Thailand Open ICT Ecosystems: a Scenario Analysis of Electronic Commerce Infrastructure Investment for Small and Medium Enterprises

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Abstract—Compatible electronic commerce performance needs a single digital ecosystem for engaging in global knowledge economy. This means that entrepreneurs will be able to position their businesses for economic expansion throughout the power of information communication and technologies (ICTs) based on the ICT sharing without unfair treatment and monopoly. In Thailand, the small and medium enterprises (SMEs) are playing important roles for increasing Thai economic growth. The Thai government cooperates with those SMEs who are on the first stage of using electronic commerce systems and technologies for driving their business to global economic. The most important factor is the ICT infrastructure which is invested by both public and private sectors. This paper aims to present the growth of Thailand’s electronic commerce from the infrastructure investment perspectives via the SMEs perspectives. This consists of the current situation of Thailand’s electronic commerce infrastructure and investments in the infrastructure. The current situations noted are a) the ICTs development policies and plans, b) the pace of electronic commerce infrastructure development based on statistics such as the network readiness and IP network size, and c) electronic commerce laws and regulations. Finally, a model of Thai open ICT ecosystem engaging with SMEs’ electronic commerce will be proposed.

Index Terms—Thailand Open ICT Ecosystems, Thailand E-Commerce Infrastructure, E-Commerce Infrastructure Investment

I. INTRODUCTION

In order to promote Thai SMEs’ participation in the world of electronic commerce, the Thai government needs to engage in the open ICT ecosystems. Ideally, the open ICT ecosystems provide equality and aims to reduce the digital divide around the countries. The Open ICT ecosystems are based on five principles: inter-operation, user-centre, collaboration, sustainability, and flexibility [1]. The policy on the ecosystems has to be established with the cooperation between the government and private sectors. Consequently, those SMEs will be able to access electronic commerce technologies and promote their products to customers in the external (international market) and internal markets (domestic market) with the capability to construct their online market niches worldwide.

Whether Thailand will succeed with electronic commerce will depend on cooperation between all sectors and especially support from the government. The Thai government has established relevant organisations to support the entrepreneurs, disseminating information and promote knowledge about electronic commerce. SMEs and customers also have to contribute to the establishment of service centres in support of electronic commerce in all regions around the country [2].

Moreover, the key factors influencing the development of electronic commerce in Thailand are the Internet users, Internet and its related infrastructure. In the 9th (2002-2006) and the 10th (2007-2011) Thai National Economic and Social Development Plans, information and communication technologies investment in the country is an important feature with the aim of achieving the following objective:

“Southeast Asia as a stimulating and growing market for telecommunications and information technology and services [3].”

The U.S. Ambassador to Thailand, Mr Ralph L. Boyce, has affirmed in 2005 that the United States has paid attention to the Southeast Asian region as an ICT infrastructure arena. Consequently, the cooperation of United States Trade and Development Agency (USTD) and ASEAN counties has caused an upsurge in the establishment of telecommunication infrastructure, resulting in an upgrade of the delivery services. The initiatives also resulted in the promotion and facilitating the e-commerce environment in Southeast Asia. The cooperation encouraged many information and communication technology (ICT) organisations in this region to accelerate enhancement of the ICT infrastructure. Based on information from the U.S. Commercial Service, Thailand telecommunications market has maintained a steady growth of between 5 to 7 percents. The mobile phone growth has continued to expand at double digits, and Internet usage continues to grow at 20 to 30 percent per year. Even though Thailand is lagging behind the implementation of new technologies, the country has followed developed market trends on wireless technologies which have evolved from analogue to digital, and from dial-ups to broadband [4].

In 2006, The Ministry of Information and Communication Technology (MICT) announced that
Thailand is all set to be the new ICT hub of ASEAN through its ICT infrastructure and global collaboration in ICT trade, investment, and development. The ‘Bangkok International ICT Expo 2006’ was held to support and encourages international partnerships in ICT development. The expo has been held since 2004 and is becoming an important driving force to prepare and support the Thai entrepreneurs for global electronic commerce. Through the Expo, Thai ICT entrepreneurs have the opportunity to present their products in the world-class ICT exhibition and to network with worldwide ICT businesses. This is one of the trade strategies of Thai government in order to build the capacity of Thai’s ICT infrastructure in the ASEAN region and amongst the world [5].

The aforementioned notions imply that SME electronic commerce in Thailand is undergoing ICT development in terms of capabilities in the aspects of integration, sustainability, interoperability, collaboration and investment. These capabilities are contributing to drive Thailand into the open digital ecosystem with an intention to achieve economic growth for the nation.

