

The ICT manpower of the public sector in facilitating Thailand towards a knowledge-based economy

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Abstract

Thailand is in a transition to a knowledge-based economy (KBE), which is expected to render a higher economic growth and make the nation keep pace with globalization. As information and communication technology (ICT) is the key to get access to KBE and the success of ICT depends largely on the public sector, this article aims at assessing the requirement of ICT high-skilled workers by the Thai public sector. A comparison of size and human capital investment between the existing and desired ICT manpower can determine readiness for a move towards KBE.

It is found that an inadequate ICT manpower both quantitatively and qualitatively is inflicting the Thai public sector. The setback would worsen due to an increase in ICT-related services and responsibility as well as a rapid change in ICT technology. The excessive demand could pile up due to the higher turnover rate of existing ICT staff. To balance the demand for and supply of high-skilled ICT workers, the demand has to be brought down by lowering the provision of ICT services. Public agencies must be prudent and economizes in selecting and utilizing appropriate ICT. Although this will take more time for Thailand to be a KBE, a solid foundation can be laid in building up KBE.

1. Introduction

It is widely accepted that the availability and exchange of information reduce transaction costs and consequently account for the efficiently utilization of scarce resources of an economy. Accumulation of important and productive information to a certain extent can turn an economy into knowledge-based economy (KBE). As information and communication technology (ICT) is created and developed to generate and disseminate information effectively, ICT is indispensable to KBE. In such an economy, ICT is likely to enhance economic development by increasing labor productivity and strengthening international competitiveness. Moreover, it can improve human welfare by means of rising earnings and better quality of life.

KBE is defined by Organization for Economic Cooperation and Development (OECD) as "economies which are directly based on the production, distribution and use of knowledge and information". Similarly, the Asia Pacific Economic Cooperation (APEC) shares the idea and refers KBE as "the production, distribution and use of knowledge are the main drivers of growth, wealth creation and employment across all industries." The National Information Technology Committee proposes the definition of KBE in the context of Thailand as "an economy that depends heavily on the application of information and knowledge in the production and

distribution of goods and services. The rise in the economic growth and productivity can be enhanced by the advancement of information and knowledge through an extensive investment in research and development, a promotion of education and human resources development and an appropriate change in management approach.

Thailand, like most countries, is enthusiastic about entering into KBE. In addition of yielding a higher economic growth, KBE can make Thailand keep pace with globalization. The government has paid special attention to ICT in the hope that it can bring about KBE. The National Information Technology Committee, an ICT policy making body, was formed for the first time in 1992. Its outstanding task is to propose the first national IT policy of Thailand (IT2000), which is a 5-year plan from 1996 to 2000. A major and significant development in ICT is the establishment of Ministry of Information and Communication Technology in 2002. It plays an important role of translating ICT policies into actions and practices. Moreover, it supervises ICT-related activities of all public agencies, leading to eliminate unnecessary overlapping activities and retain effectiveness and efficiency of resource uses.

Provided that ICT is the key to get access to KBE and the success of ICT depends largely on the public sector, it is essential to evaluate inputs underlining the performance of ICT in the public

