The Industrial Sector's share of Palestinian GDP was estimated at 14% in mid 2008 and its share of total employment at 12.3%. The Annual productivity in the industrial sector in Palestine was \$20,863, while annual compensation per worker in this sector stood at \$4,328. Within the industrial sector, annual productivity in textiles was \$31,400, in food and beverages \$17,462, and in mining and quarrying \$45,259.

Table 3: Number of Enterprises by Economic Activity, 2003-2007.

| Economic Activity | Year | | | | |
|--------------------------------------|--------|--------|--------|--------|---------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| Industrial | 14,839 | 13,468 | 13,344 | 12,909 | 15,340 |
| Financial Intermediation | 478 | 467 | 468 | 469 | 844 |
| Construction | 391 | 704 | 644 | 570 | 627 |
| Transport, Storage and Communication | 551 | 874 | 869 | 823 | 1,215 |
| Services (Profit & Nonprofit) | 13,077 | 18,895 | 20,099 | 19,967 | 24,655 |
| Wholesale, Retail Trade and Repair | 41,365 | 53,420 | 55,024 | 54,862 | 59,253 |
| Total | 70,701 | 87,828 | 90,448 | 89,600 | 101,934 |

Source: PCBS, Palestine in figures, 2007-2008.

2.3 Characteristics of MSMEs ³ in Palestine:

Generally, MSMEs exhibit a combination of characteristics that enable them to integrate with other enterprises within the various economic sectors, Such as flexibility, the ability to adapt quickly, ease of establishing an enterprise, family ownership, and simple and straightforward management. However, the economic and social roles of MSMEs are integral to the Palestinian economy and make up the vast majority of Palestinian enterprises.

According to the Palestine Central Bureau of Statistics (PCBS) ⁴ and the definition of MSMEs used in this study, 99% of economic enterprises in Palestine are MSMEs. Most of these are conventional in nature, operate in light industries, primary consumption and goods production (mainly food products, clothing, non – metallic products, and furniture).

In 2007, there were 132.8 thousand enterprises; Operating enterprises represented 88% of the total number of enterprises. Of 116 thousand operating enterprises, there were 82.8 thousand in the West Bank and 33.9 thousand in the Gaza Strip. 91% of the operating enterprises are in the private sector.

In regards to the absorptive capacity of MSMEs, 90% of private sector, civil society and government enterprises employ 4 workers or less. 7% employ 5-9 workers, 2% employ 10-19 workers, leaving large enterprises with the remaining 1%. The following table shows the distribution of MSMEs in Palestine by the main economic activities and categories of employment size of 2007.

³ We will use number of workers in enterprises as definition of size of firm, Micro enterprises which hire less than 4 workers, Small enterprises hire between 4 to 9 workers, and the Medium one contains 10 up to 19 works.

⁴ PCBS, establishment's census, 2007.

Table 4: Main Economic Indicators of MSMEs in Palestine, 2002-2007.

(Value in US \$ 1000)

| Indicator | year | | | | | |
|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
| No. of Enterprise | 67,073 | 65,599 | 81,180 | 75,304 | 71,966 | 92,589 |
| No. of Persons Engaged | 193,842 | 186,836 | 229,979 | 215,865 | 197,203 | 239,157 |
| Compensation of Employees | 376,221.2 | 382,555.8 | 488,908.2 | 484,085.6 | 495,536.1 | 612,482.5 |
| Output | 1,984,232.7 | 2,316,062.5 | 3,107,387.3 | 2,993,787.6 | 3,197,592.2 | 3,995,480.9 |
| Intermediate Consumption | 918,341.8 | 972,104.1 | 1,346,995.4 | 1,295,824.1 | 1,240,602.5 | 1,639,637.6 |
| Value Added | 1,065,890.9 | 1,343,958.0 | 1,760,391.7 | 1,697,963.5 | 1,956,989.5 | 2,355,843.3 |
| G.F.C.F | 37,727.7 | 41,194.8 | 142,362.0 | 73,704.4 | 88,618.8 | 196,516.8 |

Source: PCBS, Economic Surveys, 2002-2007.

Table (5) details the distribution of enterprises according to employment size across different sectors. A large percentage of the enterprises with an employment size less than 5 are centered in the retail and whole sale sectors, and the majorities of them are shops selling different kinds of goods, and are scattered in markets within cities and towns, owned and operated by the owner and his family members. Enterprises with 10 or more employees are found primarily in the service sector, then financial and construction, followed by the remaining sectors.