II. CURRENT SITUATION OF E-COMMERCE INFRASTRUCTURE IN THAILAND

A. The Information Communication and Technology (ICTs) Development

The International Institute for Management Development (IMD) World Competitiveness Yearbook measures 55 countries on the basis of 323 criteria. The 2006 results showed that ICT infrastructure investment in Thailand ranked in the bottom group of the list and tended to decrease continually including international call charge, number of mobile owners, communication technologies which meet requirements of business sector, number of Internet users, number of broadband holders, and ICT skill. However, cost of Internet connection, cost of mobile services, and cost of hi-tech product export were low when compared with competitors. These are the strong points of Thailand. In addition, there were some factors of improvement such as the number of telephone lines, rate of computer usage, number of computers per head, budget support for developing ICTs, ICT laws and regulations, and awareness of cyber-security in business. In 2007, the IMD results show that Thailand’s ability to compete with other countries worldwide was ranked number 33. The number was down from number 29 in 2006 [6].

Although its ranking is quite low when compared with other countries; Thailand still continues with its investment and development of ICT infrastructure according to the National ICT Policy Framework 2001-2010 (IT2010). IT 2010 composes of three main elements: a) human capital investment providing for knowledge-based economy, b) innovation promotion in social and economic system, and c) ICT investment and information industry contribution. Quantity and quality of e-industry, e-commerce, e-government, e-society, e-education have been developing and improving since the IT2010 plan was launched in 2001 [7].

In order to achieve the goals of IT2010, two core groups appear to drive Thailand towards the knowledge-based economy (KBE): a) decision makers such as the Parliament, the cabinet, National Science & Technology Development Agency (NSTDA), National Research Council of Thailand (NRCT), Thailand Science Park, National Innovation Agency, etc., and, b) supporters such as National Economic and Social Development Board (NESDB), Thailand Board of Investment (BOI), etc.

These groups are cooperating to drive the ICT infrastructure in order to support online business in both the domestic and international market. It is possible to meet the goal because the 2006 survey by the Japan External Trade Organisation (JETRO) showed that Thailand is the most advantageous place for establishing a base for products or sales in the next 5 to 10 years [8]. Thailand also serves as a gateway to Southeast Asia and Greater Mekong sub-region. Moreover, Thailand also has upgraded ICTs and its network repeatedly which support the business entrepreneurship via the electronic commerce models and platforms. It is reasonable to point out that Thailand is evolving into a regional ICT hub which possesses the potentials to attract foreign investments in ICTs [9].

B. Pace of Electronic Commerce Infrastructure Development

Many factors need to be considered to lead Thai electronic commerce to the world stage, especially, ICT infrastructure supporting the electronic commerce. The latest World Economic Forum reported that network readiness index (NRI) of Thailand ranked 37th in 2006-2007, 34th in 2005-2006, and 36th in 2004-2005 [10].

The International Telecommunication Union (ITU) reported that Thailand has fixed telephone lines per 100 inhabitants at 10.92; mobile cellular subscribers per 100 inhabitants at 63.02; computers per 100 inhabitants (2005) at 6.86; Internet users per 100 inhabitants at 13.07; Broadband Internet subscribers per 100 inhabitants (2005) at 0.16; International Internet bandwidth (Mbps) at 9,909; Radio sets per 100 inhabitants (2000) at 22.89; TV sets per 100 inhabitants (2003) at 28.46; population covered by mobile signal at 30.92 [11].

In term of Internet bandwidth, it is divided into two groups: a) domestics bandwidth runs on 126.71 Gbps, and b) international bandwidth runs on 20.621 Gbps [12]. Figure 1 and 2 show the pace of growth of the bandwidth since 1999 until 2007. This implies that Thailand has constantly increasing bandwidth can be beneficial to electronic commerce performance.

![Fig.1. Internet International Bandwidth (Source: NECTEC [12])](image-url)
The Internet map of Thailand presents the Internet connectivity in the country as September 2007 which comprises of overall networks in all dimensions such as academic, research, government, business, international gateway, national Internet exchange, and international provider.

In Asia, Thailand is ranked number 10th on the IP-public electronic transaction, and punishments. The Internet map of Thailand presents the Internet connectivity in the country as September 2007 which comprises of overall networks in all dimensions such as academic, research, government, business, international gateway, national Internet exchange, and international provider.

