

Telecommunications Network Development: Organisational And Societal Challenges For Thailand

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ABSTRACT

The overall aim of the paper is to provide a brief introduction of Thai telecommunications industry - the past, present, and the future. The paper will report the strategic issues related to network planning for Thai telecommunications infrastructure development; the organisational and societal challenges encountered by companies for telecommunications network development in Thailand.

The first part of the paper will focus on the organisational challenges faced by the public and private telecommunications operators for expanding the network. The second part will report the areas related to societal challenges anticipated. Directions for further research will also be provided.

1. INTRODUCTION

Due to the rapid growth of the economy, developing nations like Thailand is facing tremendous pressure from the end users and business sectors to expand their networks. There is a huge demand for service, but the

major telecommunications service providers are unable to meet the demand for the nation. Currently, companies like NYNEX, Pacific Telesis, AT&T, NTT and the others are working with the local Thai companies for expanding networks and meeting the user demand. The TOT (Telephone Organisation of Thailand), the CAT (Communications Authority of Thailand) are the major state enterprises in the market. In Thailand, the overall telephone penetration is around 5 per 100 population. [1]. By the year 2000, Thai government is planning to have an overall penetration of 9.35 per 100 population. [2]. To satisfy the unmet demand, the Thai government is planning to increase their telephone lines from 3.5 million lines to 5.5 million lines by the year 2000. Thailand's required investment from 1993 to the year 2000 is forecasted to be more than US\$6,565 million.[3].

On the basis of the above factors, it is clear that Thai telecommunications industry needs immediate strategic attention for the development of a sound telecommunications network. Due to the improper financial facilities, the Thai government started to give concessions to local companies like TA (TelecomAsia), TT&T (Thai Telephone &

Telecommunications), and Shinawattra etc for improving the telecommunications network.[4].

2. THAI TELECOMMUNICATIONS INDUSTRY

The Thai telecommunications industry will be discussed under the following categories:

- 2.1 Historical Overview;
- 2.2 Industry Structure;
- 2.3 Legal Foundations & Financial Health;
- 2.4 Services Development; and,
- 2.5 Private Sector's participation

2.1 Historical Overview

Historically, communications infrastructure development has played a key role in the development of Thailand since the deployment of the first public telegraph service in 1875.[5]. A brief chronology history is provided in Table 1. As in most nations, Thai telecommunications history has largely been directed under the influence and control of various government agencies. The present telecommunications infrastructure development is under the control of three organisations: the Post and Telegraph Department (PTD); the Telephone Organisation of Thailand (TOT); and, the Communication Authority of Thailand (CAT). PTD is responsible for policy rules and regulations; CAT is responsible for the operational and control of international services; and, the TOT for domestic telephone services. Whist the TOT and the CAT are state enterprises and PTD a government department headed by the director general. All three organisations are eventually directed by the Ministry of Transport and Communications (MOTC). [6].

Thailand in the late twentieth century, is one of the wave of Asian countries (after Japan and the "four dragons") to engage in widespread industrialisation. Bangkok has become an important world city--home to the regional offices of many international organisations and this has created tremendous demands on the adequacy of a proper infrastructure, including telecommunications. [7]. Thai government introduced the telephone and telegraph into Thailand (called Siam until 1939). By law and regulations, government agencies have had a monopoly on them since nineteenth century, but this began to change with the 1991 announcement of new franchises-one for Bangkok and one for up country. The first government act was to give a twenty-five year concession to Telecom-Asia (strategic partner Nynex) for installing two million telephone lines for BMA (Bangkok Metropolitan Area) and at the same time one million lines concession was given to TT&T (Thai Telephone & Telecommunications) for up-country. [8].

In 1992, the ratio of telephone lines per population was only 3.3 lines per 100 population and by the end of 1993, the ratio increased to 5 telephone lines per 100 population. Thai government's Seventh National Economic and Social Development Plan ending in 1996 is to expand the telephone network to achieve a ratio of 10 lines per 100 population. The National Economic and Social Development Plan Commissioner indicated that Thailand's telephone penetration ratio should be 25 lines per 100 population to be competitive with other developed Asian nations. [9].

