

The Analysis of the Software Industry in Thailand

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Abstract—The software industry has been considered a critical infrastructure for any nation. Several studies have indicated that national competitiveness increasingly depends upon Information and Communication Technology (ICT), and software is one of the major components of ICT, important for both large and small enterprises. Even though there has been strong growth in the software industry in Thailand, the industry has faced many challenges and problems that need to be resolved. For example, the amount of pirated software has been rising, and Thailand still has a large gap in the digital divide. Additionally, the adoption among SMEs has been slow. This paper investigates various issues in the software industry in Thailand, using information acquired through analysis of secondary sources, observation, and focus groups. The results of this study can be used as “lessons learned” for the development of the software industry in any developing country.

Keywords—Software industry, developing nations.

I. INTRODUCTION

THIS information and communication technology (ICT) business was comprised of four main segments: computer hardware, computer software, computer services, and telecommunication (wired and wireless). Driven by the increasing use of technology in all aspects of society, the industry had been growing rapidly in Thailand, as in other countries around the globe, as an ever-expanding diversity of products, lower prices, and wider access to knowledge about how to utilize the various technologies has encouraged demand in the public, private, and civil society sectors. In consequence, by 2010, the Thai ICT market, accounting for 11% of the GDP, had risen to become one of the largest in the South East Asian region and was projected to grow at a compound annual growth rate of 12% over the 2010-2014 period [1]. The total value of Thai domestic spending on IT products and services, which had been in the vicinity of US\$5.4bn in 2010, was expected to reach US\$8.7bn by 2014 [1].

Increased usage of the Internet and software applications [2] has steadily pushed upward the overall market value of the industry. Total ICT market value increased every year from 2009 to 2011, when it reached a value of \$22,621 million, with a solid 11.7% growth from the previous year. By far the largest contributor to the market value was the telecommunications industry, which accounted for 61.7% (or

\$13,945 million) of the total ICT market. The remaining segments, in declining order of the magnitude of contributions to the overall market value, were computer hardware shares (at 14.8%, for a market value of \$3,350 million), software shares (at 12.4%, for a market worth of \$2,807 million), and services (at 11.1% shares, for a market value of \$2,519 million [1, 2].

II. ICT AND NATIONAL COMPETITIVENESS

In general, ICT has the potential to have both an economic and a social impact on a nation. In terms of economic impact, the World Bank [3] found that in low- and middle-income countries a 10 percentage point increase in broadband penetration could accelerate economic growth by 1.38 percentage points. In a similar study, McKinsey & Company [4] estimated that every 10 percent increase in broadband penetration in households could boost a country's GDP anywhere from 0.1 percent to 1.4 percent. In addition, Booz & Company [5] found that a ten percent increase in broadband Internet penetration in a specific year is associated with 1.5 percent greater labor productivity growth over the following five years. Furthermore, the growth of Internet and mobile applications has created jobs and has led to the creation of new businesses such as e-business, e-commerce, mobile applications, and social media. ICT also has had impact on entrepreneurship because it provides opportunities to create new types of business models, as well as reduce the cost of doing business. To summarize, there is a direct link between ICT and economic development. Several findings from both the aforementioned World Bank and UN reports concluded that the more successful economies have more technologies and are better prepared for using them to enhance their competitiveness.

A. Overview of Thai Software Markets

There were 870 firms (Software House) providing software products in Thailand. In 2011, the production value from these companies was about 29,418 million Baht, with a 10.1 percent growth rate; out of this number, software has the highest market share at about 60%, followed by Software Service (36% share) and Mobile Applications (3% share), which is the lowest value yet highest growth rate, at about 35% in 2012 [6].