Table 5: Percentage Distribution of Enterprises by Employment size and Economic Activity, 2007

| Economic Activity | year | | | Total |
|-----------------------------|------|------|------|-------|
| | 0-4 | 5-9 | 10+ | |
| Industrial | 77.1 | 15.1 | 7.8 | 100 |
| Construction | 66.6 | 21.2 | 12.2 | 100 |
| Retail and Wholesale | 95.2 | 3.8 | 1.0 | 100 |
| Transport and Communication | 86.5 | 8.7 | 4.8 | 100 |
| Financial | 66.6 | 20.8 | 12.6 | 100 |
| Services | 70.2 | 11.8 | 18.0 | 100 |
| Total | 89.5 | 7.1 | 3.4 | 100 |

Source: PCBS, Palestine in figures, 2007-2008.

2.3.1 MSMEs in Industrial Sector

The total number of industrial establishments in operation reached 15,340 in 2007. Over 75% of these establishments are located in the West Bank and the remaining are in the Gaza Strip. This number represents 13.2% of the total number of establishments across all economic sectors. In addition, industrial establishments are distributed according to firm's size as following: 77.4% are employing 4 workers or less, 14.7% employ 5-9 workers, 6% employ 10-19 workers, leaving large enterprises with the remaining 1.9%.

2.4 ICT sector in Palestine:

Information and Communication Technology is one of the fastest-growing sectors in the Palestinian Territory, mainly thanks to private telecommunications services. The growth rate of this sector has averaged 25–30% annually since 2000.

Before the creation of the PNA, telecommunications infrastructure and services in the Palestinian territories were in a very poor state, due to underinvestment, neglect, and Israeli restrictions. Since the mid-nineties, however, the ICT sector has developed rapidly. The Palestine Telecommunications Company (PALTEL) was established in 1995 and Pal-Cell (Jawwal) was set up in 2005 to provide mobile phone services. In 2008, the number of telephone lines was approximately 357,509. Meanwhile, Jawwal counted 1,400,000 subscribers by 2008⁵.

The Palestinian ICT sector has strengths in terms of competitive labor cost and positive sector growth rates despite the political situation. The Palestinian private sector, as well as consumers, responds quickly to technological offerings. The size of the Palestinian ICT market is a modest one compared to neighboring countries, however it has been growing steadily for the past 10 years. Estimates of the ICT market was at a value of about US\$120 million in 2000, then it dropped to US\$87 million in 2003 only to rebound in 2007 to US\$ 250 million.

Moreover, there are around 300 enterprises working in the ICT sector⁶, which is considered the fastest growing sector in the economy.

2.4.1 ICT Economic Indicators:

The value added of the ICT sector - ICT share of Gross Domestic Product (GDP) - has been growing significantly for the past 10 years. Its grown from about \$87 million in 2000 to about \$330 million in 2007, The average annual ICT value added has been around (8%) with some years showing a growth of over (50%). Moreover, its contribution to GDP has been growing from about (3%) in 2000 to reach (5.32%) in 2007. The growing performance of the sector has been achieved under very sever political and economic conditions. Table (6) provides data on the contribution of the ICT sector from 2000-2007. Comparing the above figures with the reported contribution of other sectors to GDP, it becomes clear that the ICT sector is at a comparable level in terms of economic importance to the agricultural, construction and financial intermediation sectors. Moreover, the causal relation that exists between the ICT sector and other sectors suggests that growth in these sectors would positively contribute to the growth of the ICT sector.

5 PalTel Group, Annual Report, 2008.

6 The Palestinian ICT Sector, A three- year outlook based on economic indicators, PITA, May 2009.

Table 6: Main Indicators for ICTs in Palestinian Territories ⁷

(Value in US \$ 1000)