Thai telecommunications development started in 1869, when two Englishmen received permission to set up a British company for the installation and maintenance of telegraph system for various provinces of Thailand. The connection was given from

Penang in Malaysia. Unfortunately, the British company could not complete the project. In 1875, Thai government assigned the Ministry of Defence to install a telegraph line from Bangkok to Samutprakarn (a fortress town on the Gulf of Thailand). A 46 km distance telegraph line was established at Saranromya Palace in Bangkok. A 32 km telegraph was installed in 1878, running from Bangkok to Bang-Pa-In Palace. In July 1885, Thailand joined the International Telegraph Union and in 1886 telephone service was moved from the Ministry of Defence to the Post and Telegraph Office (PTO). The PTO was split into departments for post and for telegraph (including telephone) in 1891, and was recombined as the PTD (Post and Telegraph Department) in 1897. By 1930, most of the major cities and major towns were linked with Bangkok, and, in some cases, directly with each other. Releasing the extent of demand for telephones, Thai government ordered two exchanges (totalling

3500 lines) from General Electric company in 1945. [10]. By 1978, Thailand had 146 telephone exchanges with 362,150 numbers and in 1980 TOT(Telephone Organisation of Thailand) estimated that only 25% of the population had access to telephone services. In 1988, only thirty-six out of the seventy-three provinces had telex services.

During 1990 to 1991, the TOT took some major initiatives for upgrading the telecommunications infrastructure of Thailand by offering more flexible services to subscribers. The major movements taken by TOT over the years are the introduction of special SPC (Stored Program Control) exchange system services; paging services; NMT 900 MHz Mobile telephone service; Data transmission network service (DATANET); Toll Free Call 088 services; and, the introduction of Public Card phone service. [11].

1875	First telegraph service
1881	First telephone service
1883	Postal & Telegraph Department Established
1897	Postal & Telegraph Departments combined to become the Post and Telegraph Department (PTD)
1931	First private citizens' radio station
1936	First long distance telephone service (to Tokyo)
1954	Telephone Organisation of Thailand (TOT) established
1963	First international telex services (to Japan)
1966	Thailand became a member of INTELSAT with 0.1 percent share
1971	First radio paging service
1972	First car phone installed
1976	Communications Authority of Thailand (CAT) established
1979	First facsimile transmission service
1984	Thailand's share of INTELSAT increased to 0.49 percent and GTE International was contracted to build the earth station near Bangkok
1991	Shinawattra was given a 8 year monopoly contract to launch ThaiSat for television, government and domestic communication needs, as leases expire on the other satellite systems
1991	TelecomAsia was given a 25 year concession for installing 2 million telephone lines for Bangkok Metropolitan Area
1991	TT&T (Thai Telephone & Telecomm.) was given concession for installing 1 million telephone lines for up-country
1995	Privatisation plan announced

Table 1. A brief chronology of Thai Telecommunications Development [12].

2.2 INDUSTRY STRUCTURE

Three organisations are responsible for telecommunications: the PTD (Post and Telegraph Department), the CAT (Communications Authority of Thailand), and the TOT (Telephone Organisation of Thailand). PTD is responsible for rules and regulations, CAT for the operation of post, telegraph and related services, and TOT for telephone services. But in practice all three organisation's authority overlaps. Furthermore, PTD is a government department headed by the director general, whereas CAT and TOT are state enterprises, and as such supposed to operate like private companies. TOT is responsible for the domestic telephone service, international service to Laos and Malaysia, and leased circuits for domestic point-to-point transmission of voice, telegraph, radio, and television. TOT employed about 17,000 personnel in 1989. On the other hand, CAT is responsible for the postal service as well as telegraph and telex, telephoto and facsimile services, domestic radio-telephone links, and, international leased circuits. CAT employed about 20,000 personnel in thirty-six divisions in 1989. [13].

2.3 LEGAL FOUNDATIONS AND FINANCIAL HEALTH

Five major laws form the legal foundations for post and telecommunications in Thailand. They are the Telegraph and Telephone Act 1934, the Post Act of 1934, the Telephone Organisation of Thailand Act of 1954, the Radio Communication Act of 1955, and the Telecommunications Authority Act of 1976. [14].

Due to the budget constraints, the TOT could add about 200,000 telephone lines per year in the late 1980s, despite a reported half-million line backlog in 1990 and 1.2 million in 1991. [15].

2.4 SERVICES DEVELOPMENT

By 1978, Thailand had 146 telephone exchanges with 362,150 numbers, including 32 exchanges with 277,918 numbers in Bangkok (population over 4 million then) and 114 exchanges with 89,232 numbers in up-country. [16]

The CAT has developed major plans or projects for increasing the efficiency to make services comparable with those in other countries and compatible with economic growth in future. [17]. Their major acts are as follows:

1. Project on the development of telecommunications business in specific economic area (Teleport);
2. Project on expansion of international telephone services of SPC system (ITSC IV);
3. Fibre optic submarine cable project;
4. Thai-Malaysia fibre optic submarine cable system; and,
5. Thai-Vietnam-Hong Kong fibre optic submarine cable system.

