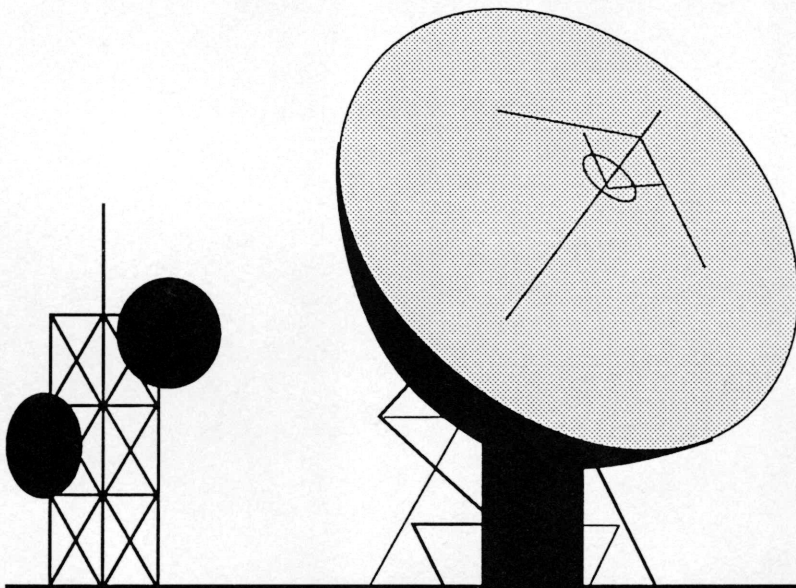


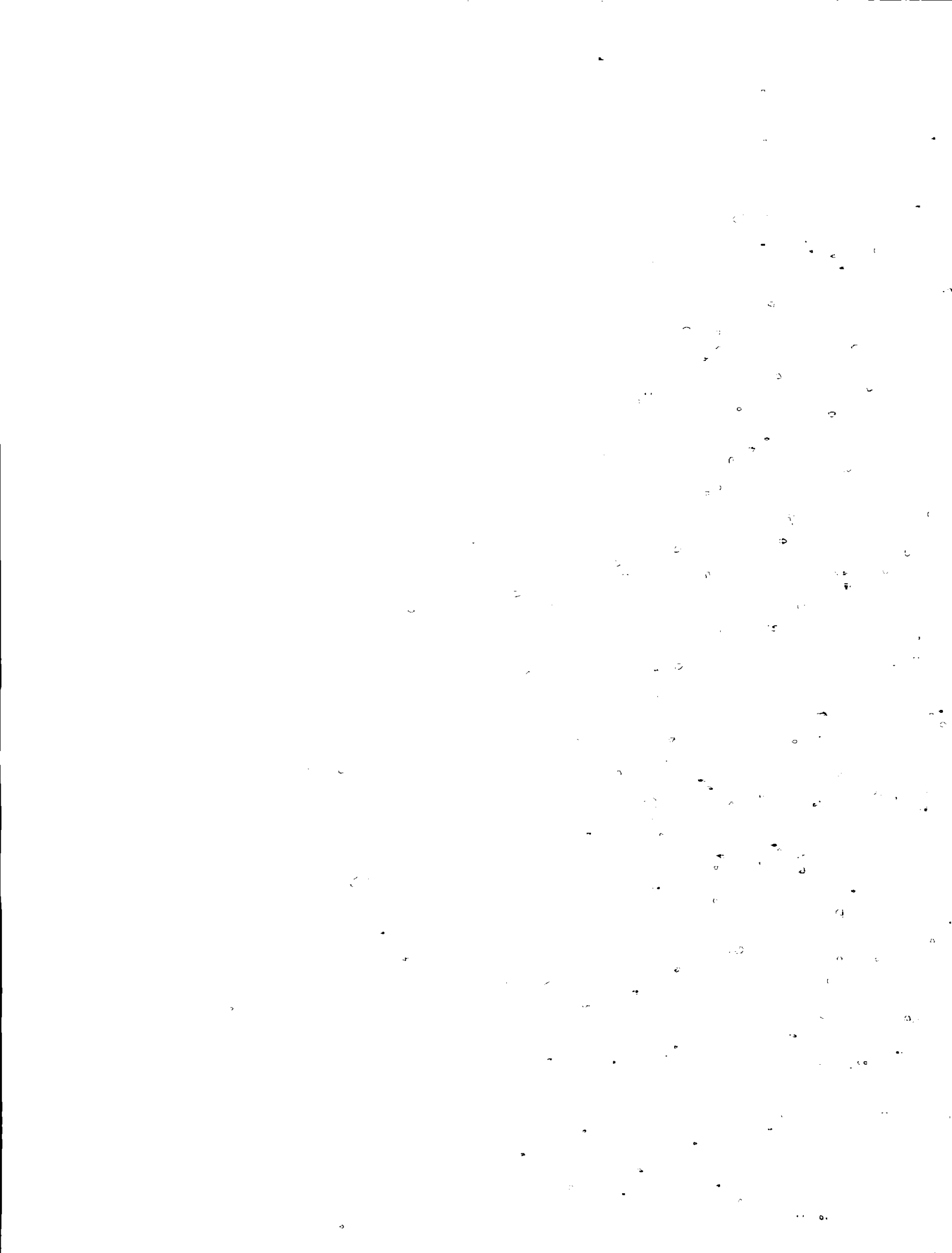


Trends in Policies for Telecommunication Infrastructure Development and Investment in the ASEAN Countries

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Abstract

Perceived needs and strategic choices for the development of telecommunications are analyzed based on ASEAN financial and human resources. Current and planned infrastructure and investment data on telecommunications development in the ASEAN region are presented. Policies for telecommunication development are evaluated in terms of their strengths and weaknesses for enhancing the economic and social development of the ASEAN countries.

Telecommunications regulatory policy is changing in each ASEAN country, and trends toward different forms of deregulation, liberalization of markets, and privatization of the telecommunication authorities are in evidence. This report explores these trends in five of the six ASEAN countries, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Introduction

The research program on Modernization, Communication, and Change of the Institute of Culture and Communication at the East-West Center has provided the opportunity for numerous research projects to explore aspects of social, economic, technological, and cultural change in the Asia-Pacific region. This paper reports on one such research project investigating the impact of telecommunications technologies on the economies of the countries of the Association of South

East Asian Nations (ASEAN). The project was policy oriented in terms of a description and analysis of changing telecommunication policies and markets for infrastructure development and investment in each of the ASEAN countries.

The project endeavored to access and provide data on telecommunications systems in the ASEAN region. These data are presented in appendix 2, which organizes information on each of the ASEAN countries over the past decade or more. Project objectives included indicating and specifying markets and highlighting structural adjustments occurring in each market for telecommunications technologies. Perceived needs and strategic choices for telecommunication technologies were analyzed based on ASEAN financial and human skills resources. Policies for telecommunications infrastructure investments were evaluated in terms of their strengths and weaknesses for enhancing economic and social development of the ASEAN countries.

The very dynamic nature of telecommunications technology development over the past several years has forced a reexamination of policy for its development in many countries, both developed and developing. These changes are driving trends toward various forms of deregulation of the telecommunication authorities and industries, pushing toward privatization of telecommunication operating entities and the liberalization of telecommunication markets for equipment and services. In addition, rapid advances in technology and the need to be interconnected in the expanding global information networks have brought on new opportunities for international cooperation which simultaneously benefit national interests and development as well as call into question values and

traditions. Current and potential cooperation in policy development in telecommunications in the ASEAN region point to new directions for sector-specific inter-regional development which can benefit from the diverse experiences of each country.