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TABLE I
VALUE & GROWTH RATE OF SOFTWARE MARKETS AND SOFTWARE SERVICES
IN 2011 AND FORECAST FOR 2012

Category	Value (Million Baht)			Growth rate (%)	
	consumption 2011	manufacture 2011	manufacture 2012	manufacture 2011	manufacture 2012
Enterprise Software	27,880	17,865 (61%)	20,688 (60%)	7.9	15.8
Mobile Application	NA	1,065 (3%)	1,447 (4%)	13.6	35.8
Software Services	NA	10,488 (36%)	12,346 (36%)	13.4	17.7
Total		29,418	34,481	10.1	17.2

Source: The survey results of Thailand information technologies and communication market for the year 2011 and forecast for 2012 [6]

Note: Elements of Software Services can be found in the appendix; it is difficult to evaluate and measure the numbers for the consumption figures for some of information from foreign countries.

The growth of Enterprise Software markets was rising because of high government and business spending in IT. Mobile Application revenue was rising due to the expansion of Mobile phone services and high adoption among mobile users. Moreover, the growth of the software services markets comes from the Enterprise Software market expansion.

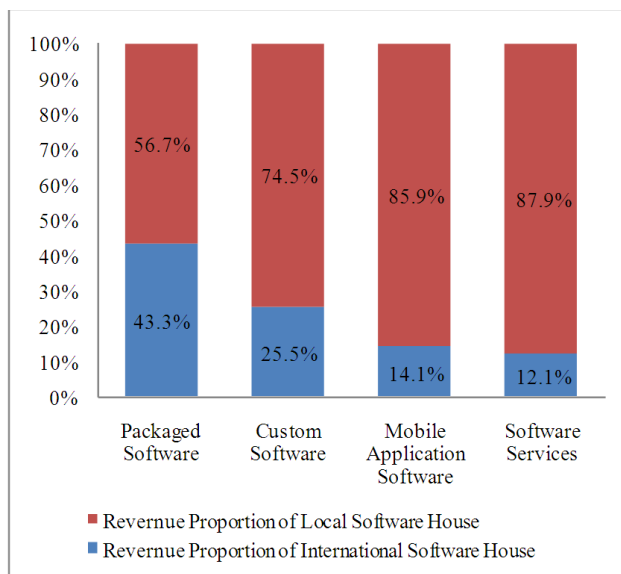


Fig. 1 Total value of software production and software services in 2011 Source: Summary for survey results of Information and communication technologies [7]

In software services and Mobile Application, Thai companies have a strong market share—87.9% and 85.9% respectively. However, for package software, the local companies have a market share of only 56.7%. Custom software has been largely dominated by the foreign companies.

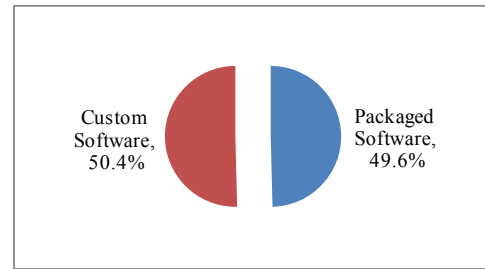


Fig. 2 Ratio of packaged software to custom software in 2011 Source: Summary for survey results of Information and communication technologies [7]

TABLE II
TOTAL PRODUCTION VALUE OF SOFTWARE SERVICE

Software services	percentage
Software maintenance services	42.7
Service and application hosting	13.9
Software as a service (SaaS)	9.5
Software service outsourcing	30.8
Software-related training and education	3.1
Others	0.0
Total	100

Source: Summary for survey results of Information and communication technologies [7]

In the software services markets, the highest share is Software Maintenance Services (42.7%) followed by Software Services Outsourcing (30.8%) Service and Application Hosting (13.9%) SaaS (9.5%), and Software-Related Training and Education (3.1%).