The law composes of 2 sections and 30 articles which distinguish computer crimes and the roles of related officers.

Criteria and Approaches in Public Electronic Transaction Decree was ratified in November 2006. The decree composes of 10 articles which distinguish the electronic information format and system including information flow and its timeframe.

Telecommunication Law was ratified in November 2001 which composes of 10 sections and 81 articles. The law distinguish process of telecommunication entrepreneurship, telecommunication network link and use, standard of telecommunication network and it peripherals, rights of entrepreneurs and costumers, service contract, fee and service charge, monitoring and control, and punishment.

National Information Infrastructure Law is in process of approval from the cabinet.

Data Protection Law is in process of approval from the cabinet.

Electronic Funds Transfer Bill has just finished a draft proposed by NECTEC and Bank of Thailand. These laws and regulations are not enough for developing open ICT ecosystems in Thailand. The areas of legal practices in the near future should also cover the following legal issues that may surface in the realisation of open ICT ecosystems in Thailand:

- Civil Liberties—concern with free speech, privacy, freedom of the press, free assemblage, and freedom from persecution.
- Antitrust and Competition—concern with consumer protection, business monopoly, competitive behaviours, prevention of new products and services.
- Intellectual Property—concerns with intellectual property rules, regulations and enforcement, property rights, and upholding broad access to creative thoughts and articulations of thoughts as public goods.
- Communications—needs to eliminate oligopoly telcos by the private sectors; joint Internet exchange points and examining agreement; home-based ISPs, WANs, and wifi.
- Enterprise, Tax, Electronic Commerce and Labour Law—concern with business licensing, entrepreneurial participation, taxation, effective commercial courts and alternatives, law covering electronic commerce, labour laws, competitive wage market for workers.
- International involvement—concerns with conditions among nations, trade agreement, investment, and immigration.

III. FRAMEWORK OF OPEN ICT ECOSYSTEMS FOR SMEs IN THAILAND

SMEs are the key economic driver of Thailand and in order to support them to achieve success with electronic commerce, a key action that the Thai government has to do is setting up the open ICT ecosystem with the aim of developing the framework of the ecosystem to reduce the digital divide around the country. The framework should be composed of three layers (adapted from Nahira [17]):
A. Layer 1: the basic ICT infrastructure which consists of electronic commerce knowledge sharing network among the SMEs and related organisations and institutions including e-business models and approaches, the best e-commerce practices, basic e-services and architectural modules, network and electronic commerce technologies, and its protocols. The open ICT ecosystems framework should be developed in this phase. Figure 4 shows that the open ICT ecosystems should be created on the basis five principles of openness [18]:

- Interoperability—open standards, open source software.
- User-Centre—service orientation.
- Collaboration—working together among government, businesses, and related stakeholders in leveraging strengths, creating solutions, innovating and constructing the ICT ecosystems.
- Sustainability—retaining steadiness and resilience of ICT ecosystems in order to flourish and progress.
- Flexibility—acclimatising flawlessly and speedily to new knowledge and innovations.

B. Layer 2: the specific operations which compose of specific training, specific business models and procedures, specific e-services, specific solutions, etc.

C. Layer 3: specific node of innovations and local implementations means that the ICT ecosystems implementation in terms of innovation or in local areas.

Figure 4 shows the three key drivers of the Open ICT Ecosystem: efficiency, innovation and growth. They are the encouragement for the government, SMEs and customers in gaining advantages from the ecosystems. Features in the new paradigm include increased business choices and competitions; greater access to information and standard specifications with relevant supporting materials; the ability to control scalability and upgrading of the projects; and, protection of market value. In addition, the government, SMEs and customers have the opportunity to engage their business activities together. In Thailand, larger competition among suppliers, manufacturers and service sectors has the potential to help them to gain return on investment and to improve performance. For example, the ICT open ecosystem can make the government gain greater efficiency in the ability to work with new low cost and sophisticated ICTs and digital systems, to be transparent in investment negotiation with business sectors, to set requirements and contractual terms, etc. Moreover, SMEs and customers can gain more benefits from the open ICT ecosystem such as more choices of higher quality products and services, generation of new niche markets, accessibility to different choices of interactive devices, richer information, low cost access, transparency in the workflow and working environments, knowledge sharing and better project control.

IV. E-COMMERCE INFRASTRUCTURE INVESTMENT

Constructing open ICT ecosystems in Thailand is a new initiative, with only the Roadmap of Open ICT Ecosystems [18] appears as a link on the NECTEC website. However, the government is interested on the perspective and has started spotlighting the ideas via...
related organisations. In addition, the open ICT ecosystem is one of many approaches which the government is attempting to support and drive the economic growth. Investment into electronic commerce infrastructure is a key government’s role for leading the public and private sectors including citizen towards the digital economy.