It was hypothesized that contemporary culture in the ASEAN region is in the process of change as telecommunications and information systems influence business, government, education, and day-to-day economic activities. This affects the choices made for goods and services and can result in value conflicts within a society. Governments must respond with policies appropriate to their own sociopolitical environment, which may result in exacerbating the conflict between preserving traditional values and reaping the benefits of modernization.

It appears that the growth and change of the telecommunication sector is especially implicated in the socioeconomic change of any nation. An understanding of the trends and changes in policy toward telecommunications infrastructure and investments as they affect economies and social structures of each nation seems especially warranted. This report will focus on a description and analysis of changing policies for telecommunications in five of the six ASEAN countries, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Brunei was not included in this study due to the unavailability of data. We are indebted to our many friends and collaborators in each country who generously accommodated us by providing information, graciously answering our questions in interviews, and participating in discussion and debate through a project workshop (see appendix 1). While many people contributed to the project, the contents of this report, including opinions and any errors it may contain, are the sole responsibility of the authors.

ASEAN in Perspective

While it has been generally acknowledged that telecommunication markets are expanding in the ASEAN region, the need remains to understand, on a country-by-country basis, the potential for infrastructure development and investment in order to participate within changing policy developments. The ASEAN countries offer examples that provide insight into telecommunication policy trends within different country contexts as well as point to opportunities for regional cooperation.

The worldwide trend in telecommunications toward deregulation and privatization is well publicized. The United States, Great Britain, and Japan have set the stage and provided examples for moves in other countries. In responding to ever stronger market forces and the need for capital-intensive infrastructure development, government telecommunications authorities are under pressure to allow freer access to telecommunications markets. The provision of services by competitive enterprise and the concerted look toward the deregulation and perhaps even privatization of the telecommunication organizations are now a part of the development agenda in many countries.¹

While the privatization of British Telecoms and NTT in England and Japan respectively and the breakup of AT&T in the United States provide examples of the worldwide trend, they are by no means necessarily models for deregulation and privatization in other countries. In essence, the need for deregulation arose from the declining benefits of economies of scale and scope within the natural monopoly framework. In value-added services, the concept of natural monopoly could no longer be established or justified. The general trend, however, seems cyclical, as just five years after deregulation, the long-distance market is so shaped that reregulation is being called for in the United States.

Indeed, each country must respond to its own needs and priorities within the social and political context in determining the form and extent to which deregulation and privatization may be useful. The ASEAN nations may provide an example of the varied forms

1. Mark A. Hukill and Meheroo Jussawalla, "Trends in Telecommunication Regulatory Policies in the ASEAN Countries," *APT Telecoms Journal*, 2, no. 2 (July 1990).

the trends in deregulation and privatization are taking in many other countries. They point to the need to reflect not only on regional transformations but on the individual country differences as well.

It has been suggested that the overall economic success of the east and southeast Asia region will be due to adopting export-oriented policies that generate greater competitiveness and more market responsiveness.² The development of transportation and communication technologies along with trade and capital networks has accelerated these exchanges. However, a drop in oil prices and a recession in commodity prices in the 1980s have meant that the ASEAN economies have had to incorporate major structural adjustments. The switch from import-substitution to export-promotion strategies and the development of private rather than government-led economic growth will characterize the ASEAN countries well in the 1990s.

Whether telecommunications development causes an increase in GNP is not established categorically. Rather than a direct causal relationship between telecommunications development and overall economic development, there appears to be a complementary and self-reinforcing process. That is, while the growth in telecommunications does not necessarily have a direct effect on the growth of the economy, there is evidence that a strong link exists between the GNP of a country and its having an efficient phone network as shown in the correlation between the number of telephones per 100 population and the GNP of a country (table 1). Four countries account for approximately half of the world's telephone access lines. There are also approximately 725 million telephones in the world or approximately 14 per 100 population worldwide. However, most are concentrated in four countries: the United States, Japan, West Germany, and the USSR. The United States alone accounts for one-third of all the world's telephones.

It appears that the economic efficiency of a country does depend to some extent on strong and efficient telecommunication networks. Therefore, the electronic connectivity level of a people may indeed play a role in the enhancement of economic activity. For developing countries, the message is clear. The establishment of an efficient telecommunications infrastructure is vital to success in attaining economic development goals.

Table 1

Four Leading Countries by GNP and Number of Telephone Access Lines (in millions)

United States	120
Japan	47
West Germany	26
Soviet Union	26
World Total	430

Source: *Communication Technology*, July-Sept. 1988

The six ASEAN countries (Brunei Darussalem, Indonesia, Malaysia, the Philippines, Singapore, and Thailand) represent an area of the world with one of the highest economic growth potentials. The region has a higher per capita GNP and volume of exports than Eastern Europe. Trade with Japan and the United States, ASEAN's two largest trading partners, will amount to more than half a trillion dollars this year. The economic importance of ASEAN to the United States, Japan, and Europe merits a close look at the changing structures in many areas of international concern, including telecommunications and information systems.

Dynamic technological innovation and changing economic environments have been bringing new concepts to regulation, institutional configurations, pricing policies and financial structures for the global information economy. Telecommunications carriers, information service providers, and equipment producers are all gearing their organizations toward competition in this fast-changing and challenging environment.

Both a cause and consequence of the globalization of economies is the dynamic change in the telecommunications and computer industries. The boundaries between these two industries are rapidly blurring, and this merger is in turn propelling a restructuring of the institutional and market paradigms. It has become difficult for the market participants and policymakers to completely grasp the dynamics of these changes. This difficulty is compounded at both the domestic and international levels by geographic and political regulatory boundaries.

Cooperation in telecommunications in the ASEAN region has resulted in the establishment of undersea

2. Saburo Okita, "East Asia and the Global Economy," Pacific Forum Conference on China, East Asia and the Changing Global Economy, Shanghai, China, November 1-4, 1988.

cable systems linking each country and with the Transpac cable system across the Pacific to Hawaii and on to North America. An undersea fiber cable linking Singapore with Marseilles, France, to be completed in 1994, will result in a complete fiber optic connection from Europe to Japan via Southeast Asia. In addition, Thailand, Singapore, Malaysia, and the Philippines and more recently Papua New Guinea (a non-ASEAN country) will be using the Indonesian Palapa satellite system. As cooperation grows in economic arenas, ASEAN could become a major force in political and economic matters similar in nature to the European community.

Nonetheless, each ASEAN country is on a different growth pattern and has its own priorities for economic development. From the more developed Singapore and the near NIE's (Newly Industrialized Economies) of Malaysia and Thailand to the lesser developed Indonesia and Philippines, the ASEAN countries have pursued rather independent courses for their telecommunications sector despite the regional cooperative efforts. The response to telecommunications growth and development is quite different in each country and must therefore be analyzed on a country-by-country basis. These differences, in the traditionally cited indicator of telecommunications, the density of telephone sets per 100 inhabitants, over a ten-year period in each of the ASEAN countries can be seen in table 16 of appendix 2.