TABLE III
SOFTWARE AND SOFTWARE SERVICES MARKET SHARE BY ECONOMIC SECTORS

Economy	Percentage		
	Enterprise Software	Mobile Software	Software Services
Ministries and government agencies	26.2	16.7	15.1
Finance	41.4	35.5	23.6
Telecommunications	2.5	11.5	7.2
Education	5.9	1.4	2.5
Energy	2.4	20.3	5.1
Transport and Logistics	1.8	1.5	20.3
Manufacture	2.9	11.8	6.0
Motor vehicles and parts	6.6	0.4	11.9
Medical and Public Health	3.5	0.0	2.5
Retailing	2.9	0.1	2.1
Travel	0.3	0.8	1.1
Jewel	0.6	0.0	0.0
Others	3.0	0.0	2.6

Total	100	100	100
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Source: Summary for survey results of Information and communication technologies [7]

When categorizing Enterprise Software markets by economic sectors, the sector that has the highest spending in software was finance (41.4%), followed by the government sector (26.2%) and motor parts (6.6%). In the Mobile Application Software markets, the sector with highest spending was finance (16.7%). In the software service markets, finance had the highest spending (23.6%), followed by transport and logistics (20.3%), and the government sector (15.1%).

B. Current Challenges

1. Piracy

As regards threats and similar issues confronting the industry, two stood out in bold relief. The main problem by far was the prevalence of software piracy, an ongoing issue in the Thai IT industry, which has earned the dubious distinction of holding the top rank in the world in terms of software piracy. The lack of enforcement of copyright laws has led knowledgeable industry observers to conclude that most software installed on personal computers in the country has been obtained illegally. The consequences of this situation are several: legitimate purveyors of software are deprived of revenues that would have been realized from legitimate sales; the country did not receive tax revenues that would have been realized from legitimate software sales; and programmers, knowing that their software is most likely pirated, are bereft of the motivation to create software or other intellectual properties.

2. Shortage of Skilled Labor

Even though the numbers of people working in ICT related industry are rising, the number of those considered highly skill workers are shrinking. In 2012, there were 493,563 people working in ICT-related industries; however, only 1.8 percent of those people had a bachelor degree in ICT-related fields [7].

In conjunction with the country's shortage of highly skilled labor needed to support the development of software, the entry of new host countries in terms of software developers is a growing threat. More specifically, as Thailand's economy developed at a faster pace than that of other competitors and potential competitors, the country's longstanding status as the investment destination of choice for software developers was at risk of being lost to venues such as China, India, and Vietnam, which, in some instances, could offer even lower-cost software production, along with a higher level of software development skills.

3. Digital Divide

According to Fink and Kenny (2003), the digital divide can be defined as:

- A gap in access to ICT—measured primarily by the number of users or individuals with access per one hundred people

- A gap in the ability to use ICT—measured by an individual's skills set
- A gap in actual use—measured by the amount of time an individual goes online
- A gap in the impact of use—measured by economic returns or savings attributed to ICT [8]

The digital divide is a situation associated with differences between groups and societies in the deployment and diffusion of information and communication technologies (ICTs), especially computers and the Internet [9]. ICTs are the result of the combination of computer and telecommunications technologies. There is no doubt that ICTs can create advantages and disadvantage between people that "have" and "have not" accessed ICT.

In Thailand, there has been an increase in the use of cell phones, computers, and the Internet; especially cell phone use has almost doubled since 2004. Computer and Internet users have also increased in number, but not as rapidly as the growth of cell phone users.

Data collection from 18.28 million households revealed that 3.59 million households or 19.6% had a computer, but the access rate to the Internet was only 1.57 million households (8.6%) or less than half of the people that had computers. Moreover, the highest number of users of both computers and Internet connection were in Bangkok.

Digital Divide is the result of demographic factors, such as educational level, ICT workers, age, household income, and Internet expenditure, etc. The age of the population that exhibited the highest rate of computer use was between 6-14 years, and they mostly used the computer for playing games. The highest Internet usage rate fell to the age between 15-24 years—individuals studying in high school and for diplomas and in the university, and those that used the Internet for educational purposes. However, the working age (25-49 year) group, which is supposed to use the computer and access the Internet, showed lower usage than expected. This implies that working people likely make decisions based on insufficient information. However, Thai ICT workers, who are the most important segment in terms of leveraging the knowledge and strength of the ICT field, are increasing in terms of numbers and educational level, and they tend to work in areas with high-skill ICT job requirements. If Thailand had more people with high-level skills, it would help the country to develop its own advanced technology and also would help to increase the overall level of ICT competency. Further, these people could also play an important role in increasing the ICT knowledge of all the people in Thailand. In 2008, the average income per household was around 15,942 baht. According to the graph, the highest Internet expense rate was between 400-599 baht,, or approximately 3.2% of total income. Even though there was a free-of-charge Internet option, the quality and coverage were not so good, so this option could not sufficiently help to bridge the gap between people that had high and low information accessibility.

