A Summary of Doctoral Dissertation

ICT USAGE IN MALAYSIA:
A STUDY ON ITS ECONOMIC IMPACT

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SUMMARY

There have been many attempts to study the factors that have contributed to Malaysia’s robust economic growth. However, the relationship between productivity and Malaysia’s past economic performance remains unclear. Past studies tend to focus on the role of capital accumulation through inflows of foreign capital and the role of socio-economic policies. The use of information and communication technology (ICT) as a source of productivity improvement has scarcely been covered in those analyses. The recent usage of ICT was poorly regarded as one of the contributing factors in improving the productivity of the Malaysian economy. Therefore, the recent Malaysian economic growth does not appear to be fully explained in the past studies.

The Malaysian economy has been dominated by the service sector, which constituted 41.8% of the Gross Domestic Product (GDP) in 1960, 48.4% in 2000, and 56.8% in 2003. The agricultural sector used to be the second most dominant, but it has been replaced by the manufacturing sector since the 1980s. The manufacturing sector’s share in the economy has increased markedly from 8.6% in 1960 to 32.6% of the GDP in 2000, and to 30.6% in 2003. Conversely, the agricultural sector decreased from 40.5% in 1960 to 8.8% in 2000, and to 8.2% in 2003. Many factors have contributed to this rapid transformation of the economy. Foreign investment has helped the manufacturing sector expand its share in the GDP. In particular, ICT-related manufacturing activities have increased rapidly during the last two decades. As a result, ICT-related manufactured products contributed 53.5% of the total manufacturing output in 2000, and 55.1% in 2003, whereas there was practically no ICT manufacturing in the 1970s. Since the service and manufacturing sectors constituted a major portion of the GDP, efforts to improve productivity in these sectors have led to far-reaching benefits for the overall Malaysian economy.

During the 1990s, there was an enormous increase in investment in ICT by businesses in those two sectors with the intention of enhancing their competitiveness and productivity. ICT investment started in the 1980s and grew more than fourfold between 1990 and 2003. ICT-related manufacturing companies headed the manufacturing sector in investing in ICT during that period, while financial service companies were the leading investors in the service sector. The high level of investment by the manufacturing sector during the 1990s was driven
by the need to increase efficiency in business processes and to improve competitiveness in the global market. For financial service companies, the high level of ICT investment during the same period was due to continuous efforts to upgrade their computer networking infrastructures and to prepare for launching Internet banking services.

The combined efforts of the manufacturing and service sectors have helped Malaysia achieve a relatively high level of ICT usage compared to many other developing countries. This high level of ICT usage in Malaysia has been recognized by such international organizations as the International Telecommunication Union (ITU), which regards Malaysia as having a leading position among the developing countries in Asia. In the *e-readiness index* developed by international expert communities such as the Economist Intelligence Unit (EIU), Malaysia ranks ahead of other developing countries, suggesting a higher level of e-readiness in ICT usage, which provides a better opportunity to further innovate and to gain benefits from technology.

It is the theme of this thesis to identify the impacts of ICT investment and utilization on the Malaysian economy. The prevalent usage of ICT in firms’ business processes is expected to have helped improve the labor productivity in these sectors and, theoretically, in aggregate, the improvement is to have translated into economic growth. This output growth is considered *productivity-driven* economic growth, which is different from *input-driven* economic growth.

To examine the productivity of the Malaysian economy, this thesis uses a combination of six approaches, four of which are sector-specific, and two of which are macroeconomic-based. By combining these approaches, the thesis attempts to produce a comprehensive picture for the purpose of understanding the productivity improvements in the Malaysian economy. The sector-specific approaches provide assessment of the productivity of the major economic sectors, while the macroeconomic approaches evaluate the productivity of the whole economy. In addition to the six approaches, this thesis is also supported by a survey on the impacts of ICT usage among small and medium-sized firms, as well as an assessment of the latent factors that correlate with ICT usage.