More recently however, world economic changes and pressures have necessitated that the ASEAN region act in concert in such forums as the Uruguay Round of trade policy talks of the General Agreement on Tariffs and Trade (GATT). The position of ASEAN is shifting vis-a-vis other lesser developed countries in terms of the highly protected services, including telecommunications.³ While liberalization in trade services is being supported by ASEAN as a whole, the reasons are different in each country, and there is a fair amount of divergence in views. It would therefore be premature to refer to ASEAN as a trade bloc. An understanding of the characteristics of each country is required and is the focus of the analysis here in terms of trends in telecommunication regulation. Five

of the six ASEAN countries, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, will be discussed as examples of different schemes for development of the telecommunications sector and the need to understand the conditions under which various forms of policy exist and the changes that are occurring.⁴

There is one important common element in each of these countries in terms of providing basic telephone service. Apart from Singapore, for the low- and middle-income countries, problems of providing services to remote and rural areas still require subsidization by a government monopoly. For distributive reasons, competition in basic services cannot be justified.

Indonesia

Indonesia is made up of approximately 13,700 islands with a population of over 170 million. Sixty percent of the population lives on the island of Java, site of the capital, Jakarta.

Indonesia has been recovering from the recession of the mid-1980s brought on by a collapse in oil prices, which dried up consumer demand and all but ended an import-oriented development strategy. With the focus into the 1990s on industrialization and the expansion of commercial and tourist centers, Indonesia has been more export-oriented and is more actively courting private foreign investment. Still heavily in debt, with a current accounts deficit of some \$5 billion and debt-service ratio of nearly 40 percent, Indonesia has been forced to reexamine and change policy regarding national development and especially the development of such capital-intensive sectors as telecommunications infrastructure.

While market forces may now be dictating the telecommunications environment in developed countries, where a high degree of deregulation and privatization are pursued, the developing world must be looked at differently, according to Jonathan Parapak, president of PT Indosat, Indonesia's state-

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3. Mohamed Ariff and Tan Loong-Hoe, ed., *ASEAN Trade Policy Options: The Uruguay Round*. Singapore: Institute of Southeast Asian Studies, 1988.
 4. Mark A. Hukill and Meheroo Jussawalla, "Telecommunications Policies and Markets in the ASEAN Countries," *Columbia Journal of World Business*, 24, no. 1 (1989).

owned monopoly company that handles primarily international telecommunications. "In most cases, telecommunications still play the role of an 'agent of development.' In some instances, telecommunications services have to be provided ahead of real demand: in other words, demand is created."⁵ With a need to provide services ahead of demand and develop infrastructure to support services, which may not provide an immediate payback in revenue, additional stress is put on an already overextended budget.

Other factors also contribute to the difficulty of infrastructure development in Indonesia. The state has a quasicorporate nature, and private business interests are often intermixed with public office. Combined low labor productivity and shortages of technical and managerial talent only help to undermine efficiency in the economy as well as slow potential growth. A corporate culture that will negotiate additional "taxes" on the price of goods and will accept "commissions" ranging up to 30 percent on infrastructure development projects only exacerbates otherwise well-intentioned development schemes.

Like many developing countries, Indonesia is struggling to improve its telecommunications systems while at the same time trying to justify capital outlays that cannot be measured on a conventional return-on-investment basis. Government development policies, therefore, continue to dictate priorities given to the telecommunications sector. Indonesia has the lowest density of telephone sets per population in the ASEAN region with only 0.5 per 100 as of the end of 1989. Twenty-five percent of all telephones are in the capital city, Jakarta, alone. However, many inhabited islands and outlying rural areas have no phone service at all. The provision of basic service is still the major priority of the Ministry of Post and Telecommunications and PERUMTEL, the state-owned monopoly corporation charged primarily with domestic public telephony.

Indonesian telecommunications is, and will remain in the foreseeable future, a government-owned and controlled sector. Nevertheless, while privatization of the telecommunications authorities in Indonesia is anathema to meeting development goals set forth in priorities by the government, trends in the liberalization of markets and services are making their mark. The need to provide better services and to expand infrastructure in the face of high capitalization and

operating costs have prompted Indonesia to relax regulations somewhat to allow for greater private participation.

Initially, Indonesia pursued a policy of attracting private investment in telecommunications through a revenue-sharing plan called BOT (build, operate, and transfer). In the BOT scheme a foreign vendor provided financing to build systems, helped to operate the system while training Indonesians, and subsequently transferred control as the investment was recovered. In addition, efforts to obtain "soft" loans continues. In this case, a foreign government would lend capital for telecommunications infrastructure development and would be paid back on a revenue-sharing basis. Such soft-loan projects include the extension of microwave transmission systems and data networks as well as the establishment of a regional training center and a research and development center.

The BOT scheme is no longer officially pursued, although revenue-sharing projects continue. In 1990, 125,000 additional telephone line units are being installed through revenue-sharing schemes.

Perhaps the most significant recent development in Indonesian telecommunications regulation change is the adoption and implementation of Law 3/89, known as the Law on Telecommunications, dated April 1, 1989. It is probably more accurate to say that the law, as approved, now more closely reflects the actual business practices that had been going on for some time prior to the implementation of the law. The new law supersedes Law #5/64, which previously allowed only PERUMTEL and PT Indosat to provide telecommunications services in Indonesia unless provision is made with their consent or in cooperation with them.

One of the more significant aspects of the new law is the opening of nonbasic telecommunications services to other than the government telecommunications organizations. Specifically, chapter IV, article 12, paragraph 2, of Law 3/89 reads:

A body other than the organizing body [government authorities] . . . may organize basic telecommunication services on the basis of a cooperation with the organizing body, while non-basic telecommunication services may be organized by another body *without* a cooperation with the organizing body. (emphasis added)

5. Jonathan L. Parapak, "Telecommunications Market Environment in Developing Countries: The Indonesian Experience." *PTC '88 Proceedings*. Honolulu: Pacific Telecommunications Council, January 1988.

The law further states in the same chapter, article 19, paragraph 3 that:

The organizing body and other bodies referred to in Article 12, paragraphs (1) and (2) in providing and promoting telecommunication services, shall be authorized to import, control and own telecommunication equipment for the provision of telecommunication services.⁶

In effect, the new law will allow for ownership and control of telecommunication equipment for nonbasic services provision by private organizations. In addition, more private participation will be allowed in providing basic telecommunication services in cooperative arrangements between private organizations and the governmental telecommunication bodies, namely, Perumtel and PT Indosat.

While not changing the structure of government ownership and control of basic telecommunications in Indonesia, the new law will allow for improved access to Indonesia's telecommunications markets and will, it is hoped, help improve the capitalization problems of developing telecommunication infrastructure as well as operating and maintaining services. Private organizations from outside Indonesia will still have to do business through joint-venture arrangements with an Indonesian organization. While it is doubtful that further privatization will occur in Indonesia and that the government entities will maintain control, Indonesia has, in its own way, begun to address the problems common to many developing countries in terms of realization of capital and services for the ever-growing demand in their country.

In an attempt to close telecommunications services provision gaps, two strategies have been given priority, namely, increasing accessibility in rural areas and increasing phone density in high-demand areas. This includes the increased provision of services for tourism-related activities, banking, financial institutions, and commercial centers as well as industrial plants, which are highly dependent on telecommunications. In addition to World Bank loans and "soft" loan financing with cooperating foreign governments and finan-

cial institutions, funds from the private sector have been sought as allowed for under Law 3/89.⁷

Indonesia's prowess in satellite telecommunications through its Palapa satellite system continues to grow. With the recent relaunch of the Palapa B2R satellite that was recovered in 1984 by the U.S. space shuttle from an incorrect orbit, the Palapa system will again be operating with a full complement of satellites in orbit. Tenders are now pending for a new "C" series Palapa satellite to meet the growing current and future needs. Given the vast distances in Indonesia, the efficiency of using satellite links in network development is important. By the year 2004, Indonesia hopes to have a telephone backbone system circuit distribution consisting of 75 percent terrestrial and 25 percent satellite links.