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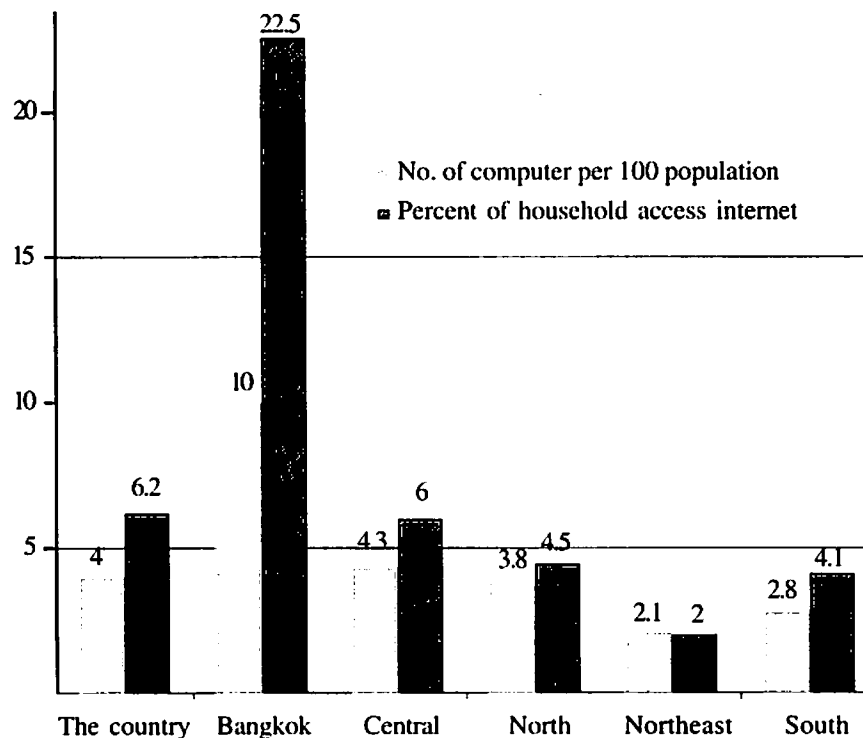


Fig. 1 Number of computer per 100 population and percentage of households access internet in Thailand in 2005

Source: The National Statistical Office (2006a)

sector. This article aims at assessing resources used up in producing ICT by the Thai public sector. As ICT requires high-skilled workers, it focuses on the analysis of the ICT manpower in the public sector. The comparison of size and human capital investment between the existing and desired ICT manpower determines readiness for a KBE.

2. Overview of the current ICT in Thailand

In 2005, the ratio of computer to 100 population for the country was 4:1. The ratio is highest in Bangkok (10.1:1) whereas those in other regions are equal or below the average of the country. There were 6.2% of all Thai households that get access to

internet. The majority of them (22.5%) are in Bangkok. The figures in the other regions are between 2% and 6%. Figure 1 shows a disparity in the computer possession and internet accessibility of households living in different parts of Thailand.

Software Industry Promotion Agency (SIPA) estimates that the market value of ICT in Thailand in 2007 would be around 15,763.5 million US\$ (Table 1). Between 2006 and 2007 the market value grows by 7%. Software market will increase by 18%, followed by computer services market (15%), hardware market (9%) and communication market (5%). The government spending on IT, excluding communication, amounted to 29% of the total IT expenditure in 2006 while enterprises, small and home offices and households together expend 71%. Table 2 shows that small and home offices and households spent most on hardware; enterprises on software; and the government on computer services.

According to the National Statistical Office (2006b), it is estimated that there were 359,274 persons working in the ICT sector in 2006. This is equivalent to about 1% of the total workforce. However, the majority of them (over 70%) have low skills. Figure 2 shows that over an half of the high-skilled workers are developed and maintenance programmers, followed by computer system

Table 1 The market value of ICT in Thailand during 2005 and 2007 (million baht)

| Type of ICT | 2005 | 2006 | 2007* |
|-------------------|---------|---------|---------|
| Computer hardware | 58,191 | 65,947 | 71,962 |
| Computer software | 41,435 | 52,763 | 62,174 |
| Computer services | 10,403 | 12,770 | 14,686 |
| Communication | 309,858 | 367,504 | 387,137 |
| Total | 419,887 | 498,984 | 535,959 |

Note: *estimated values

Source: SIPA (2007)

Table 2 IT expenditures of three major economic sectors in Thailand in 2006

| Sector | Total | | Hardware | | Software | | Computer services | |
|---------------------------------------|---------|-----|----------|-----|----------|-----|-------------------|-----|
| | Value | % | Value | % | Value | % | Value | % |
| Government | 38,331 | 29 | 15,302 | 23 | 15,201 | 29 | 7,828 | 61 |
| Enterprises | 93,150 | 71 | 21,606 | 33 | 31,623 | 60 | 4,942 | 39 |
| Households and small and home offices | | | 29,039 | 44 | 5,939 | 11 | | |
| Total | 131,481 | 100 | 65,948 | 100 | 52,763 | 100 | 12,770 | 100 |