| Economic Indicators | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| No. of Persons Engaged | 2,305 | 2,196 | 1,886 | 2,205 | 2,743 | 2,782 | 3,058 | 4,347 |
| Output | 128,120.6 | 136,039.9 | 143,874.1 | 169,530.2 | 193,670.2 | 127,805.9 | 268,383.7 | 380,013.9 |
| Gross Value Added | 87,010.5 | 123,264.1 | 133,282.8 | 156,632.9 | 177,433.0 | 98,444.2 | 216,676.7 | 330,464.2 |
| Number of Main Telephone Lines | 272,211 | 255,218 | 241,894 | 243,494 | 271,458 | 337,025 | 312,999 | 348,788 |
| Number of Palestinian Cellular phone "Jawwal" Subscriptions | 85,000 | 175,941 | 251,602 | 264,091 | 436,628 | 567,584 | 821,800 | 1,021,481 |
| The Number of Main Telephone Lines Per 100 Inhabitants | 9.1 | 8.1 | 7.3 | 6.3 | 7.9 | 9.4 | 8.7 | 10.0 |
| The Number of Mobile Per 100 Inhabitants | 2.6 | 5.2 | 7.1 | 7.1 | 11.8 | 14.8 | 20.7 | 35.9 |
| Percent contribution to GDP | 3.0% | 3.11% | 3.16% | 3.43% | 4.65% | 4.27% | 5.05% | 5.32% |

Source: PCBS, Economic Surveys, 2002-2007.

2.4.2 Indicators of the spread and usage of ICT in Business:

According to the survey data⁸, 21.3% of economic enterprises in the Palestinian Territory used computers in the year 2007. Noticeably, the highest rate for computer use was 83.0% for enterprises that had ten employees and over. On the other hand, the rate for enterprises with 0-4 employees was 16.4% and for enterprises with 5-9 employees was 43.2%. Moreover, 12.7% of the total number of enterprises accessed the internet. 67.8% of the enterprises that used computers accessed the internet.

Table 7: List of Selected Indicators, 2007

| Indicator | Percentage |
|--|------------|
| Percentage of Enterprises Using Computer | 21.3 |
| Percentage of Enterprises Using Internet | 12.7 |
| Percentage of Enterprises Using Electronic transactions | 2.3 |
| Percentage of Enterprises with (IT) Department | 1.2 |
| Number of Computers in Enterprises Per 100 Employees | 24 |
| Number of Telephones Per 100 Employees | 28 |
| Number of Mobile Phones Per 100 Employees | 40 |
| Number of Employees Who Are Using Computer Per 100 Employees | 22 |
| Number of Employees Who Are Using the Internet Per 100 Employees | 15 |
| Number of (IT) Specialist Per 100 Employees | 3.5 |
| Total Expenditure (USD in thousands) on (ICT) Services | 175,282.9 |

Source: PCBS, Business Survey on ICT Main Findings, 2007.

⁷ Source: <http://www.pcbs.gov.ps>⁸ PCBS, Business Survey on ICT Main Findings, 2007.

Survey findings showed that the rate of enterprises, which carried e-commerce transactions via the internet was 2.0% via the internet and 0.4% via networks of the total number of enterprises. Additionally, data showed that 9.8% of the enterprises that used computers and internet carried out commercial transactions (sales) via the internet.

Chapter III

3.1 Theoretical and Empirical Issues

It is widely believed that ICT is a powerful enabler of economic development. ICT can be even more supportive if initiatives are designed to target specific, measurable goals. ICT has proven to be the key technology of the past decade. Moreover, ICT has become a fact of economic life in all economies all over the world. Almost all firms are now using computers and most of them have an Internet connection in addition to fixed or mobile phones.⁹ The widespread diffusion of ICT tools (such as: the Internet, mobile and broadband networks) demonstrates how important this technology has become.

MSMEs, in general, use ICT both as an input in the production process, and in the transaction process. A large proportion of these firms use computer networks for economic purposes, such as selling their products or acquiring inputs of goods and services. However, despite the widespread diffusion of ICT, questions remain about how precisely ICT affects the economic performance of companies, specifically, MSMEs.

Pilat (2004) argues that there are three effects of ICT on productivity and growth: First, as a capital good, investment in ICT contributes to overall capital deepening and therefore helps raise labor productivity. Second, rapid technological progress in the production of ICT goods and services may contribute to more rapid multifactor productivity (MFP) growth in the ICT-producing sector. And third, greater use of ICT may help firms increase their overall efficiency, and thus raise MFP. Greater use of ICT may also contribute to network effects, such as lower transaction costs and more rapid innovation, which will improve the overall efficiency of the economy.