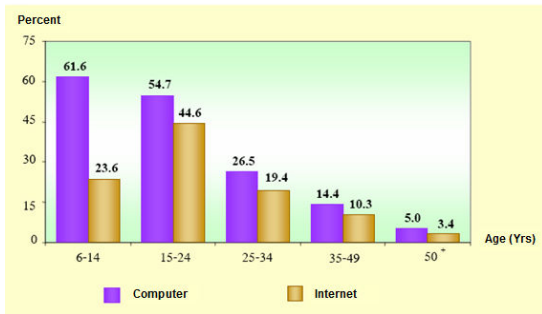


Fig. 3 Percent of Population over 6 Years of Age That Used the Computer and Internet Divided by Age in Thailand

The population aged 6 to 14 years had the highest computer usage rate (61.6%) and the individuals in the range of 15 to 24 years had the highest Internet access rate (44.6%).

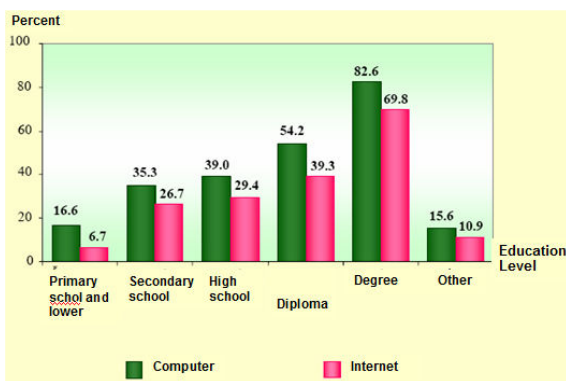


Fig. 4 Percent of population that were over 6 years of age that used the Computer and Internet divided by Education Level

In 2008, bachelor degree students had the highest usage rate of both computers and the Internet (82.6% and 69.8% respectively). Second ranked were diploma students, who used computers at 54.2% and accessed the Internet at around 39.3%.

We are in an information and knowledge economy, where access to ICT is a critical factor that can create differences among income status, education, and well-being. ICT can be viewed as offering people opportunities, and the use of IT creates a gap between people that can access it and people that cannot access or use IT. This can also lead to both social and economic impacts—people that have more information will have more bargaining power. Moreover, there is a strong correlation between the GDP and the usage of ICT. In addition, there is also a linkage between ICT and poverty reduction. The digital divide affects all regions and economies in the world along dimensions such as social equality, social mobility, economic equality, and economic growth and innovation. The digital divide also slows progress toward the goals of the Information Era, resulting in individuals, businesses, societies, nations, and the world losing development opportunities in areas having a relationship with the use of ICT. Therefore, bridging the digital divide in

developed and developing countries will provide better opportunities for the world's development.

4. Low Adoption among SMEs

Overview of SMEs in Thailand

TABLE IV
2010 THAI ENTERPRISE STRUCTURE

Enterprise size	Number of (units)	Share (%)
Small-sized enterprises	2,894,780	99.0
Medium-sized enterprises	18,387	0.6
Large-sized enterprises	9,140	0.3
Not specify	2,605	0.1
Total	2,924,912	100

Source: Office of Small and Medium Enterprises Promotion

Small- and medium-sized enterprises (SMEs) usually are critical to the national economy; they are considered a key mechanism for strengthening the economic development of a country. In 2010, the number of enterprises in Thailand was 2,924,912; out of this number, large enterprises merely constituted 9,140 units (0.3% share) while small- and medium-sized enterprises amounted to 2,923,167 units (99.6% share). The SMEs not only contribute to employment of up to 77.86% of the total employment nationwide, but also 28.40% of the total exports of the country.

