

## Preface

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## PREFACE

The rapid and universal application of information and communications technology (ICT) is considerably conducive to the economic development of nations. ICT is a combination of information technology (IT) and communications technology (CT). The former involves the processing and packaging of information, while the latter is concerned with the interaction, exchange and linkage with information and databases among users via networking. The coverage of ICT goes beyond such activities as programming, networking and analyzing. It enables the use of computers and related tools to enhance the quality of products, labour productivity, international competitiveness and quality of life.

The fact that new knowledge is made available and widely disseminated through ICT can lead a traditional and energy-based economy into a knowledge-based economy (KBE). KBE, therefore, refers to an economy in which a significant proportion of the population performs knowledge-related activities. Globalization plays a crucial role in integrating and converging knowledge and economic activities between developed and developing countries. One measure of a nation's economic development in the future can be by its ICT development. Improving ICT human resources in developing countries to keep up with those in the developed countries can narrow the disparities that create digital divides between and within countries.

The Institute of Developing Economies, Japan External Trade Organization (JETRO), in collaboration with academicians, government officials and experts in Thailand, wanted to study the Thai ICT sector and analyze Thailand's potential for becoming a KBE. Since a smooth transition to a KBE depends substantially upon appropriate and desirable ICT human resources, an analysis on the human resource development in relation to ICT issues in Thailand was especially needed. A joint research project entitled "Human Resource Development Toward a Knowledge-Based Economy: The Case of Thailand" was undertaken to achieve those objectives. The research highlights four major aspects: the Thai labour market in ICT-related industry, education development toward a KBE, science and technology (S&T) development toward a KBE and ICT manpower development. Also, it includes case studies to present the current ICT situation of three regions of Thailand. The research findings reflect strengths for the Thai Government to sustain and

weaknesses to remedy. The research also highlights issues entitled to consideration from Japanese technical cooperation as well as from other international bodies. Contributors to this volume present the findings of that project.

Chapter 1 discusses the labour market in Thailand in transition toward a KBE. The chapter consists of two objectives: First, it attempts to explain the structural changes in the Thai labour market and in Thai industry. Due to changes in Thai industry, the Thai economy is moving toward a knowledge-based economy that requires new labour skills, especially science and technology (S&T) skills. However, the Thai labour market has not improved significantly in labour quality. Therefore, the Thai labour market is not ready for the new era of a knowledge-based economy. The second objective is to investigate the attempt by both public and private sectors to develop Thai human capital. The first part investigates the Government's industrial policies in regards to human resource development and then it investigates the strategies by Thai firms in ICT-related industries on human capital improvement. There have been several plans and policies to deal with ICT-related human resources development. The main targets are improving both quantity and quality of ICT-related human capital in Thailand. One major factor keeping Thai firms from improving their competitiveness is the lack of sufficient incentives provided by the Government for these risky activities. Therefore, the investment in research and development among Thai private enterprises is too low. The chapter concludes that the result of this attempt is below the desired achievement.

Chapter 2 focuses on education development toward a KBE. Since education is the most important factor for empowering all people and improving the competitive advantage of the country, reform of the education sector is now a national agenda for Thailand for restructuring its economy and society in order to achieve sustainable development. Significant progress has been made since the enactment of the 1999 National Education Act, particularly in ensuring basic education for all and the reform of the education system in order to enhance people's potential and capacity to improve the country's development and international competitiveness. The reform of higher education also has been initiated accordingly. For e-learning technology in Thailand, major policies and plans regarding ICT for education have been developed. In this chapter, the strengths and weaknesses of the Thai education

system are pointed out. In order to meet the demands of a KBE, Thailand urgently needs to reform its entire performance-based budgetary allocation and utilization; it needs improvement and enhancement of teaching and learning activities in general, and specifically, it needs to focus on ICT-curriculum development.

Chapter 3 focuses on science and technology development toward a KBE. Special attention is paid to the development of information and communications technology. The National Innovation System Concept is used here to analyze characteristics of Thailand's stage of science and technology development. On the whole, Thailand's National Innovation System (NIS) is weak and fragmented. Not many firms have the capability to innovate, and research and development activities in firms is rare. Knowledge linkages between firms both vertically (i.e. supplier-user relationships) and horizontally (i.e. cooperation between firms in the same or related industries) are generally weak. Institutional supports for firms' technological capability development and innovation is ineffective. Likewise, the university and industry linkage is underdeveloped because most of the surveyed firms perceive universities only as sources of producing human resources. They are considered to be either irrelevant or unimportant for firms' technological activities. However, as regards ICT development, Thailand has made significant progress in recent years. A committee, headed by the Prime Minister, responsible for IT policy making has been established for more than a decade. Two IT master plans have been implemented rather successfully. At present, Thailand has adequate infrastructure. Many schools throughout the country have free Internet access. Utilization of IT in the public sector has obviously increased.