Additionally, ICT can influence the performance of an enterprise in many ways, such as labor productivity, return on investment and market expansion (S. K. Chowdhury, S. Wolf, 2003). ICT can enhance an enterprise's performance through indirect and direct cost. Thus, In the long run, ICT may have an even bigger impact as it can completely restructure the production process and transaction methods, increase flexibility and improve outputs. Indeed, ICT has the potential to improve seller-buyer communications. As a result, MSMEs can integrate themselves into the global market, and as a consequence, demand for a particular product becomes less dependent on local market conditions. Taking into account that both the input and output markets in developing countries are characterized by imperfect and asymmetric

⁹ Increased use of ICT over time can be observed in case of SMEs of our sample as well as we have seen in the previous chapter.

information. As a result, ICT—particularly the Internet—can change the way that seller-buyer matches are made, and the output of SMEs may become less dependent on local market conditions.

The benefits of ICT for a firm include savings in inputs, general cost reductions, higher flexibility and improvements in product quality (Spyros, 2004). ICT is used to help firms acquire the information needed to change the technology of production and optimize the acquisition and use of factor inputs.

Adopting ICT results in a more effective use of time (Kajogbola, 2004); it contributes significantly to closing communication gaps. ICT saves time and space in the sending and retrieving of information both within and across diverse organizations. ICT provides faster response to market needs and allows more flexibility in product design, production and equipment delivery.

The firm-level evidence also suggests that the uptake and impact of ICT differs across firms, varying according to characteristics such as the size of the firm, the age of the firm, activity, etc...(Pilat, 2004).

Empirical evidence shows that the effects of ICT on a firm's performance in the context of developed and developing countries is, at best, mixed. Studies with firm-level data often find the strongest evidence for the economic impacts of ICT. However, some recent enterprise-level studies in the US have reported positive effects of ICT on the performance of firms (Brynjolfsson and Hitt ,2000).

Analysis of Australian firms also found that the association between ICT use and productivity growth at the industry level was clearest in finance & insurance. Importantly, the firm-level econometric analysis found positive links between ICT use and productivity growth in all the industry sectors that were examined (Gretton, Jyothi and Parham, 2002).

Analysis conducted in Germany and the Netherlands indicates that ICT capital deepening raised labor productivity in firms operating in the service sector (Hempell, Leeuwen and Henry, 2004).

In Canada strong evidence has been found that the use of ICT is associated with superior performance (J. Baldwin, D. Sabourin and D. Smith, 2004). In particular, greater use of advanced information and communication technologies was associated with higher labor productivity growth during the nineties.

In Switzerland (S. Arvanitis, 2004) a firm's labor productivity is closely correlated with ICT use. Moreover, the use of the Internet was found to be less important for firm performance in manufacturing than in the

service sector, presumably because many manufacturing workers do not perform a desk job and are not equipped with a PC and an Internet connection.

In Finland there is strong evidence for the productivity enhancing impact of ICT (M. Maliranta and P. Rouvinen, 2004). This effect is much higher in younger firms and in the ICT-producing sector, notably ICT-producing services. Overall, the higher productivity induced by ICT seems to be somewhat greater in services than in manufacturing. Manufacturing firms benefit in particular from ICT-induced efficiency in internal communication, which is typically linked to the use of local area networks (LANs), whereas service firms benefit from efficiency gains in external (Internet) communication.

Empirical evidence of the effects of ICT on small enterprises in developing countries is very limited partly due to data problems.

Similar to the analysis of industrialized countries, some recent studies on SMEs in the manufacturing sector of India have reported a positive link between ICT-capital stock and productivity (Müller, D.2002) and between ICT adoptions and export performance (Lal, 1996).

Findings of the paper on the use of ICT and its impact on the economic performance of SMEs of three East African countries: Kenya, Tanzania and Uganda suggest that, the diffusion of ICT among East African MSMEs is both industry and country specific. The empirical findings suggest that investment in ICT has a negative impact on labour productivity and a positive impact on general market expansion. However, such investment does not have any significant impact on enterprises' return, nor does it determine enterprises exporter (non-exporter) status (Chowdhury and Wolf, 2003).

In Tunisia (R. Mouelhi, 2009) the results confirm the presence of positive returns to ICT capital and the impact of ICT on efficiency is strong. The results and evidence show that achieving benefits from investment in ICT requires complementary investments and changes in human capital.