At the end of 1993, TOT had a capacity of 1,588,635 basic telephone lines at 204 exchanges in the metropolitan area. Of these 1,586,611 lines at 189 exchanges were operated by TOT itself, and 105,000 lines at 15 exchanges were run as a private-sector joint venture. In the provincial areas, the TOT had a capacity of 957,446 lines at 894 exchanges, a total of 2,540,081 lines at 1098 exchanges—an increase over the previous year of 380,080 lines and 222 exchanges. [18]. The services development chronology by TOT is shown in Table 2.

1954	TOT established and had 4 exchanges, namely Wat Liab, Bang Rak, Sam Sen, and Phloenchit, with 10,000 lines
1960	The PTD transferred 10 provincial telephone exchanges with 1,600 lines and later another 37 provincial telephone exchanges with 8,100 lines to TOT
1964	The Ministry of Transport and Communications transferred its long distance telephone networks in the Central, Eastern, and Northeastern regions to TOT
1969	Northern and Southern long distance telephone networks was transferred by Ministry of Transport and Communication to TOT
1986	The TOT introduced NMT 470 MHz mobile phone service
1990	TOT introduced the Special SPC Exchanges System services
1990	Introduced Paging services
1990	Introduced Data Transmission Network service (DATANET)
1990	Introduction of Toll-Free Call 088 services
1990	TOT invited the private sector to bid for "Three Million-Line Expansion Project"
1991	Introduced the Public Card Phone service

Table 2. Service Development Chronology of TOT

2.5 THE PRIVATE SECTORS' PARTICIPATION

Private sectors' involvement in Thailand's telecommunications infrastructure development based on selected telecommunication concessions is provided in Table 3. Due to the rapid economic growth Thai government is encouraging private participation through concessions as a way to speed network development and develop new

services.[18]. Private companies like TelecomAsia, is considering a radical change from the current switching plan that supports more than 75 exchanges and many RSUs to a more concentrated approach. The concentrated approach will focus on 3 exchanges' sites covering the provision of the first 300,000 lines with a view to expanding this of 9 exchanges' sites for the full implementation. The anticipated network expansion is for the first five years is 2 million lines. [19].

Project	Investor	Year	Start	Owner
2M lines	TelecomAsia	25	1992	TOT
1M lines	TT&T	25	1993	TOT
Satellites	Shinawattra	30	1993	MOTC
Paging	Shinawattra	15	1990	TOT
Data	Shinawattra	10	1990	TOT
Cellular	Hutchinson	15	1990	TOT
Paging	Pacific Telesis	10	1987	CAT
Cellular	TAC	15	1991	CAT

Source: Shinawattra International

Table 3. Private Sectors' Involvement

3. STRATEGIC NETWORK PLANNING

At the strategic telecommunications network planning level, the national planners should identify the problems with the present planning status. Looking at Thailand's present telecommunications infrastructure, it is obvious that there must be some gaps at the strategic planning level.

The following measures can support the argument that immediate attention is required at the strategic planning level. The existing problems that are identified in this paper are as follows:

- (1) Low overall telephone penetration;
- (2) Long waiting lists;
- (3) Wide disparity between information-rich and information-poor;
- (4) Existing X-Bar Switching systems;
- (5) The National Economic and Social Development Plan; and,

(6) The available technology(HW & SW)

Existing literature on Thai telecommunications infrastructure development shows the dissimilarity between the Seventh National Development Plan and the ITU (International Telecommunication Union) projection. In the Seventh National Plan, the government clearly states its intention to develop the country's telecommunications infrastructure and to become the regional centre of Southeast Asia. The target was to provide a telephone penetration of 10 telephone per 100 population and approximately six million lines by 1996. [20]. ITU's projection states that Thailand's overall telephone penetration is expected to be 9.35 telephone per 100 population by the year 2000. [21]. However, if we consider Thailand's GNP per capita income of 75,000 Baht (US\$3,000) and the forecast made by Seventh National Economic and Social Development Board, it is inevitable that Thailand will still be short of telephone lines.

Literature reveals that the demand for telephones may rise as high as 10-12 million by the year 1996. [22].