The Organization of Economic Cooperation and Development (OECD) initiated a number of cross-country studies assessing the impact of ICT usage. In its earlier studies, the level of ICT usage was assumed to be represented by the
level of ICT investment because more ICT investment is likely to establish the infrastructure for the use of ICT, in particular ICT networks, and to help provide businesses with more productive equipment and software. Those studies suggested that ICT investment has made direct and indirect contributions to the economic growth of many OECD countries in the 1990s. The direct contribution of ICT investment to the economic growth was roughly assessed by measuring ICT investment’s share in the total investment of each national economy.

In contrast, the assessment of the indirect contribution of ICT investment to the economic growth remained difficult, but it was estimated through improvement in productivity resulting from increased ICT usage. Estimating the indirect contribution of ICT usage has become the main focus of the most recent OECD studies. They have focused on a firm level, a sector level, and the whole economy. For the firm level analysis, the OECD studies use more specific indicators of ICT usage by comparing the relative intensity of ICT usage among firms. The studies suggest that ICT usage in the 1990s helped improve productivity at all those levels of the economy (the firm level, the sector level, and the whole economy), which ultimately contributed to the economic growth of many OECD countries.

The OECD studies have tried to show that increased ICT usage has improved both productivity and economic growth. In assessing the productivity impact of ICT usage in developed countries, however, the results of past studies have been mixed. Some have revealed that despite technological advancement and ICT usage improvement in the 1980s, productivity in developed countries declined. This phenomenon has been dubbed the “productivity paradox.” The OECD studies, however, are not necessarily in line with this view, suggesting that the productivity paradox is not so straightforward, but rather productivity improvement was more obvious in the 1990s.

As for Malaysia, its ICT usage has followed very similar trends to those in OECD countries. Results of this thesis suggest that the increasing trend of ICT usage in the economy positively contributed to Malaysian economic productivity during the 1990s. Due to the paucity of available data for ICT usage during the 1980s, this thesis has difficulty in making an assessment for that period. However, productivity in the manufacturing sector improved in the 1990s, led by the ICT-related manufacturing sector. During the same period, productivity improvement in the service sector is observed, particularly in the financial services sub-sector. Because both the manufacturing and service sectors are simultaneously dominant
and the main users of ICT in the Malaysian economy, their increased ICT usage seems to have naturally contributed to the general improvement in productivity and economic growth.

By using the so-called Solow model of total factor productivity (TFP) measurement on a macro level, this thesis confirmed that the Malaysian economy experienced higher productivity in the 1990s as compared with the 1980s. As argued in regard to the OECD countries, the improved TFP in the Malaysian economy is considered to have clearly reflected a spill-over effect from technological innovations, especially in ICT-related areas.

The above results of improved productivity in major economic sectors and in the whole economy correspond to the findings on Malaysia’s economic growth performance. By using a macroeconomic production function, the productivity of the Malaysian economy in the 1990s is shown to be higher when compared with the 1980s. In theory, increased productivity is possible only with technological improvement, efficiency improvement in labor and capital usage, and/or favorable and stable economic conditions. Considering the conditions that surrounded Malaysia, the increased ICT usage during the 1990s is one of the most likely factors that brought about this clear improvement both in productivity and economic growth. Given the most recent trend in ICT usage, the Malaysian economy will continue to achieve both higher productivity and economic growth in the near future. This future trend will be sustained only by improving the level of e-readiness and further intensifying ICT usage in the economy.