Four other nations in the region—the Philippines, Thailand, Malaysia, and Singapore—use the Palapa system for internal communications, mainly television broadcasting. Papua New Guinea is the newest signatory to the Palapa system and becomes the fifth country in the region to use Palapa.

In many respects, Palapa is becoming a regional system. Although intercountry exchange through Palapa is still limited, Palapa has the potential for data, voice, and video exchange between Southeast Asian nations as well as providing alternative routing for the ASEAN undersea cable systems. In addition, Palapa could conceivably provide access for private as well as public networks. However, the political will to cooperate and the structural, economic, and financial advantage to cooperating parties would require comprehensive negotiation. Strategies to overcome regulatory differences would also need to be addressed.

It seems clear that there is an economic necessity to keep Palapa under government control. Reaching a large number of islands with basic services may only be feasible through the distance-insensitive cost benefits for thin-route communications provided by the Palapa satellites. This advantage could also be used by the Philippines and Malaysia as well. Interestingly, the future status of Palapa as a regional system may be in some question with ASIASAT now in orbit. Whether the government-controlled Palapa system

6. Soedjono, Kramadibrata, "1. Dynamics of Indonesian Telecommunications and 2. Strategic Plan of Indonesian Telecommunications." Jakarta: Ministry of Tourism, Posts and Telecommunications, April 1, 1989.

7. Sumitro Roestam, "Closing the Gaps of Telecommunication Hardware and Software Developments in Developing Countries: The Indonesian Experience." Paper presented by Safwan Natanagara at the 6th World Communications Forum, Japan Society of Information and Communication Research, Tokyo, and the Asian Mass Communication Research and Information Centre (AMIC), Singapore, March 1990.

will or should compete with ASIASAT in the region remains unclear.

The Directorate General of Post and Telecommunications reports that seventeen major telecommunications projects are planned over a six-year period through 1994 at an estimated cost of US\$1.35 billion. By 1994, plans in Indonesia are to increase automatic telephone lines from 910,000 to 2.3 million lines. Projections are to increase this to 7 million lines by the turn of the century. Plans for 1994 also include adding 15,200 new telex lines and 75,000 public pay phones.

Indonesia is also continuing its policy to develop and manufacture telecommunications equipment in-country. PT INTI (Industri Telekomunikasi Indonesia) is the state-owned and controlled monopoly manufacturer of telecommunications equipment in Indonesia. This company produces digital exchange switches for the public switched network in a joint effort with Siemens of West Germany, PABX exchanges and pay phones in a long-standing arrangement with Bell Manufacturing of Belgium, along with a host of transmission equipment ranging from high-frequency transceivers to small earth stations. However, 60–65 percent of the telecommunications equipment for Indonesia is still obtained through local contractors working in cooperation with foreign vendors.

Through the public switched telephone network, new services are being added. These include database access, electronic mail boxes, computer time-sharing, and applications for banking, insurance, and other financial and business institutions. The relative level of use of these services and the extent to which they are available remain low but will certainly increase in the future.

Indonesia is also looking to digitize its current networks as well as build only digital telecommunications systems in the future. In terms of switching equipment, the current plan calls for the complete digitization of systems by the year 2004 with a complete phase-out of analog switches by that time.

Malaysia

The telecommunications authority in Malaysia, STM (Syarikat Telekom Malaysia Berhad), is in the process of privatization. Previously, the organization JTM (Jabatan Telekom Malaysia) was the government-owned and controlled telecommunications authority under the Ministry of Energy, Telecommunications and Posts. In place of state-owned entities, a new breed of organization has begun to emerge, partially in response to civil servants who have been given a personal as well as an ethnic stake in policy reforms. Public enterprises in telecommunications are now replaced "with new privatized firms largely owned and managed by retired or ex-civil servants of the same government enterprises."⁸

JTM is now basically a regulatory body. STM is a semiautonomous corporate organization that will be offering public shares by the end of 1990. In reality, however, the government of Malaysia controls and will continue to control a majority share in STM. The government interest will insure that control of STM is not entirely the private affair of STM.

In such a state of semiprivatization, STM has been able to begin a reorganization process to make the company more efficient. Yet, it is still under the policy control of the government, which, lacking an overall strategy for services provision, continues to saddle STM with problems of unclear guidelines for service development.

The direction of privatization of telecommunications in Malaysia is stepwise with deregulation, perhaps to follow the financial stabilization of a privately financed STM. With ever-increasing demand for more and higher quality services, government licensing for private provision of nonbasic services such as radio paging will continue. The question of a license being granted for a second operator to provide basic services in competition with STM is also not out of the realm of possibilities in Malaysia. However, firm mandates for providing rural services would need to be established so that STM would not bear the entire burden of capitalizing rural services, which generate less revenue or operate at a loss as compared to services in

8. Vincent Lowe, "The Policy Context for Telecommunications Reforms in Malaysia—A Case Study." Paper presented at the Pacific Basin Telecommunications Conference, Tokyo, Japan, Columbia University, and MPT, October 29–31, 1988.

the urban areas. This could put STM at a severe competitive disadvantage to a private telecommunications provider. Thus the government must strike a balance between encouraging private-sector telecommunications development and the necessity to maintain a monopoly in public switched networks to subsidize rural telecommunications development.

It has been suggested that STM's role be reduced to that of a common carrier in the future and that competition be introduced in other telecommunication services areas. Whatever final path is set for STM, clearly increasing privatization is leading to further deregulation and liberalization of markets for more competition in telecommunication services in Malaysia.

Currently there are approximately twenty-eight thousand staff and employees of STM. While this number will remain fairly constant, new skills are needed in the areas of computers and software, marketing, and finance. The costs of retraining are high. In terms of sales, normal marketing activities of a completely private firm are somewhat stymied since it is difficult to lower the previously high sales salaries in exchange for commissioned sales. Changing attitudes is a slow process both for employees of STM in a new, more competitive environment and a government learning the advantages of keeping hands off of the business activity of STM.

In the next five-year period, 1990-1995, STM plans to invest approximately 1 billion *ringgit* (US\$370 million) per year for network and services expansion. Approximately 20 percent will be for switching, 20-25 percent for local networks and cabling, 20 percent for transmission equipment, 10 percent for international direct dial services, and 5 percent for computerization of operations. The remainder will be primarily in building and land acquisitions. This investment does not include operating expenses.

STM has no intentions of getting funds from the government for investment purposes. Supplier credits and competitive financing packages will be important determinants for selection of vendors. While STM has approximately half a billion *ringgit* (US\$185 million) in back reserves, its debt equity is about 1.6 billion *ringgit* (US\$593 million). That will need to be brought down to about 1 billion *ringgit* before floating of public shares on the Kuala Lumpur Stock Exchange. The

offer of public shares, due for the end of 1990, will be the major source of corporate financing for STM.

STM has done rather well in terms of keeping up with demand for telephone service. Even with approximately 11.5 percent demand growth for phones per year, waiting lists have been trimmed over the last several years, although some sixty-eight thousand potential customers are still waiting. Interestingly, STM has an overcapacity of main lines available, which could in effect eliminate the waiting list entirely. Unfortunately, that capacity is not located in areas where recent rapid urbanization and development have occurred.