Source: SIPA (2007)

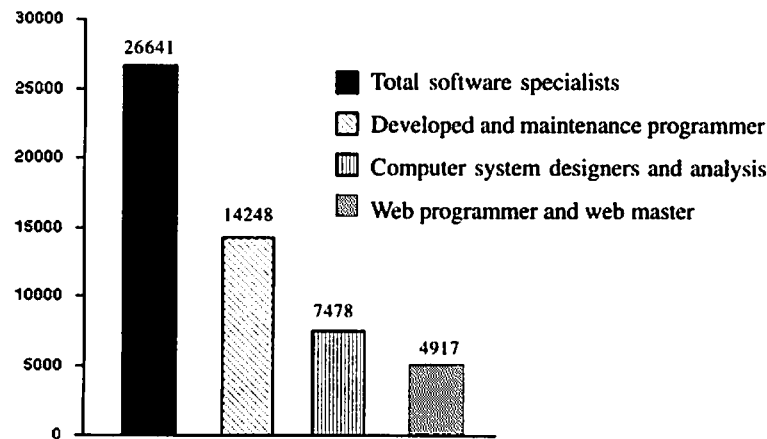


Fig. 2 Number of software specialists of the private sector in Thailand in 2006

Source: The National Statistical Office (2006b)

designers and analysts, and web programmers and web masters.

In the macro level, the ICT sector contributes relatively small to the Thai economy. The ICT expenditure is about 3.6% of gross domestic product (GDP). The use of ICT by the services sector accounts for 38% of the total ICT value whereas the uses by other sectors do only an half and less than that figure (e.g. the industry sector, 18%; the public sector, 18%; the education sector, 14%; the financial sector, 9% and the agriculture sector, only 3%). However, an estimation appearing in a publication of Ministry of Information and Communication Technology indicates that an additional use of ICT by 1% causes the Thai economy to grow by 0.13%.

3. Major roles of the Thai public sector in the ICT development

ICT development strategy

The Thai government launched IT2010 (2001-

2010) as a policy framework, which aims at utilizing and applying ICT to promote and sustain social and economic development. Specifically, the policy addresses five key sectors. Major aspects of each sector can be summarized as follows.

- E-education facilitates the human resources development, which in turn raises workers' productivity and eventually international competitiveness of the country. It is expected to support a new approach to study called "learner center".
- E-society improves the quality of life of the population. Also, occupations and environment in local communities can be sustained and protected. Digital divide will be reduced by means of increasing digital opportunity.
- E-commerce raises the volume and value of trade both at the local and international levels. Trading becomes fairer and more transparent while consumer's rights are protected more effectively.

- E-industry strengthens the production part of various industries in the private sector in order to enhance their competitiveness. Linked activities are also included such as logistics, research and development, and innovation.
- E-government provides services to citizens at high speed and with quality. It is beneficial to the public administration. This will eventually contribute to good governance of public agencies and the government as a whole.

A national ICT master plan 2002-2006 was drawn up to implement the IT2010 in the first five years. The plan specifies visions, missions, objectives, strategies, plans and timeframe. Seven strategies can be briefly identified as follows.

1. To develop the Thai ICT industry as a strive for the leader of this region
2. To utilize ICT to raise the quality of life of Thai people and society in general
3. To reform and enhance research and development potential in the ICT sector
4. To improve national competitiveness by means of investing ICT in human resources
5. To expand capability of entrepreneurs to increase foreign trades
6. To encourage small and medium sized enterprises (SMEs) to use ICT
7. To stimulate the use of ICT in the public administration and service provision

It is unfortunate that a national ICT master plan for 2007-2010 is not ready now. Ministry of Information and Communication Technology is in the process of drawing up the second master plan through seeking opinions from relevant stakeholders as well as weighting pros and cons of different strategies in

guiding Thailand's ICT to a desirable direction. A preliminary result of consultation meetings in various parts of Thailand indicates that the new plan should carry out the existing strategies and make sure to achieve the goals. As the plan is running out of time, no new strategies and projects will be allowed to initiate.