This thesis is composed of five chapters and eight appendixes. Chapter 1 begins with a discussion of ICT usage, followed by a review of the theoretical background underpinning the theme of the thesis. This chapter also spells out the framework and methodology used to assess the impacts of ICT. Chapter 2 reviews the economic contribution of ICT investment and usage in OECD countries and the nature of ICT investment and usage in the Malaysian economy. Chapter 3 analyzes the impacts of ICT investment and usage in the main sectors of the Malaysian economy. Chapter 4 analyzes the impacts of ICT investment and usage in the whole economy. Finally, in Chapter 5, the findings are summarized and the implications of the study are elaborated.
LIST OF ACADEMIC ACHIEVEMENTS


O ‘Explaining the Factors that Affect the ICT Usage: Case of ASEAN, East Asian and Malaysian Economy’, for the INTAN Management Journal by the National Institute of Public Administration (INTAN), Kuala Lumpur, Malaysia – (Vol. 7, 2004) [Publication number: ISSN 0128 –3324]- due to be printed.

Lectures | a. ‘ICT in Malaysia: Policy, Regulation and Industry’ on November, 14\textsuperscript{th} 2001, in the ‘Workshop for Regulators and Policy Makers’ organized by the International Telecommunication Union (ITU) and Waseda University, held in Waseda University, Tokyo.

b. ‘The Emerging Digital Economy in Malaysia: A study on its contributions and growth determinants’, on November 29\textsuperscript{th} 2002, in the GITS’s Meeting for Doctoral Dissertation Presentation, held in Waseda University, Tokyo, Japan.

c. ‘Developing Digital Economy in Malaysia, the Progress and Challenges’, on October 10\textsuperscript{th} 2003, in the academic conference of the Japan Association for Social Informatics (JASI), held in Tokyo University of Technology, Hachioji, Japan.

d. ‘The Role of ICT in Economy: Assessment of Malaysia’s Experience’, on October 31\textsuperscript{st} 2003, in the ‘Workshop for Regulators and Policy Makers’, organized by the International Telecommunication Union (ITU) and Waseda University, held in Waseda University, Tokyo.

e. ‘Getting Education in Foreign Countries’, on November 17\textsuperscript{th} 2003, in the ‘ASEM Symposium on Education Exchange’, organized by the Ministry of Foreign Affairs of Japan, held in Scuba University, Scuba, Japan. |
f. ‘Addressing the Digital Divide: Care for those in the Margin’, on February 19th 2004, in the ‘Seminar for IT Executives’, organized by the Center of Excellence, held in Waseda University, Tokyo, Japan.

g. ‘The Impact of ICT Usage in the Malaysian Economy’, on February 27th 2004, in the GITS’s Meeting for Doctoral Dissertation Presentation, held at Waseda University, Tokyo, Japan.

h. ‘The Impact of ICT Usage in the Malaysian Economy’, on Mac 3rd 2004, in the joint academic seminar of the Multimedia University and Waseda University held in Multimedia University, Putrajaya, Malaysia.

i. ‘Motivations and Barriers to ICT Usage for E-commerce in Malaysia’, on June 30th 2004, in the GITS’s Meeting for Doctoral Dissertation Presentation, held in Waseda University, Tokyo, Japan.

j. ‘Motivations and Barriers to Internet Usage for E-commerce among Small and Medium Enterprises in Malaysia’, on September 12th 2004, in the 41st annual academic meeting of the Japan Section of the Regional Science Association International (JSRSAI), held in Waseda University, Tokyo, Japan.


a. Helped make the first draft and presented the statement for the ‘Workshop for Regulators and Policy Makers’, on November, 24th 2001, organized by the International Telecommunication Union (ITU) and Waseda University, held in Waseda University, Tokyo.

b. Helped make the first draft, presented and chaired a round table discussion on the formulation of statement for the ‘Seminar for ICT Regulators and Policy Makers’, on November 27th, 2002, organized by the International Telecommunication Union and Waseda University, held in Waseda University, Tokyo.

c. Helped make the first draft and presented the statement for the ‘Seminar on E-Government for ICT Regulators and Policy Makers’, on November 23rd, 2004, organized by the International Telecommunication Union (ITU), Asia Pacific Economic Cooperation (APEC) and Waseda University, held in Waseda University, Tokyo.