Improvement of services, including new installations, and the restoration and upgrading of existing systems are important. With approximately one million home customers and four thousand business customers, STM, in Kuala Lumpur especially, will look for local service improvements.

Perhaps the most difficult questions in terms of the privatization process for STM still remain. Government decisions on service provision mandates and allowance of private-sector competition in services is unclear. For instance, STM has spent considerable funds in research and development of some mobile services (ATUR 800), which the government has just recently decided will be licensed to a competing entity. Without a strategic policy, it will be difficult for STM to operate effectively as a private competitor. In addition, more competitive tariff policies will need to be considered in order to make use of STM services over other leased services.⁹ While STM is promoting its data services (MAYCIS and MAYPAC) to businesses, it may be too late to include in terms of options to users who see private leased lines as a cheaper and more efficient route.

Nonetheless, the moves toward privatization of telecommunications in Malaysia are expansive and farsighted. It is important to note that private telecommunication organizations are playing a leading role in the privatization efforts in Malaysia. The participation of Cable and Wireless of Hong Kong in the moves toward privatization and of other multinationals, such as Alcatel, in gaining access to the large-customer-premises equipment (CPE) market cannot be ignored. Market stimulation for services through more competitive tariffs and increased private financ-

9. Daud bin Isahak, "Meeting Challenges of Privatization in Malaysia," in *Restructuring and Managing the Telecommunications Sector*, ed. Bjorn Wellenius et al., Washington: The World Bank, 1989.

ing will help create stronger and higher quality network infrastructure and services in Malaysia.

In addition, there appears to be a growing demand in Malaysia for data transmission, both within the government and for private industry. A difficulty remains in addressing the market size and level of computerization. The Malaysian Administrative Modernization and Management Planning Unit (MAMPU) of the Prime Minister's Department has been charged with studying government computerization and telecommunications network needs. A Malaysia Federal Telecommunications Review study was begun in 1989, but the results are as yet unavailable. In the private sector, the Association of Computer Industry Malaysia (PIKOM) has undertaken a survey of the Malaysian computer industry to assess the market size and level of computerization among the different industries. Preliminary results are due in September 1990. These efforts should help policymakers in determining the direction of data telecommunications regulation in Malaysia in the future.

As in many developing countries, modernization and change often put traditional values and development goals in conflict. There are those in Malaysia who see telecommunications development as a two-edged sword. On the one hand, the need to improve telecommunication infrastructure and services is viewed as a necessary ingredient to meet economic and social development goals. On the other hand, telecommunications opens up the country to international economic, political, and cultural influences as well. With a precarious stability in the ethnic composition of the country, a gradual erosion of traditional Malay culture will bring into conflict the high-priority cultural-identity policy with pressure to "Westernize" in order to develop socially and economically. This leaves policymakers with a paradox in trying to enhance a cultural base of indigenous Malay and Islamic values while pursuing ever-increasing economic expansion and private enterprise in the global marketplace.

The Philippines

Telecommunications ownership, authority, and control in the Philippines are a marked contrast to those of the other ASEAN countries. Due to American dominance since the end of the Spanish-American War, when the United States acquired the Philippines as a territory, the structure of telecommunications in the Philippines is essentially that of private ownership with government public utility regulation not unlike the structure of telecommunications in the United States. Until 1967, the primary telephone company, Philippines Long Distance Telephone (PLDT), was wholly owned by GTE of the United States. GTE divested to a group of Filipino businessmen when it was discovered that equipment supplies for telecommunications were being monopolized through payoffs.

Although the telecommunications systems are privatized in the Philippines and are therefore unlike the monopoly, state-owned and controlled telecommunications authorities of the other ASEAN nations, the conditions of the telecommunications networks in the Philippines are not unlike those of Indonesia, Malaysia, and Thailand in particular. With a high concentration of the available services provided in urban areas, there are still thirteen provinces in the Philippines without phone service.

A single carrier (operator) per service area is franchised to provide local telephone service. A total of fifty-eight different companies provide telephone, telex, and telegraph services. PLDT is the largest telephone company and accounts for 94 percent of the total telephone line units. PLDT provides local telephone service in addition to domestic and international long-distance service. Radio Communications of the Philippines, Inc. (RCPI), controls 65 percent of the domestic market for telex and telegraph, while Philippines Global Communication (Philcom) and Globe-Mckay Cable and Radio Corporation (GMRC) control the major share of the international telegraph and telex markets respectively. There are four private international records carriers and nine domestic carriers. The government-owned Telecommunications Office (TELOF; formerly BUTEL) operates 68 percent of all telegraph stations in the Philippines, predominantly in rural areas and areas not covered by the private companies, as the TELOF charter requires. However, TELOF has less than a 5 percent share of the total telephone market and less than a one-third

share of the telex and telegraph market. In seven municipalities, TELOF competes directly with private companies.¹⁰

The urban/rural dichotomy of service witnessed in the other ASEAN countries (except Singapore) is repeated in the Philippines with 73 percent of all the telephones concentrated in the metro Manila area and an additional 13 percent in other major cities. Of the 216 telephone exchanges, 147 are on the island of Luzon, wherein lies Manila. The national teledensity for the Philippines is only 1.61 per 100 people (projected for 1990) and 9.64 per hundred in the metro Manila area.

In 1979, the Ministry of Transportation and Communications (later called Department) was created with the goal of providing infrastructure for development. A National Telecommunications Commission (NTC) was set up as a regulatory agency on the model of the U.S. Federal Communications Commission (FCC). Policies to rationalize the industry continued through 1982 encouraging mergers of telephone companies and giving directives for a single, compatible network for voice and data. Development of telecommunications in rural areas has been given higher priority recently as the complex problems of poverty and the long history of rural insurgency are finally being addressed in more than just political terms. The development of the telecommunications sector is only a part of the overall rural transformation goals. Under the Aquino administration, a much greater priority is being placed on telecommunications expansion.

International communications are provided by five submarine cables and links with Intelsat and Palapa. Undersea cables link the Philippines with Okinawa, Hong Kong, Singapore, Taiwan, and Guam. A new \$709 million fiber-optic cable system is being constructed with participation from eight international organizations, including AT&T, which will link the Philippines with digital circuits spanning the Pacific.

Satellite services have been used since 1966, when the Philippines Communications Satellite Corporation (Philcomsat) became a member of Intelsat. Philcomsat also joined Inmarsat in 1981. With 85 percent of the Philippines' merchandise transported by sea, growth in the use of Inmarsat will continue, with many Philippine ports clamoring to be linked with the maritime satellites.

Domestic satellite service is provided by Domsat, which has one master station in Manila and eleven earth stations in the rest of the country. Domsat leases a half transponder from the Indonesian satellite, Palapa, primarily for television transmission.

On the local level, one paging service is in operation in the Manila area, and the NTC has recently had as many as seven service applications for new paging services. Also, one application to provide an electronic mail link between the Philippines and the United States has been before the NTC.

PLDT operates a cellular radio telephone service, primarily in the metro Manila area, and is increasing capacity to accommodate three thousand subscribers. Express Telecommunications Company, Inc., also has been authorized to provide cellular radio telephone service in Manila and will connect with the PLDT network.