Chapter 4 discusses ICT manpower development in Thailand. The market value of ICT has rapidly grown after a substantial drop due to the 1997 economic crisis. But the application and spread of ICT is uneven in Thailand. More people in Bangkok own computers and have access to the Internet than those in other regions. The majority of the ICT workforce has a Bachelor's degree, are young (25-34 years old) but have limited work experience (1-3 years). The demand for ICT personnel is affected by annual economic growth and the ICT infrastructure investment of the Government. With an assumed annual economic growth rate of 2.5 percent, 4.5 percent and 6 percent, it is estimated that there will be a need for 122,100 ICT workers in 2004, 157,547 in 2005 and 184,123 in 2006. There was a shortage of ICT

personnel in 2001 of 18,522 persons, and at the estimated growth rate, the shortage will increase to 26,053 workers in 2006. An appropriate approach to coping with the skill shortage relies on an improvement in the ICT training by the private and public sectors alike. Thailand's competitiveness in the computers and accessories exports to the global market keeps declining. The only strength of the international competitiveness of Thailand's ICT sector rests on the liberalization of its ICT market. The ICT sector's weaknesses, however, are many and include the non-existence of e-commerce laws and enforcement, the lack of qualified ICT manpower, limited supports from the Government, a scanty investment in research and development, a widespread violation of intellectual property rights and insufficient ICT infrastructure to attract private investments. ICT strategies for turning the Thai economy into a KBE focus on five major sectors: e-education, e-government, e-business, e-society and e-industry.

Chapters 5, 6 and 7 present case studies of regional development toward a KBE. Chapter 5 addresses the development strategies in the northern region toward a knowledge-based economy. It finds that less than 5 percent of manufacturers use information and communications technology. Most of the firms in the North are small and medium enterprises (SMEs), and the high cost of leased-lines is an obstacle to e-business. The North is highly attractive for investments because of its abundant labour force working for lower wages than in Bangkok as well as its location near domestic and foreign markets. The majority of electronic firms in the Northern Region Industrial Estate (NRIE) are Thai affiliates of foreign-owned companies. The firms in the NRIE have an advantage in the lower cost of production than overseas competitors, but sophisticated production that needs advanced manufacturing technology is operated by other affiliates overseas instead. There is little evidence that ICT is used to improve product design and manufacturing processes. Local firms have the misunderstanding that ICT only benefits high-tech businesses and is not relevant to traditional manufacturing and service businesses. Local major businesses, such as handicrafts, food processing and tourism, need to enhance their ICT knowledge, skills and creativity to improve their services and productivity. Although there have been a number of efforts made in applying ICT to local SMEs, they are not enough in meeting the needs of the SMEs. Many local firms have not succeeded in competing with overseas competitors, not only in terms of productivity, innovation and quality but also

in ability to manage their basic internal business operations. Business operations and accompanying problems need to be clearly identified and subjected to improvement through the use of ICT.

Chapter 6 addresses development strategies in the northeastern region toward a knowledge-based economy. In the view of the economy and labour market, the existing situation of the Northeast is not favourable for ICT development. Its gross regional product (GRP) amounts to 8.9 percent of the country's gross domestic product. The region has one third of the Thai population and the highest incidence of poverty. Thus, in terms of per capita income, the Northeast ranks the lowest and represents only 12.5 percent of the per capita income of the Bangkok metropolitan area. The majority of the population older than 15 years is poorly educated and unskilled. Industrial development in the Northeast, measured by the GRP industrial sector, shows an improvement in its performance and significant structural changes. Most enterprises are found in the agri-based industry. Public universities play a major role in higher education and the information centre of the region. The information network management in the Northeast is chaotic. Education institutions, public agencies and private firms have developed their own network independently with different objectives. This is an issue to which a public ICT organization should pay serious attention. The digital divide in the Northeast presents the greatest challenge for policy makers, strategists and planners who are responsible for ICT development. In the move toward a knowledge-based society, intensive training programmes, especially in how to utilize ICT for lifelong learning and improvements in the standard of living, should be widely implemented in the region.

Chapter 7 addresses development strategies in the southern region toward a knowledge-based economy. It notes that the industrial structure of the South depends upon natural resources such as agricultural products, fish and rubber, which are not easily conducive for developing industrial clusters. However, there is considerable potential for becoming a gateway for trade and investment with neighbouring countries through a regional framework such as the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT). Moreover, Electric Data Interchange (EDI), as is pointed out, would be effective for the expansion of the transportation network. The chapter includes discussion on an ICT development project in Phuket and surrounding areas. The success of that project rests upon the Government's initiative in relaxing regulations for work

permits and visas for ICT foreign specialists and other incentives in cooperation with the private and education sectors. Also, the necessity of ICT-related human resource development is demonstrated in the chapter. Efforts for upgrading IT literacy, including Japan's technical cooperation, are elaborated and the need for human resource development in relation to a KBE is stressed.

A major conclusion drawn from this study is that the current human resource development is inadequate to move the Thai economy toward a KBE in the near future. Key obstacles responsible for this include the weak ICT-related labour market, poor science and technology education development, a low level of research and development in science and technology and insufficient ICT manpower with desirable qualities. Moreover, the human resource development is even weaker in other regions compared to the Bangkok metropolitan area. Despite a leading role played by the Thai Government in solving these problems, assistance from Japanese technical cooperation and other international agencies is of importance in accelerating the Thai economy to attain success in a KBE, as anticipated.

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**Editors**