3.2 Methodology:

Over the past years, much progress has been made in developing statistics methods for measuring the use of various ICT technologies in the economy. A number of alternative methods have been proposed to measure technical efficiency of production units. In addition, many countries have developed databases that provide detailed and comprehensive data on the performance of individual firms. The impacts of ICT are estimated by their contributions towards enhancing

the efficiencies in the utilization of existing factor inputs and technology. We assume that the performance of a firm can be decomposed into performance stemming from ICT and performance resulting from other factors such as labor and capital.

Thus, the Cobb-Douglas form was chosen to characterize Palestinian MSMEs by industrial sector. Moreover, the bulk of data used in this study is obtained from the PCBS which conducted a survey on ICT access and usage among Palestinian enterprises in 2007, linked with data from the Economic Surveys Series 2007, with a greater focus on the industrial sector.

The analysis clarifies the link between expenditure on ICT and the added value of firms and whether there is a relationship between them or not, and what the impact is of this relationship.

Moreover, we will analyze the answers of firms to the following questions:

- 1 - What is the main purpose of using ICT?
- 2 - What is the main reason for not using ICT?
- 3 - What benefits from using ICT in Transaction did firms find?
- 4 - Did firms include ICT development items in their Budget for the year 2008?

3.3 The Economic Model and Hypothesis:

The Cobb-Douglas form was chosen to characterize Palestinian MSMEs in the industrial sector:

$$Y = L^{\alpha_1} K^{\alpha_2} ICT^{\alpha_3}$$

Y = Value added

L = size of firm

K = capital

ICT = expenditure on ICT equipment and services

In order to investigate the equation econometrically, we transformed it into a linear model by taking logs of both sides. A Simple rearrangement yields the empirical model:

$$\ln Y = \alpha_1 \ln L + \alpha_2 \ln K + \alpha_3 \ln ICT$$

Where small letters denote the corresponding logarithms, we will use the data to find the correlation between uses of ICT and its impact on the economic performance of MSMEs, by testing these hypotheses:

1. There is no relationship between expenditure on ICT and the Value added of firms according to firm's size.

$$H_0 = \alpha_3^{mi} = \alpha_3^s = \alpha_3^{me} = \alpha_3^l = 0$$

Where *mi* donates micro firms which contain less than 4 workers, *s* donate small firms (between 5 and 9 workers), *me* donates medium firms (between 10 and 19 workers) and *l* donate large firms which have more than 20 workers.

2. There is no relationship between expenditure on different tools of ICT and the Value added of firms according to firm's size.

$$H_0^{fix} = \alpha_3^{mi} = \alpha_3^s = \alpha_3^{me} = \alpha_3^l = 0$$

$$H_0^{Mob} = \alpha_3^{mi} = \alpha_3^s = \alpha_3^{me} = \alpha_3^l = 0$$

$$H_0^{inter} = \alpha_3^{mi} = \alpha_3^s = \alpha_3^{me} = \alpha_3^l = 0$$

$$H_0^{PCs} = \alpha_3^{mi} = \alpha_3^s = \alpha_3^{me} = \alpha_3^l = 0$$

Where *fix* donates the total amount of expenditure on fixed telephones, *Mob* donates the total amount of expenditure on Mobile telephones, *inter* denotes the total amount of expenditure on Internet access and *PCs* the total amount of expenditure on Computers.

3.4 Data and Descriptive Analysis:

The data used in the analysis is taken from the Palestinian Central Bureau of Statistics (PCBS) which conducted a survey on ICT access and usage among Palestinian enterprises in 2007. The sample represents the enterprise activity of 2,579 enterprises. The sample was further divided into six categories; industrial, construction, whole sale and retail, transportation and communication, financial intermediation, and services. In our research we will focus more on the industrial sector. We excluded other firms that operate in sectors other than the industrial sector and combined this data with data from Economic Surveys Series 2007, which was also conducted by the PCBS and covers the main indicators for economic activities taking place in the Palestinian Territory. We ended up with 544 firms working in the industrial sector in 2007; they were distributed as follows:

Table 8: sample distribution according to Firm size

| size of firm | Frequency | Percent |
|--------------|-----------|---------|
| 1-4 | 171 | 31.4 |
| 5-9 | 126 | 23.2 |
| 10-19 | 100 | 18.4 |
| +20 | 147 | 27.0 |
| Total | 544 | 100 |

3.5 Econometric Results and Discussion:

3.5.1 Use of ICT in Businesses:

Before we explore the relationship between expenditure on ICT and the economic performance of Palestinian industrial enterprises, it is useful to describe the diffusion of ICT, which is defined as the degree to which information and communication technologies are adopted by enterprises.