E-services

The government has paid special attention to e-services by setting up and developing a public website called www.egov.go.th. It is supposed to be first stop service web portal for G2G, G2B, G2C and G2E. Figure 3 gives examples of e-services the government planning to provide in the near future. A variety of projects take place to support e-services such as setting up citizen portal (www.ecitizen.go.th), e-procurement, smart card, government fiscal management information system (GFMS), government data exchange (GDX) and government information network (GIN).

Providers of ICT education and training

A recent reform in the education sector, as a result of implementing the 1999 National Education Act, makes it possible to equip students with broader knowledge and perspectives, including ICT. The education sector gives a high priority to ICT by setting up a National ICT for Education Master Plan (2005). The plan focuses on 3 policies. The value-added policy is to fully utilize the existing computer hardware and software. The equity policy redistributes computers and related equipments more evenly between schools in different parts of the country. The quantum-jump policy invests more resources to get teachers and students a better literacy of IT and internet.

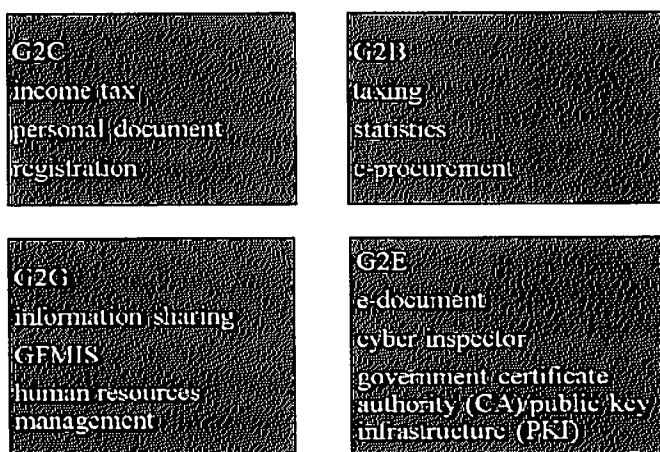


Fig.3 Examples of various e-services expected to be available in Thailand

Table 3 The share of new ICT-related students and new ICT-related graduates from all universities in Thailand

| Year | Percent of new students to the total students | Year-on-year comparison (%) | Percent of new graduate to the total graduate | Year-on-year comparison (%) |
|------|---|-----------------------------|---|-----------------------------|
| 1997 | | | 2.14 | |
| 1998 | 2.28 | | 2.18 | 1.88 |
| 1999 | 2.64 | 15.79 | 2.72 | 24.69 |
| 2000 | 3.06 | 15.83 | 2.96 | 8.68 |
| 2001 | 2.23 | -26.99 | 3.15 | 6.33 |
| 2002 | 3.22 | 44.34 | | |

Source: Author's computation based on data from The Ministry of Education (www.mua.go.th/ebook2/bookdetail.php)

In 2005, a public school under the Ministry of Education on average has 5 computers, which implies the ratio of 1 computer to 59 students. Every school can get access to internet. 21.7% of teachers acquire IT training. Higher education institutes of Thailand can produce ICT graduates about 3% of the total graduates each year (see Table 3). Despite the small proportion, it is likely that the growth of new ICT-related students is rising. This means that more ICT workers will be available in the future.

4. Assessment of the ICT performance of the Thai public sector

E-government

In 2004, National Electronics and Computer Technology Center (NECTEC) conducted an on-line survey on e-services of public agencies, known as "Service e-Readiness Explorer" program. It evaluated five dimensions of e-government maturity; that is, information, interaction, transaction, integration, and intelligence. The assessment result is used to make recommendations for developing web services in order to attain a higher level of integration among various government agencies in the future. Web sites of 267 government agencies were examined. Most of the e-services were least developed (see Table 4). For instance, 13% of the web sites were still at the basic level. A small number of the web sites could attain the intermediate and advance levels in transaction, intelligence, and integration. The fact that no web sites provided integration reinforces the above conclusion. This also implies the lack of collaboration among agencies. A suggestion is that a systematic mechanism is urgently needed in promoting a closer online collaboration.