The major obstacles faced by the Thai public telecommunications operators (PTO) are financing, and advanced technology. To achieve the target set by the Seventh National Economic and Social Development Plan-Thailand will require approximately 300 million Baht in equipment expenditure alone. Government budget shortage and limited long-term strategic planning has resulted in delay and postponement of telecommunications projects. [23]. So, privatisation of telecommunications services is the only way to cope with the rapid economic growth of the country.

4. ORGANISATIONAL CHALLENGES

The organisational challenges to be addressed for telecommunication network development are as follows:

- 4.1 Economic Pressure;
- 4.2 Technological Leapfrogging;
- 4.3 Human Resources Development;
- and,
- 4.4 Regulatory Environment

4.1 Economic Pressure

The geographical location of Thailand gives an advantage for economic growth. Bangkok is becoming an important city of the world and many multinational companies subsidiary offices operate here. Thailand's economy has experienced a rapid growth in recent years in comparison with the OECD nations. In the period 1982 to 1992, Thailand experienced a GDP growth

rate of around 16%, while maintaining a comparatively low level of inflation. [24].

The economic growth in Thailand has brought on a very high demand for telecommunications services. Due to economic pressure, the public telecommunications operators are facing challenges for expanding their networks. The telecommunications network expansion requires funding from the public, private and foreign sectors. However, there has been an increase in the international borrowings for infrastructure development in Thailand.

4.2 Technological Leapfrogging

Telecommunications industry is changing very rapidly and most of the organisations are facing challenges for the adaptation of new technology and technological obsolescence. Due to financial and regulatory constraints, private sectors are unable keep track of the technological advancement. So, at the strategic planning level we need to look at the current hardware and software usages by neighbouring country's telecommunications industry and the requirements to adopt that advance technology.

Companies like TelecomAsia, are shifting from the existing switching plan that is designed to support more than 75 exchanges and many RSUs and are adopting a more concentrated approach. TOT needs immediate attention for the replacement of their X-Bar tandem to SPC (Stored Program Control) tandem. [25].

4.3 Human Resources Development

Human resources development should be given a very high priority at the national planning level. Most of the companies are

facing difficulty with their human resource development scheme, especially the SMEs (Small and Medium Enterprises) are suffering most. The telecommunications net-

work planner need to rethink about the development of human resource for future network expansion. Government universities and colleges should open courses in telecommunications. For example: Thailand's Assumption University is now in the process of opening up Telecommunications Technology department; University of Wollongong, Australia is offering strategic telecommunications planning courses for the industry people.

4.4 Regulatory Environment

Thailand plans to privatise its two national telephone companies--the CAT and the TOT--to help them compete with country's private fixed line service suppliers, TelecomAsia and Thai Telephone and Telecommunications. Details regarding the treatment of assets in a sale, especially about the revenue TOT receives from TelecomAsia and TT&T for network interconnection is still to be determined. However, the privatisation plan declared by the Thai government is not finalised yet.

Due to the country's regulatory environment, private participation is repeatedly hampered and the foreign companies are also finding it very difficult to understand the major public players acts and motives towards privatisation and liberalisation of the Thai telecommunications industry.

5. SOCIETAL CHALLENGES

The societal challenges to be encountered at network development phase are the identification of cultural and social

requirements. The use of telecommunication systems and computers in business and industry has been growing and changing rapidly. There is a tremendous growth in telecommunications traffic and in adoption of microcomputers throughout the industry. The organisations need to understand the user requirements, of which the users may not be fully aware or be fully capable of enunciating--that arise from the users culturally acquired patterns of perception and behaviour with regard to communication and information. So, it's necessary for the telecommunications service providers to have perspective, experience, tools and procedures that ease the discovery and definition of these user requirements-"cultural requirements". [26].

Managing and developing telecommunications networks in Asian countries like Thailand can challenge the most astute telecommunications professional. Due to vast distances, differences in language, customs, culture and regulatory matters plus those in national infrastructure, rates and service offerings make it difficult to staff, let alone finance, a private approach to the network management process for telecommunications networks development.

6. CONCLUSION

The primary emphasis of this analysis was to provide a brief introduction of Thai telecommunications infrastructure development--the past, present, and the future. It is clear that the regulatory systems in place are needed to link public objectives and concern with private incentives. There seems not to be an appropriate fit between the strategic planning and the implemented one.

The second part of the paper outlined the factors related to strategic network planning

and steps to be taken by the companies. Looking at the second part it is clear that there is a potential for further investigation. The fourth and fifth part of the paper report the organisational and societal challenges that might be faced by public and private companies for the development of telecommunications network.

AUTHOR'S NOTE

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