In our sample, the possession of information and communication technologies or access to ICT is, on the whole, directly proportional to enterprise size, which is indicated in our case by the total number of employees. Table (9) illustrates this observation.

Table 9: Percentage Distribution of ICT tools by Employment Size

| ICT Tools | Employment Size | | | |
|-------------------------|-----------------|------|-------|------|
| | 0-4 | 5-9 | 10-19 | +20 |
| Fixed Phone line | 49.7 | 46.3 | 86.0 | 95.9 |
| mobile | 78.9 | 84.1 | 86.0 | 95.2 |
| PCs | 14.6 | 37.3 | 62.0 | 83.0 |
| Internet connection | 9.4 | 23.8 | 45.0 | 66.0 |
| Total no of enterprises | 171 | 126 | 100 | 147 |

Note: numbers are percentage.

The trend is quite apparent; the larger the enterprise the higher its ICT diffusion. In our sample, the average fixed line and mobile diffusion among enterprises is relatively high. The typical fixed line usage is 72.2%, whereas mobile usage is on average at 85.8%. Mobile access is almost flat among enterprises regardless of their sizes, whereas there are sizeable differences among enterprises with access to fixed phones. The low penetration of fixed lines can be explained by the fact that most enterprises rely on mobile phones which are used both for business and private purposes.

Mobile telephones represent a greater share of the sample size than fixed landlines, since there is about a 30% increase in mobile phone penetration over fixed phones, especially for micro enterprises with a 0-4 employment size. However, the difference between mobile telephones and fixed telephones diminishes as the number of employees increases. Moreover, the mobile is the most highly rated ICT tool. In addition to mobility which is a very attractive feature, mobile devices have many advantages over fixed phones and many computing features as well. Mobile phones now come with a large memory which can be used to store data. Mobile phones also have visual interfaces that are much more attractive for customers. This is, of course, in addition to the new trends in mobile computing such as mobile commerce, mobile banking,

and so on, which are currently competing with Internet-based or E-computing services. Moreover, In terms of flexibility, while the mobile phone is more physically movable (remaining with owners or managers wherever they go), the fixed line phone is more flexible from a business point of view as more people have access to it. A fixed line can also be used as a fax line or for modem Internet dial up. This might explain some of the continuing demand for fixed lines.

On the other hand, when we examine the diffusion of computing technologies in Palestinian enterprises, it shows that about 47.1% are using PCs, and 34.6% of those who use PCs are connected to the Internet. Internet connectivity among enterprises is quite low, the key reason behind this is the fact that most enterprises involved in the survey were very small or micro enterprises that were not interested in joining the Internet community, as they do not see any Value added to their businesses, and they do not tolerate the monthly expenses of these services in their budgets.

In trying to understand why some enterprises do not adopt ICT (either in terms of computers or the Internet) in their business operations, it is quite clear that literacy has a certain role to play when considering low ICT penetration especially among micro enterprises with an employment size less than 5. The enterprise size is correlated to the PC literacy of the employees to some degree, which shows that the likelihood of enterprise personnel knowing basic ICT skills is higher if the employee works for an enterprise of considerable size. One reason behind this could be that large enterprises work to employ people with some level of knowledge and experience in ICT, or they act to improve the ICT skills of their employees during their employment.

Table 10: ICT Literacy by enterprises Size

| Employees with ICT specialty | Employment Size | | | |
|------------------------------|-----------------|------|-------|------|
| | 0-4 | 5-9 | 10-19 | +20 |
| literate | 3.5 | 7.9 | 13 | 31.3 |
| Illiterate | 96.5 | 92.1 | 87.0 | 68.7 |
| Total no of enterprises | 171 | 126 | 100 | 147 |

Note: numbers are percentage.