Since security is one of the most essential parts of the implementation of e-government, NECTEC also made an assessment of the security system of the

Table 4 Maturity levels of government web sites in 2004

| Dimension | Basic | Intermediate | Advance |
|--------------|-------|--------------|---------|
| Information | 13% | 0% | 87% |
| Interaction | 0% | 17% | 66% |
| Transaction | 44% | 5% | 6% |
| Integration | 0% | 0% | 0% |
| Intelligence | 7% | 0% | 0% |

Source: National Electronics and Computer Technology Center (2005)

government web sites. Out of 267 web sites surveyed, 104 web sites (39%) did not have any security systems. 131 (49%) used simple security systems such as user name/password authentication. 31 (12%) employed more advanced systems like Secured Socket Layer (SSL) and data encryption. Only 1 (0.4%) installed the strongest security measure; that is, digital signature for encryption and authentication

According to UN Global E-Government Readiness Index Report, E-Government Readiness Index of Thailand is ranked 46 (out of over 150 countries and economies) in 2005, moving upwards from a rank of 50 in 2004. Even though Thailand's e-government fares well by the international standard, improvements in various aspects are necessary. In preparation to support the intensity of e-government activities, Ministry of Information and Communication Technology has drawn up a roadmap for 2005-2007. There are four parts. The infrastructure part deals with network, information and security. The regulation part involves issuing relevant laws such as computer crime law, data protection law, electronic transaction act and electronic funds transfer act. The leadership and management part is responsible for establishing e-government agency and administering Ministry of Information and Communication Technology efficiently. The services part strengthens providing

essential e-services such as G2C, G2B and G2G as well as expands 15 e-services every year.

The Electronic Transactions Act, governing civil and commercial electronic transactions, was enacted in 2002 and became effective in 2006. Acts involving cyber-crime, electronic funds transfers and national information infrastructure were passed in 2007. These major laws can facilitate e-government and e-commerce. The government is in the process of drafting a data protection bill, the availability of which could get the government and business community take more advantage of e-government and e-commerce opportunities. Nevertheless, in comparison with other more advanced countries, the existing legal framework is considered as undeveloped. United States Trade Representative stated in National Trade Estimate Report on Foreign Trade Barriers in 2007 that the lack of a complete legal framework for e-commerce in Thailand will constrain the development of electronic transactions.

E-procurement

The 9th National Economic and Social Development Plan called for a rise in the provision of government services through ICT. To make it happen, a cabinet made a resolution in 2002 that online

procurement must be implemented in all government agencies. The target for the e-procurement is a transaction value of 100,000 million baht by 2006. In 2005, e-procurement through e-auction undertaken by all government agencies was valued at 23,841.9 million baht (596 million US\$). In addition, the state enterprises also made such transactions with a value of 17,062.4 million baht (426.6 million US\$). A preliminary result of a recent survey by the National Statistical Office indicates that in 2006 the value of e-auction by all public organizations adds up to 176,683 million baht (5,048 million US\$). Compared to the total e-commerce value of 305,159 million baht (8,718.8 million US\$), e-procurement by the government took a sizable share of 57.9%. In addition to achieving the target, the government emerges as a prominent trader of e-commerce in Thailand.

