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Abstract
This paper discusses how the use of ICT contributes to economic growth and how it is measured. It also provides an insight of results from past studies carried out to confirm the productive relationship between the two (ICT and economic growth). An indication of proposed future research that could help to keep the trend going is also given.

The Impact of ICT on Economic Growth

Introduction

There is no doubt that the use of ICT is perceived as a catalyst for economic growth. ICT is defined as a set of activities that facilitate by electronic means the processing, transmission and display of information (Estavillo, 2004). Thus, it is important to know how the effectiveness of such a process has an impact on a nation's economy. Typical ICT components include hardware, software and telecommunication equipment (Kaiser, 2004).

Over the past decades, we have witnessed how the US economy has been revived in the late 1990s due to large investment in ICT, as referred to Stiroh (2002) of the Federal Reserve Bank of New York.

ICT capital is superior to Non-ICT capital in enhancing economic growth: a higher level of ICT capital stock per capita allows a typical economy to achieve a higher growth rate for given levels of growth in labor and capital inputs (Vu, 2004). With respect to Khuong Vu's view, it is also possible to say that sometimes it may not be how much capital you invest, that makes a difference, but rather how you invest it.

How the use of ICT contributes to the economy

Economic growth is the increasing ability of a nation to produce more goods and services (Miles, 2001). The use of ICT therefore enables the production of goods in a short amount of time with the assistance of computerised systems. Services are also provided more efficiently and rapidly.

Growth can occur in two different ways; the increased use of land, labour, capital and entrepreneurial resources by using better technology or management techniques and increased productivity of existing resource use through rising labour and capital productivity (Miles, 2001). This advocates further the impact of ICT in contributing to economic growth that occurs as a result of a country's development partially assisted by the use of technology. What we mean by technology, is the development and application of tools, machines, materials and processes that help to solve human problems (Wikipedia, 2004).

Economic growth is also closely linked with the distances we are able to travel, thus the further people are, on average, able to travel, the greater the economic activity and the wealth of the society (Lake, 2004). According to Lake, the increasing use of information and communication technologies (ICT) is changing the nature of this linkage with the use of virtual mobility that renders the distance less important, but insists that the connection with mobility remains. If consumers spend less on transportation, they would save money, which could be added to their disposable income.

"*Increasingly ICT are becoming pivotal for economic growth. By enabling "virtual mobility", ICT provide the means to undertake many of the activities that have so far needed physical transport*" (Lake, 2004). In support of Lake's view, it is also true to say that the use of email, online banking and e-commerce have significantly cut down on the physical transportation involved in sending mail, banking and buying goods, which as a result save money.

Measuring economic growth

The metrics used to measure economic growth are the GDP (Gross Domestic Product) which determines the value of output produced within a country during a time period and the GNP (Gross National Product) which also identifies the value of output produced within a country plus net property income from abroad (Bized, 2004). The GDP/GNP per head/per capita, which takes into account the size of the population, is also used.

Example of Countries where ICT has been successful in enhancing economic growth

During the second half of the 1990s the US, but also some EU Member States (notably Ireland, the Netherlands, and Finland) and some other OECD countries (e.g.US, Australia and Canada), have recorded a resurgence of economic growth and of productivity, steady or declining inflation and diminishing unemployment through the deployment of ICT (Commission of European Community 2001).

Piatkowski (2003) indicates that in Poland, ICT investment contributed on average 0.47 of a percentage point or 8.9% of GDP growth and 12.7% or 0.65 of a percentage point contribution to labor productivity between 1995-2000.

A study by Coleccia and Schreyer (2001) cited by Kanamori *et al* (2004) provided the results below, on The contribution of ICT to economic growth.

	Year	Australi	Canada	Finland	France	Germany	Italy	Japan	U.K.	U.S.
Contributio	90-95	0.48	0.3	0.24	0.18	0.3	0.21	0.31	0.27	0.43
of ICT	95-99	0.66	0.51	0.62	0.33	0.35	0.36	0.38	0.47	0.88
Real Output	90-95	3.37	1.79	-0.7	0.97	2.22	1.44	1.33	2.12	2.64
Growth	95-99	4.72	4.09	5.62	2.6	1.73	1.93	1.1	3.48	4.43

Fig 1: Results from Past Studies

Source: Coleccia and Schreyer (2001) cited by Kanamori et al (2004)

It is true to say that the results clearly demonstrate that when the contribution of ICT is greater, so is the real output growth. For example in the UK, between 1990 and 1995 when the contribution of ICT accounted for 0.43 of a percentage point of economic growth the Real Output Growth for that period was 2.12, whereas between 1995 and 1999, when the contribution of ICT was 0.47, the Real Output Growth that occurred during that period was 3.48. As a result, we could say that ICT drives the economy and also effective ICT investments do have a positive impact on the economy.

Discussion

Since ICT plays such a vital role in economic growth, there is no doubt, that government takes great part in promoting the awareness of the benefits associated with the use of ICT, but it is imperative to set up some independent bodies that would be actively involved in monitoring ICT performance in the economy, and make suggestions on improvements.

In spite of the fact that ICT has proven to be effective in reducing consumers and business transportation costs, it is still necessary for businesses to think of ways of consolidating the trend, the maximize the benefits brought by the use of this technology. This could be achieved through regular technical optimization with the prime quest for speed, security and multifunction. Moreover, a dynamic management with strong development focuses.

It is also worth noting that flexibility in international trade laws is predominant in ensuring that businesses are able to import ICT goods of their choice and specification, from different parts of the world.

Does the speed of ICT development affects the speed of economic growth? It is possible to say that if recent ICT developments have contributed enormously to economic growth in a short amount of time, in economic terms, then, there seems to be a positive correlation between the two. Hence, R&D in ICT must be encouraged and measured against the needs and demands of the market. Smith (2002) also adds by saying that governments should invest in the creation of ICT industries, and in the diffusion of ICT products and services.

Future work

Research on the impact of ICT on economic growth, have so far focussed on their results on the statistics that dated between 1990 and 2000. No research has so far collated statistics from the year 2000 to 2005 to justify the link between the contribution of ICT in economic growth and the real output growth for that period.

Although the assumption is that the trend is still continuing (Cette *et al*, 2004) it would be essential to identify the changes in statistics, that have taken place from the end of the 90's to the current year. It is possible to say that the findings would be very different, as we already know that the internet boom has come to an end since the year 2000, causing negative effects on economies that relied so much on it. However, we also foresee that the use of broadband and recent developments in mobile telephony have made business processes so much easier, thus, this signifies that ICT investments might be catching up with the needs and demands of the ever changing business environment to retain the trend of profits that is associated with them.

It is also essential to conduct comparative studies that would seek to identify the reasons for the difference in ICT contribution to economic growth, amongst developed nations. This would assist slow moving nations in pin pointing areas for concern and improvements.

Conclusion

Due to the enormous contribution of the use of ICT in economic growth, it is fair to say that businesses play a vital role in ensuring the usage of an adequate technology that renders their processes faster, cost effective and increases their production levels.

It is equally important for businesses to know that an increased in productivity could only be achieved if fuelled by steady and rapid improvements in ICT performance (Cette *et al*, 2004).

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