The communications sector is extremely complicated in the Philippines. It exhibits all the characteristics of competition based on the U.S. model but is subject to more intervention and control by the government. Competition is nominal, however, as PLDT, in conjunction with its subsidiary, Philtel, accounts for 97 percent of the telephone market. Rural telephony is provided principally by the government. Only the cities of Manila, Baguio, Cebu, and Davao have adequate domestic and international service. As a result, many corporations and individuals operate legal and illegal private high-frequency radio telephones.

The regulatory administrative structure of telecommunications in the Philippines is as follows:

Department of Transportation and Communications (DOTC)

Office of Under-Secretary of Communications

Formulates and recommends guidelines for network systems and directs research and development programs.

National Telecommunications Commission (NTC)

The regulatory arm of DOTC which controls public and private service except for military communications and has quasijudicial powers.

Legal Department

Drafts regulations for NTC and formulates all negotiations with ITU and ASEAN.

Telecommunications Planning and Development Department

Monitors the regulatory activities of the eight regional offices of the NTC.

10. Thomas G. Aquino, "The Philippine Telecommunications Industry: Changes and Prospect." A paper presented at the Pacific Basin Telecommunications Conference, Tokyo, Japan, October 29-31, 1988.

The existing framework for telecommunications regulation consists of three major principles. The first principle is that only franchised corporations are allowed to provide telecommunication services, whether or not a company has the technical and financial capabilities to do so. The national Congress of the Philippines approves operating franchises. Second, the policy on protection of prior investment puts an effective cap on competition in areas where it is deemed that adequate service is already provided. This policy in effect creates a monopoly for PLDT in many areas. Third, rate structures for various telecommunication services are regulated with the aim of providing a fair, reasonable, and nonconfiscatory return on investment.

The official Telecommunications Policy established in May of 1987 has begun to pave the way toward some deregulation. Subject to type approval, some customer-premise equipment (CPE) is no longer required to be operator provided. Since rates for the rental of CPE are still included in the rate charges (rates are "bundled"), adding nonoperator-provided CPE to the network is still subject to rate and tariff approvals.

The major problem with the development of telecommunications in the Philippines is finance. Some funding has come from the government of Germany and Siemens, which is a major supplier of telecommunications equipment to the Philippines. In February 1988, Siemens offered to donate fiber-optic cable linking two islands. Although previously tried in Singapore, the Philippines is providing the first commercial test of this technology, called Minisub, combining radio and satellite transmission for interisland linkages.¹¹

The Japanese government's Ninth Yen Fund for Overseas Cooperation (OEFC, Overseas Economic Cooperation Fund) provided for a 960-channel backbone transmission network with twenty-four repeater stations. The Japan International Cooperation Agency conducted a feasibility study for a Regional Telecommunications Development Project (Phase A). The total cost of the project is estimated at 7.6 billion yen, and the Toyo Corporation of Japan serves as a major contractor. Phase B of the project will be completed in 1990 with a thirteenth-year Yen Credit Loan Program

amounting to \$38.7 million. NEC is likely to provide the equipment for eight thousand new lines, five microwave links, and nine cable transmission links.

PLDT has sought funding from the International Finance Corporation, the private investment arm of the World Bank. The \$24 million loan will be for modernization of its virtual monopoly long-distance service by providing a digital electronic exchange to service a ten-thousand-line telephone network using fiber-optic cable.

For the future, the Department of Transportation and Communications has launched a new program designed to provide equity in teledensity across the Philippines called the National Telephone Program (NTP). It will provide a public-sector-operated telephone backbone running from north to south in the archipelago. For this purpose, the department hired the firms Teleconsult International of Washington, D.C., and Sycip, Gorres, Velayo (Manila) to design a least-cost strategy to implement the NTP. The plan calls for 380,000 new telephone lines to be added to the approximately 900,000 existing lines (mostly owned by PLDT), which will be installed at a cost of \$1 billion in 188 cities and municipalities.¹² The implementation will occur in three major phases. The first phase, anticipated to be completed by the end of 1990, will add 138,000 new lines in eighty-five municipalities at a total cost of \$369 million. Funding will be provided through the World Bank and local credit institution loans and an equity contributions scheme, which will issue stock under a subscriber investment plan.

ISDN is also being introduced in the country, for which officials from the Deutsche Bundespost had been invited to conduct seminars. None of the carriers except PLDT are enthusiastic about ISDN because of the current voice and data services operational dichotomies. Since ISDN calls for the integration of voice and data exchange into a single digital network, it is easy to understand the position of the relatively small records carriers who fear they would be pushed out of the market by the near-monopoly voice carrier, PLDT.

There is, however, enthusiasm for Datanet, which is a proposed 539-node packet-switched network system to operate with the PLDT plant. NEC is also

11. *Business Week*, February 10, 1988.

12. "Updated Telecommunications Network Development Plan: Addendum to Final Report," Submitted to the National Telecommunications Commission, The Republic of the Philippines by Teleconsult International, Inc., Washington, D.C., and Sycip, Gorres, Velayo and Company, Manila, Philippines, January, 1988.

currently testing mobile telephone systems with five hundred subscribers for the busy highways on Luzon.

On the whole, the Philippines will continue to have a complex network system that leaves a wide gap for telecommunication services between the urban and remote areas. The objective for the future is to bridge this gap through the NTP, but the hurdles are formidable.

With a foreign debt in excess of \$30 billion, the Philippines has been forced to reschedule some debts maturing after 1986. Political problems make it unlikely that significant financing can be raised from international organizations and bankers. The IMF, in return for supplying standby credit, has required the Philippines to accept a financial discipline including limits on budgetary deficits. Since the country provides such a large potential market for the use of telecommunications, including space-sector equipment, it appears that supplier's credits would probably provide a partial solution to the paucity of funds for the development of the telecommunications infrastructure.

Singapore

Singapore Telecoms, the government-owned and controlled monopoly telecommunications authority (statutory board) has been highly successful. With a telephone density of 47 sets per 100 population and nearly one million access lines for a population of 2.6 million people, Singapore has one of the most modern phone systems in the world. Without the encumbrance of a large rural population or geographical area, the telecommunication systems have very quickly become first rate. The entire country of Singapore is a concentrated, moderately sized urban area smaller than the capital cities of four other ASEAN countries. It has been possible therefore to provide extensive telecommunication coverage and services without the burden of the larger countries' development problems.

Singapore Telecoms has revenues of approximately S\$800

million (US\$421 million) per year and is planning to invest S\$2 billion (US\$ 1.053 billion) over the 1990-1995 period. As of 1990, Singapore is the thirty-third largest telecommunications equipment market in the world, a remarkable position considering the relatively small size of the country. The estimated value

of this market is US\$427.7 million for 1990 and is projected to increase to \$625 million by 1995. Switching equipment will account for the major portion of expenditures, amounting to \$135.6 million in 1990 and reaching \$176.9 million by 1995. Transmission equipment expenditures will reach \$121.7 by the end of 1990 and then slow somewhat. In addition, data communications expenditures will increase to \$72.6 million by 1995.

Singapore Telecoms is expanding beyond the borders of Singapore with more and more foreign investment and is beginning to provide services and expertise to telecommunications authorities in other countries. Currently, Singapore Telecoms has joint-venture investments in Thailand, Sri Lanka, Mauritius, and Saudi Arabia. In addition, Singapore Telecoms is looking to establish itself as a multinational corporation in Brunei and Indonesia with an eye on China as well. Its strategy is to provide international marketing, form alliances to provide services, and provide consultancy services for planning, operations, and maintenance.