However, the government procurement in general is criticized by some countries expecting to participate in acquiring goods and services to Thai agencies. The government procurement in Thailand in theory relies on the Prime Minister's Procurement Regulations, which emphasize nondiscriminatory treatment and open competition in bidding contracts. In practice, United States Trade Representative

Table 5 The share of the ICT budget of ministries in the fiscal year 2006

| Ministry | Percent of the total budget |
|--|-----------------------------|
| Office of the Prime Minister | 2.3 |
| Ministry of Defense | 0.3 |
| Ministry of Finance | 0.9 |
| Ministry of Foreign Affairs | 0.6 |
| Ministry of Tourism and Sports | 2.6 |
| Ministry of Social Development and Human Security | 0.9 |
| Ministry of Agriculture and Cooperatives | 0.3 |
| Ministry of Transport | 0.2 |
| Ministry of Natural Resource and Environment | 0.7 |
| Ministry of Information and Communication Technology | 5.5 |
| Ministry of Energy | 2.6 |
| Ministry of Commerce | 3.7 |
| Ministry of Interior | 0.4 |
| Ministry of Justice | 4.4 |
| Ministry of Education | 0.4 |
| Ministry of Labour | 0.5 |
| Ministry of Culture | 0.5 |
| Ministry of Science and Technology | 1.5 |
| Ministry of Public Health | 0.2 |
| Ministry of Industry | 4.4 |
| Independent Public Agencies | 1.7 |

Source: The National Statistical Office (2006a)

Table 6 A comparison of estimated demand for and supply of ICT high-skilled manpower in the public sector between 2005 and 2008 (unit: persons)

| Year | demand | | supply | | balance | |
|------|--------|--------|--------|--------|---------|-------|
| | min. | max. | min. | max. | min. | max. |
| 2005 | 19,597 | 21,582 | 16,444 | 16,668 | 3,153 | 4,914 |
| 2006 | 20,675 | 24,458 | 18,641 | 19,396 | 2,034 | 5,062 |
| 2007 | 21,874 | 26,813 | 20,925 | 22,559 | 949 | 4,254 |
| 2008 | 23,077 | 29,322 | 23,301 | 26,224 | -24 | 3,098 |

Note: Balance is the demand figure minus the supply figure.

Source: Suksiriserekul (2006)

claimed that various public agencies and state enterprises have their own means of obtaining supplies. That is, public agencies and state enterprises reserve the right to accept or reject any bids at any time as well as being able to modify the technical requirements during the auction process. The allegation of foreign companies in terms of "managing tenders" as irregularity of the government procurement can damage the growth and development of Thailand's e-procurement.

5. An analysis of resources for ICT of the Thai public sector

Government budget for ICT

In 2005, the government granted a total budget of 4,312 million baht (108 million US\$) to all public agencies to spend on ICT. The shares of the ICT budget vary between the ministries (see Table 5). The size of the share depends on the priority given by the government and urgent needs of the ministries. Besides Ministry of Information and Communication Technology, Ministry of Justice and Ministry of Industry obtained the highest shares in 2006.

Public agencies are allowed to allocate 25% of the total ICT budget for outsourcing. During the next 5 years, although the share is expected to increase by 18.7% per year, the ICT-related tasks could intensify by 34.6% per year. An imbalance of the inputs and outputs in the future implies a mismanagement and in turn a failure to attain the goals.

Size of the ICT high-skilled manpower

A small-scale survey in 2005 found that a division, which is a smallest unit in the Thai public sector hierarchy, on average, had 18 ICT workers (Suksiriserekul, 2006). In the next 5 years, 7.5 additional workers are needed. Its annual budget is around 120 million baht (3 million US\$) with a rise of

16.3% per annum. Spending on ICT equipments (29.8% of the total budget) is higher than wage and salary paid to their staff (15.9%). The disproportion would lead to a bias against the ICT manpower and undermine recruiting new staff for unfilled positions.

Suksiriserekul (2006) estimates the demand for and supply of ICT high-skilled workers in the Thai public sector. Table 6 shows that there is a shortage of the workers. The most severe shortage occurs in 2006 with a deficit of 5,062 workers. Although the extent of the shortage subsides after 2007, the excess demand exists. A minimum estimation points out that the excess demand accounts for 16.1%, 9.8% and 4.3% in 2005, 2006 and 2007, whereas the slightly excess supply of 1% takes place in 2008. On the contrary, a maximum estimation indicates that the excess demand is 22.8%, 20.7%, 15.9%, and 10.6% in 2005, 2006, 2007 and 2008; respectively.