1) The Government Roles

The Thai government is an important player in leading and supporting investors worldwide to invest in ICT industry sector. The Thailand Board of Investment (BOI) has engaged with this issue closely by generating the circumstances that attract private sector investors. BOI has promoted and given privilege rights to those investors including constructing the attractive investment atmosphere of the country. According to the IT2010 plan, seven strategies were proposed: 1) ICT industry promotion and contribution, 2) ICT for quality of life, 3) ICT research and development, 4) social infrastructure for compositeness, 5) retaining entrepreneurs, 6) penetrate small and medium enterprises to the ICTs, and 7) deploying ICT in the government [7].

The Office of the National Economic and Social Development Board (NESDB) [19] showed the ICT investment of Thai public companies around the country in the fiscal budget 2007 is 25% (25,487 million Baht) of the national income. This implies that Thai ICT infrastructure is still being invested constantly by the public sector.

The national Telecommunication Commission (NTC) had awarded 122 licenses to entrepreneurs in variety business such as Internet services, network provider & service provider, international calling card, IIG & NIX, very small aperture terminal (VSAT) Service, and resale [20]. Since November 2006, only the ISPs entrepreneurs who were awarded licenses have been allowed to provide voice-over Internet protocol (VoIP) calling services.

The aforementioned is only a few parts of the activities which the government has issued and operated with expectation to reach the national information infrastructure stability which will become a significant foundation for electronic commerce affairs in all dimensions.

2) Foreign Investment

Thailand is increasingly growing its role in ICT and related industry. For example, in hard disk drive manufacturing sector, Thailand ranks number two in the world and, moreover, Thailand still ranks number five in the Asia Pacific rim in 2003 in printed wiring board (PWB) or printed circuit board assembly (PCBA) industry. New investors from aboard are coming increasingly to invest in this sector, new factories established by these investors are running on online business. BOI still plays its roles for inviting new investors to join the ICT, software and electronic industry sector [21].

The main sources of financing ICT infrastructure development in the country need assistance from both public and private sectors in partnership contracts. Otherwise, the sectors may receive loans from the international or regional financial institutions or domestic financial institutions with low interest rate. The government has to pay attention to the risk management in order to guarantee the investment because of the size of these huge projects.

It is expected that ICT infrastructure in Southeast Asia region will expand within next 15 years (2006 to 2015) [22], especially Thailand which has many strong points as IMD [6] reported. Consequently, Thailand should start free trade for ICT infrastructure businesses by pushing small and medium enterprises to the ICT infrastructure arena. Eliminating ICT infrastructure monopoly by huge transnational companies include the propping up of successful electronic government and businesses such as government-to-business (G2B), government-to-citizen (G2C), business-to-business (B2B), business-to-customer (B2C), etc.

There are many challenges which Thailand is still encountering especially on how to solve the problem of the lack of ICT literacy among the rural communities, removing the digital divide, allocating more percentage of GDP to support R&D in ICT infrastructure area and reducing ICT appliance tariff, etc.

V. CONCLUSION

Development of ICT infrastructure and investment is a significant task for the Thai government and private sector. Growth of electronic commerce depends on the stability of ICT infrastructure; number of Internet users and their online behaviours; number of Internet service providers (ISPs) in all categories: Internet services with third party network, small network and leased capacity from others, large and dedicated network; low Internet access charge; domestic ICT market; consumer behaviours; and so on. Thailand is still encountering the gap of Internet access between urban and rural area. Therefore, ICT infrastructure investment becomes a major issue of the country. It is a big project with many concerns and requires big capital investment and challenges. This paper aims to provide a picture of the current status and it is believed that the information is useful for anyone having interest in the e-Commerce and ICT industry in Thailand. However, leading the country to the open ICT ecosystems is a challenge for the Thai government in diverse dimensions. The issues which have to be considered are: a) readiness and availability of ICT human resources, b) sufficient ICT investment, c) reduced digital divide, d) ICT laws and regulations support, e) ICT research and development, f) transparent ICT business entrepreneurship, and g) readiness of Thai citizen in terms of ICT literacy and their ability to access sophisticated ICT technologies and services. It is hopeful that Thailand SME participation in the ICT ecosystems will bring benefits to the communities in the long term.

REFERENCES