Perhaps the most significant trend in Singapore has been the ability of a government-owned and controlled entity to keep abreast of technological developments and provide complete telecommunications services. Where economies of scope for the public sector telecommunications authorities are being constantly reduced by innovative technology developed in the private sector, Singapore Telecoms has been in a position simply to purchase that new technology outright and incorporate it into its systems. The erosion of economies of scale that may compel a shift to more liberalized policies in other countries is simply not taking place in Singapore.

An aggressive policy to achieve the complete digitization of telecommunications networks is a major goal reflecting Singapore's commitment to develop information technology. Singapore Telecoms works closely with the National Computer Board of Singapore (NCB), whose purpose is to develop information technology for the provision of sophisticated digital data networks and services. Along with France, Singapore is the only country in the world today that has installed fully equipped digital switches ready to provide ISDN services in the public switched network.

Singapore Telecoms, despite being a government monopoly, has been able to keep up with the demand for information technology services. They are the monopoly provider for data transmission lines for the flourishing financial businesses of Singapore and also

provide the connections for such networks as the Singapore Mercantile Exchange, linked with the Chicago Mercantile Exchange and TradeNet, an international trade document exchange network created in a collaboration of government agencies and trade associations and now operated by Singapore Network Services Pte. Ltd. In addition, Singapore has progressed through a series of tariff reductions in the past several years, making telecommunications among the cheapest in the world. This in turn has begun a cycle of greater use of international communications by businesses and residents. Outgoing international calls have increased to an average of twelve per person per year from 1987 to 1989, which is among the highest rates of use in the world. These examples show that the argument for the liberalization of markets for competition of services is limited in context in each country.

Nonetheless, other factors are beginning to shape a structural shift in Singapore. With reciprocity in telecommunications trade at issue in the Uruguay Round of the GATT talks, Singapore is concerned that holding its position vis-à-vis other countries will be more difficult if it does not begin to open its own markets and services.¹³ With Singapore's expanding interests into markets of other countries, it will be under increasing pressure to liberalize markets at home. In addition, the need to change the cumbersome nature of internal procedures as a statutory board is cited as a reason to move toward a more efficient private organization.

This liberalization and privatization process will be slow and well planned in Singapore. It is not likely that services, even nonbasic services such as paging, will be opened to competition in the next several years. However, the first steps toward opening Singapore Telecoms to outsiders will be in the form of nominal privatization. Currently, Singapore Telecoms has under study plans to implement a privatization program. Nine companies have been invited to submit proposals for the privatization scheme. It is expected that one or more of these companies will then act as an advisor for the privatization program. Singapore Telecoms has a possible market capitalization of S\$10 billion (US\$5.26 billion). It is expected that flotation of Telecoms stock on the Singapore Stock Exchange (SES) could come in 1992 or 1993. Singapore Telecoms will be the first statutory board to be privatized in

Singapore. Nonetheless, it is expected that initially, the government will continue to hold a 90 percent share.

The Singapore telecommunications systems are already among the most advanced in the world and will continue to expand. With an aggressive planned-growth approach, Singapore will be well positioned in global telecommunications markets of the twenty-first century.

Thailand

Rapid economic growth in Thailand has brought on a very high demand for telecommunications services in the past several years. Phone demands have increased, and the Telephone Organization of Thailand (TOT) is extremely hard pressed to provide adequate basic services.

The current plan (Fifth Development Plan), which runs through 1992, calls for the installation of 1.2 million phone lines in Thailand. To date, approximately 750,000 of those planned lines have been installed. In addition, TOT's urgent sixth plan called for the installation of another 200,000 phone lines for the eastern seaboard industrial plants. The first 100,000 of these are being installed under two separate contracts to Ericsson and NEC. When the plans are complete, TOT estimates that there will be approximately two million phone lines in operation with the need for at least one million more to cover the existing waiting list and anticipated further demand. A target of three million lines is being set for the Seventh Development Plan (1992-1996) although some estimates have put that demand as high as six million new lines. However, under current budget and debt limits set, only about 200,000 additional lines per year could be financed by foreign loans guaranteed by the government and through the TOT budget.

Providing basic telephony service in Thailand is still critical. The high capitalization costs to install the needed phone lines, upgrade current systems, and operate and maintain at a higher level than is now undertaken has put growing pressure on the Thai government to begin to make changes in the structure of TOT. While Thailand would seem to be a likely

13. Chee-Wah Cheah, "Information Policy and Telecommunication Services Trade in the ASEAN Region." Paper presented at the 8th Conference of the International Telecommunications Society, Venice, Italy, March 1990.

candidate for the privatization of its telecommunications entities, that is unlikely due to the internal political conditions of the country.

Under one scheme, of which the United States is a strong proponent, TOT would be privatized. The United States, through the National Telecommunications and Information Administration (NTIA), recently called for the rapid privatization of TOT and a merger with the Communications Authority of Thailand (CAT), responsible largely for international telecommunications. The privatization plan, however, is looked at with considerable doubt by Thai officials as the assumptions under which a privatization scheme would work in Thailand are, according to them, not correct. The needed Thai parliamentary amendment of the statutes of TOT and CAT is highly unlikely in the vulnerable period the government now finds itself in. In addition, the very strong trade unions of TOT and CAT have consistently opposed any privatization scheme. In any case, it would take at least another two years for a first offering of TOT stock, which would not help the more immediate needs.

Although understanding that telecommunications development is important, the Thai government does not see the need for such an urgent priority to be given to the telecommunications sector and is unwilling to make rapid changes in the TOT structure. Instead of a structural change, the government is encouraging investment in and operation of public communications services by private-sector participation. In order to be able to meet its targeted plans, TOT is proposing a build, operate, and transfer (BOT) scheme similar to that in Indonesia several years ago before the change in the latter country's telecommunication law. Given the extended period needed in Thailand to make structural changes, the BOT scheme is seen as a means by which to finance the infrastructure development proposed. Under such a scheme, no laws would need to be amended, and TOT would remain the monopoly operator of telephone services. While this solution may not satisfy those who wish to see a more rapid improvement in telecommunications in Thailand, it is a politically acceptable solution and for now will have to suffice. Of the three million lines proposed to be built in the Seventh Plan, TOT is proposing that two million be installed in Bangkok and one million in rural areas. Firms interested in the BOT scheme are required to put up 1,000 million *baht* (US\$40 million) in a bank guarantee and will also be required to build switching systems in Thailand for the project.

Apart from basic telephone service, the worldwide trend in liberalization of telecommunications services can be observed in Thailand today. Due largely to the financial constraints of the state budget, the Ministry of Transportation and Communications is giving approvals for private concession development of some telecommunications services. Included are such projects as a domestic satellite-based data transmission network for banks, commercial institutions, and manufacturers who need reliable data services. Recent equipment purchases from Northern Telecom and Alcatel and the rapidly growing customer-premises equipment (CPE) market point toward how the liberalization of telecommunication markets apart from the public switched network may prove fruitful and could eventually help speed overall improvements in domestic services.

In addition, the recent launch of ASIASAT may provide the basis for expanded telecommunication services in Thailand. One of the high-powered C-band spot beams of the satellite is focused on Thailand and has the potential to provide cost-efficient television transmission as well as rural telephony and data-exchange services. As yet, a clear policy for the use of ASIASAT has not been established, and it remains unclear to what extent private enterprise will be allowed to erect and operate satellite transmission and receiving equipment for private telecommunications networks or to add to the infrastructure of the public network.