The study identifies factors influencing the demand for and the supply of ICT high-skilled workers in the Thai public sector. A rise in the demand is due to the requirement of ICT staff in the future, the age of current ICT workers and the higher ICT budget. On the other hand, a decline in the demand is a result of long periods of ICT-related training of the workers and more expenses for outsourcing ICT activities in the future. The requirement of ICT staff in the future affects the demand more than the other factors. The elasticity of this factor with respect to the demand is about 2.5 times that of the other factors. The supply goes up (go down) when an ICT worker has a long (short) working period and anticipates a rising (declining) wage rate in the future. The two factors affect quantitatively the supply similarly.

Human capital of the ICT high-skilled manpower

Suksiriserekul (2006) investigates the human capital aspects of current ICT workers in the Thai public sector. An average ICT employee is 33.6 years

old and has been working for 7.9 years. Sixty-two percent of the ICT workers have Bachelor's degree. Their ICT training period is rather brief, just only 8.2 days per person annually. An assessment by the heads of the ICT divisions reveals that existing ICT skills of their staff would be obsolete within 2.3 years. Furthermore, forty-seven percent of the staff do not have enough ICT skills in performing their jobs. After attempting various means of upgrading ICT skills of their staff, 53.1% of the heads are satisfactory with the results.

The study also examines the attitudes and opinions of new ICT employees in the public sector. An average person has been working for 3.6 years and acquires ICT training for 16.5 days a year. Although there are no criteria for identifying appropriate ICT training periods, half a month's training within a year could be judged to be too low. The load of work is higher by 15.1% over last year. Although 56.5% of the employees are happy with their jobs, 76.1% probably resign in the next 5 years. About one third of those will leave for the private sector.

6. Concluding remarks

It can be concluded that the Thai public sector suffers from an inadequate ICT manpower both quantitatively and qualitatively. The setback would worsen due to an increase in ICT-related services and responsibility as well as a rapid change in ICT technology. As a result, public agencies will demand more high-skilled ICT workers in the near future. The excessive demand could pile up due to the higher turnover rate of existing ICT staff. Some points to new ICT graduates as a way to release the intensive demand pressure. However, the production process of ICT specialists by higher education institutes is time-consuming. As knowledge and skills learned during the study are different from those required by

jobs, re-training is necessary and takes time. The excessive demand would eventually persist.

To restore the balance between the demand for and supply of high-skilled ICT workers, the demand has to be brought down. This means that public agencies will lower the provision of ICT services. After the political turmoil beginning in 2005, wealth creation by ICT is no longer desired by the majority of the people and policy makers. Priority has turned to address and tackle corruption. Public policies aim at re-distributing income more evenly among population, especially the poor. The government encourages practices of sufficiency economy as a substitute for the adoption of foreign innovation and globalization. Public agencies, therefore, is prudent and economizes in selecting and utilizing appropriate technology, including ICT. All of these imply that Thailand opts for a slow approach to be a KBE. Look on the bright side, it allows Thailand an opportunity to lay solid foundation in building up KBE.

References

- National Electronics and Computer Technology Center (2005) Thailand ICT Indicators 2005 National Science and Technology Development Agency, Ministry of Science and Technology, Bangkok, Thailand
- The National Statistical Office (2006a) Development Indicators of Thailand's ICT in 2006 Ministry of Information and Communication Technology, Bangkok, Thailand (in Thai)
- The National Statistical Office (2006b) The 2006 Information and Communication Technology Survey (Establishment) Ministry of Information and Communication Technology, Bangkok, Thailand
- SIPA (2007) Thailand ICT Market 2006 & Outlook 2007 (from website: www.sipa.co.th)
- Suksiriserekul, S. (2006) Human Resources Development in Supporting a Transition to Knowledge-Based Economy of Thailand. Human Resources Institute, Thammasat University, Bangkok, Thailand (in Thai).