However, when we look at ICT and the obstacles for not using ICT in transactions, the main reason for not using ICT has to do with the way the firms perceive ICT, which is more to do with awareness of how to employ ICT and the culture of doing business. Surprisingly, the main hindrance is not cost, as only a small fraction of about 0.5% of enterprises in our sample reported that cost is the cause for refraining from using ICT. What is striking is that the majority of enterprise executives think that the main reason for not using ICT is their belief that there is *no need* for these technologies. This is concerning as it suggests that the

awareness of the managers running these businesses concerning the significance and potential benefits of ICT is low. This belief is not only present among micro enterprise executives, but it is rather common among all enterprises regardless of their sizes. In addition, those who do not employ ICT report that the reason behind this has to do with their belief that ICT cannot bring any advantage to their businesses.

In fact operating computers and accessing the Internet is transforming these technologies into effective tools for management, marketing, and knowledge acquisition to boost business profits but this does require a totally different skill set. This is also why there is a much higher penetration of mobile and fixed phones, as compared to computers with specialized software packages and with Internet-based applications. For computer solutions to be effective, employees need special sets of competences that are not acquired by ordinary people, only by ICT graduates.

We also investigated the predicted advantages of executing transactions through electronic, instead of traditional, means. Enterprises reported different reasoning, but most agreed on the shortening of the transaction time as the major benefit, with 69.1% of all enterprises reporting this as their major gain. Other arguments like cost saving, boosting sales, and enhancing customer service are marginal when compared to time saving. Note that benefits are mostly not seen regarding the enhancement of customer services and the competitiveness of the enterprise, but rather, as the enterprise acting as a customer for other companies, especially international companies from where they can buy products and services. The time saving advantage is achieved by the enterprises when buying goods, and not in selling goods and services. This is of course hinted at by the fact that the implementation of customer services, boosting sales, and increasing the competitiveness of enterprises are marginal benefits expected from the company. We believe that this behavior can be explained by the low penetration of the Internet among Palestinian households and enterprises, for cultural reasons among other issues.

One of the issues we investigated in the study was future outlooks and visions in regards to the use of ICT and whether enterprises are thinking about increasing the level of ICT diffusion and expenditure in their businesses. The future vision of ICT varies among Palestinian enterprises according to their size and economic activities. Large enterprises have a more positive view than small ones, and enterprises with soft services have a more positive view than others. In general about half of Palestinian enterprises have plans to increase their future expenditure and usage of ICT. This is basically linked to how enterprise owners and executives see ICT's role in adding values to their business operations and future plans.

3.5.2 Impact of ICT on performance:

We have estimated the main equation that measures impact of ICT on economic performance. A translog versus a Cobb-Douglas specification was tested using an F- test based on the residual sum of squares. The resulting test at the 5% level of significance suggests that the data used does not reject the Cobb-Douglas specification. The restricted form of the translog frontier model in which the second order coefficients are 0 is accepted. The Cobb-Douglas frontier model provides the best fit for the data and adequately represent the data.

When we tested the first hypothesis and whether there is an effect for the expenditure on ICT and the Value added of firms, the output elasticities have appropriate signs and significant values. The capital elasticity is 0.893 while the labor elasticity is around 0.15 and ICT elasticity is 0.02. The results reveal a positive and significant relationship between total amount of expenditure on ICT and value added. Firms with high expenditure on ICT are more efficient than those with low expenditure on ICT.

The results indicate that the variables included in the model contribute significantly to the Value added. The effect of ICT expenditure is reflected by the coefficient of the ICT variable which is positively significant at a 5% level. A relatively positive, but weak, relationship was found between the Value added and the ICT variable.

However, when we look at the results according to firm's size, the result indicate that the effect of ICT expenditure is positively significant at a 5% level in all enterprises except small firms.

Table 11: Descriptive Statistics for regression scores No. 1

| Regressors | Coefficients | Correlations | Sig. | Adjusted R Square | Constant | F |
|-----------------|--------------|--------------|---------|-------------------|----------|-------|
| <i>lnL</i> | .150 | .419 | .000* | | | |
| <i>lnK</i> | .893 | .802 | .000* | | | |
| <i>lnICT</i> | .020 | .054 | 0.100** | | | |
| | | | | .653 | 11.872 | .000* |
| <i>lnICT mi</i> | .042 | .111 | .076** | | | |
| <i>lnICT s</i> | .027 | .014 | .243 | | | |
| <i>lnICT me</i> | .043 | .012 | .064** | | | |
| <i>lnICT l</i> | .408 | .684 | .000* | | | |

Notes: * Significant at 5% level; ** significant at 10% level.