TABLE V
THE IMPORTANCE OF SMES TO THE COUNTRY

The importance of SMEs to the country	Share (%)
Percentage of SMEs to enterprises. (%)	99.60
Value of exports by SMEs to total export value. (%)	28.40
Employment by SMEs to the total employment of the countries. (%)	77.86
Value of gross domestic product (GDP) of the country's SMEs GDP. (%)	37.9

Source: Office of Small and Medium Enterprise Promotion

The gross domestic product (GDP) generated through SMEs was 3,446,589.2 million baht representing 37.9% of the total national GDP, which was 9,104,959 million baht, with an annual growth rate of 1.9%. When considering GDP associated with the size of an enterprise, small enterprises (SEs) make greater contributions to the GDP than medium enterprises (ME) do by 2,295,711.5 million baht. In addition, the value of the SE GDP accounts for 25.2% of the total GDP and the value of the ME GDP which constitutes 1,150,877.7 million baht, accounted for 12.6% of rgw GDP.

TABLE VI
NUMBER OF SMES CLASSIFIED BY BUSINESS

Number of SMEs classified by business (2010)	Share (%)
Manufacturing Sector	18.71
Commercial Sector	47.49
Service Sector	33.76

Others	0.04
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Source: Office of Small and Medium Enterprise Promotion's report Year 2010 and Trends for 2011

Considering the number of SMEs in Thailand, as categorized by business function in 2010, the number of SMEs in the commercial and maintenance sector were highest, representing 47.49%, followed by service sector SMEs at 33.76% and the manufacturing sector at 18.71%.

5. Thai SMEs

Technology helps SMEs to create a competitive advantage by improving organizational effectiveness and encouraging innovation that promotes companies' capabilities to seek new market opportunities for their products or services. However, there have been few IT applications in Thai SMEs because of the following issues.

TABLE VII
THE USE OF IT IN ENTERPRISES IN THAILAND

The use of IT in enterprises in Thailand in 2011	Amount
Using a computer to operate business	Approximately 505,254 (23.5 %)
Using the Internet	Approximately 357,267 (16.6%)
The cost of goods and services, information technology and communications	Total 37,580.2 million or approximately 17,446.2 Baht per business
Personnel to complete the field of information technology. Information technology and operations personnel.	graduate technology, about 101,713 people (14.%) and other graduates of about 578,716 people (85.1 %)

Source: National Statistical Office, Ministry of Information and Communication Technology [10]

In 2011, the application of computers as operation units was as low as 505,254 or 23.5%, while the utilization of the Internet was just 357,267 or 16.6% [10]. The cost of goods and services, as well as information technology and communications, was 37,580.2 million in total or approximately 17,446.2 Baht per business, much lower than 17,446.2 per business in regard to the number of SMEs [10]. Generally, large enterprises include high IT costs, as there is high demand for workforces with information technology education. However, there are still few graduates with such degrees—just 101,713 people, or only 14.9%

As mention above, it is observable that SMEs are important for developing countries in terms of employment, the introduction of products and services, and monetization and exports. However, the applications of IT in promoting business group return rates remain very low these days. Therefore, strengthening IT infrastructure is critical for firms' survival and is essential to a firm's capabilities in competing in both domestic and international markets.

III. CONCLUSION

Software has become an enabling factor in enhancing the competitiveness in every sector. The software industry is critical to national competitiveness, and its growth has been rising steadily. However, several challenges and problems still hinder the competitiveness of the industry. For example,

piracy is prevalent, and there is a shortage of skilled labor, especially among highly- skilled workers. A digital divide still exists in most parts of the country, and there has been slow adoption of software among SMEs. The lessons learned from this study can be used to guide policy for software development in other developing countries.

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