The results of the testing of the second hypothesis indicate the relationship between expenditure on ICT and the Value Added generated by this expenditure according to firm size will depend upon

the type of technology invested in. Investment in mobile telephones and internet access will generate a higher level of Value Added than investment in fixed landlines. An investment made by a large firm in internet access will generate a higher level of Value Added than other sized firms.

Table 12: Descriptive Statistics for regression scores No. 2

| Regressors | Coefficients | Correlations | Sig. | Adjusted R Square | Constant | F |
|------------------------|--------------|--------------|--------|-------------------|----------|-------|
| <i>lnICT (fix) mi</i> | -.008 | -.007 | .462 | | | |
| <i>s</i> | -.001 | .002 | .490 | | | |
| <i>me</i> | -.003 | -.001 | .495 | | | |
| <i>l</i> | -.007 | .025 | .383 | | | |
| <i>lnICT (fix)</i> | -.019 | .054 | .107 | .653 | 6.171 | .213 |
| <i>lnICT (Mob) mi</i> | .001 | .037 | .316 | | | |
| <i>s</i> | .005 | .021 | .406 | | | |
| <i>me</i> | .001 | .035 | .368 | | | |
| <i>l</i> | .014 | .054 | .257 | | | |
| <i>lnICT (Mob)</i> | -.013 | .099 | .011** | .653 | 7.986 | .000* |
| <i>lnICT(inter) mi</i> | .004 | .026 | .369 | | | |
| <i>s</i> | -.046 | -.018 | .420 | | | |
| <i>me</i> | .008 | .080 | .221 | | | |
| <i>l</i> | .003 | .057 | .048* | | | |
| <i>lnICT (inter)</i> | .001 | .084 | .027* | .652 | 8.080 | .000* |
| <i>lnICT (PCs) mi</i> | .037 | .172 | .012* | | | |
| <i>s</i> | -.036 | -.022 | .402 | | | |
| <i>me</i> | .003 | .062 | .275 | | | |
| <i>l</i> | .005 | .013 | .037* | | | |
| <i>lnICT (PCs)</i> | .005 | .034 | .213 | .653 | 14.891 | .427 |

Notes: * Significant at 5% level; ** significant at 10% level.

3.6 Concluding remarks

Our descriptive and quantitative analysis of the data on the use of ICT in MSMEs in Palestinian enterprises shows that investment in ICT is one of the important determinants of Value added of enterprises among other input factors. However, investment in specific tools of ICT in our study does not have any significant impact on enterprise performance and in some cases has even a negative impact on it. The results indicate that there are substantial technical inefficiencies in Palestinian enterprises in the industrial sector. Given the existing technology, firms could increase their performance by around 2% if they used, or spent more on, ICT tools.

The results demonstrate that the impact of ICT on labor productivity and business efficiency is a function of the enterprise size and the complexity level of its operations. The lower level of ICT penetration and usage among Palestinian enterprises is a direct consequence of the high

percentage of very small, informal enterprises, and family business enterprises. ICT use among local enterprises can be characterized as traditional. Another factor which also affects the level of ICT penetration is the type or nature of products and services offered by enterprises.

Typical tools and applications are most common among enterprises. The point here is that managers are not fully aware of the best possible approaches to invoke ICT, especially advanced technologies in their operations. Most enterprises maintain their traditional methods of operating their businesses and attempt to invoke ICT in these operations, which in most cases does not yield satisfactory outcomes.

Our results also suggest that it is important to carefully control for human capital related characteristics of employment when studying the effect of ICT. Another factor which also affects the level of ICT penetration is the type or nature of products and services offered by enterprises as being tangible or intangible.

Further progress in ICT adoption could be considered as a strategic policy oriented towards fostering growth. Utilizing ICT requires new ways of thinking, business operations reengineering, capacity building, and a continuous update and learning process to turn these tools into effective ones. Stakeholders, including government bodies, business associations, and academic institutions, should seek ways of encouraging innovation, cooperation, customization, and R&D to harness ICT solutions that best fit the local market needs – specially neutral of industrial work.

ICTs will need many more years to impact the Palestinian economy, especially on the macroeconomic level, and for that to happen there should be many initiatives to encourage enterprises to adopt ICT.

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