Conclusion

While the general trend worldwide is for deregulation, liberalization of markets, and moves toward privatization on the part of the telecommunications authorities, each country must be looked at separately to understand the economic, political, and social factors surrounding the development and implementation of such policy changes. For example, while British Telecoms has been privatized in Great Britain, the telecommunications authorities of France and West Germany remain powerful government entities. Deregulation in France is in the form of a management overhaul of France Telecoms, and in Germany a limited opening of telecommunications equipment and service markets to outside bidders is evident. In both France and Germany, the monopoly over telecommunication networks and services will remain.

In the ASEAN region, countries are characterized by their different governments, social and cultural milieus, and economic policies and strategies. The priorities in development are different, and so it is no surprise that the development of the telecommunications sector is quite different in each country. However, it is also acknowledged that the growth in the economies, and perhaps the success of the ASEAN region as a whole, requires a concomitant growth in the telecommunications sector. The impressive economic results of a country like Thailand, for example, are accompanied by a very sharp and frustrating increase in the demand for telecommunications services, which are lagging.

Whether telecommunications in any country can become a leading sector for development as seen in Singapore or suffer the evident neglect that can be seen in some of the systems operations in Thailand is largely a policy question. With the high capitalization costs of telecommunications systems and the pressure to build higher-capacity and better-quality infrastructure, governments are reconsidering the policies of the state-owned and controlled monopoly operating entities. The need to liberalize telecommunications markets, especially in nonbasic services, and to look at the privatization of the telecommunication authorities and the private participation in the government-controlled enterprises is confronting each nation.¹⁴

In addition, it will become increasingly more important for ASEAN to establish strong regional linkages in order to continue to attract capital flows for infrastructure development from Europe. With an inevitable focus of Europe on the opening of Eastern European markets, ASEAN countries cannot afford to lose one of the three major sources of private financing (Japan and the United States are the others) for its telecommunications sectors. In order to do this, a focus on regional policy and coordination of the trends in policy change may provide a better platform from which to remain an attractive investment opportunity to Europe.

Faced with high costs and the need to provide better service, financing from outside the government for telecommunications is required. This is perhaps the single most important factor driving the trend toward liberalization of telecommunications in the lesser-developed countries of ASEAN. In the more-developed

Singapore, the need to respond to international pressures as the country moves well beyond domestic basic service provision into the world market for telecommunications services requires it to substantially reevaluate its position vis-à-vis privatization and monopoly control of services.

It will be important for the World Bank and Asian Development Bank to step up support for the development of telecommunications in the region. Loans and grants, however, are not enough, and private participation in the form of capitalization through privatization of the telecommunication authority or of private participation through various politically acceptable schemes in network development projects is inevitable. The forms that these changes take are different in each country but unavoidable.

The problems faced by many countries in telecommunications are not unique. The policy solutions for each country may be somewhat different, but there is a great need to comprehend fully the options available and to look to examples beyond those provided by the developed countries. It may be possible for the ASEAN region as a whole to further develop cooperative efforts in telecommunications policy. In turn, this could provide a substantially more appropriate example of the implementation of different forms of deregulation, liberalization of markets, and privatization schemes for other countries of the world. Perhaps the International Telecommunications Union (ITU) and other regionally based organizations could promote more exchange and cooperation on these critical policy issues. Already the Center for Telecommunications Development (CTD) of the ITU and regional organizations such as the Asia-Pacific Telecommunity (APT) provide technical telecommunications training and skills-formation programs. The annual ITU Telecoms Asia conference held in Singapore brings together vendors and users to promote new technologies and their development in the region. Perhaps similar efforts could be made in terms of the development of cooperative efforts in education about and the formation of regulatory policies and telecommunications technologies.

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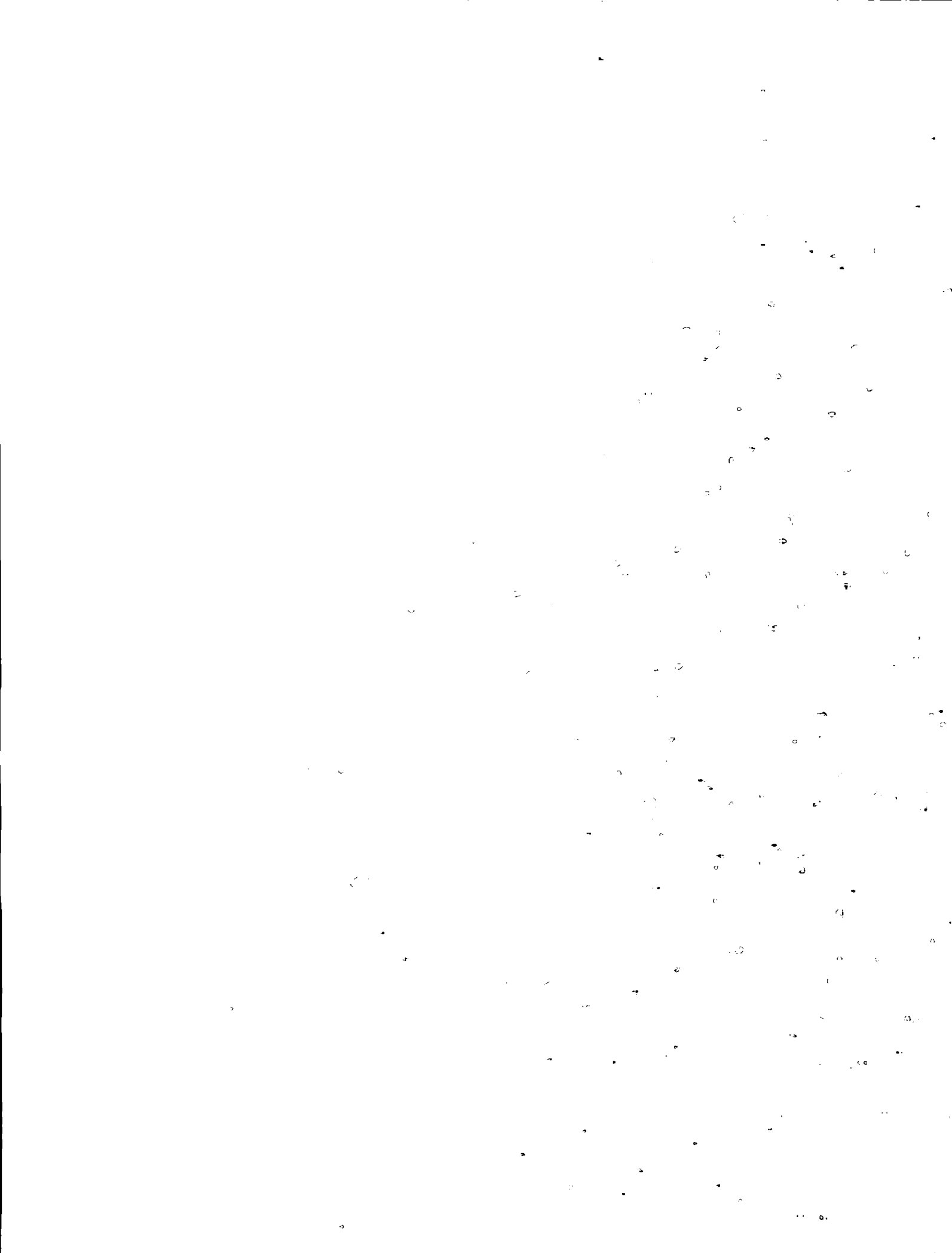
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Appendix 1

Project Research Collaborators

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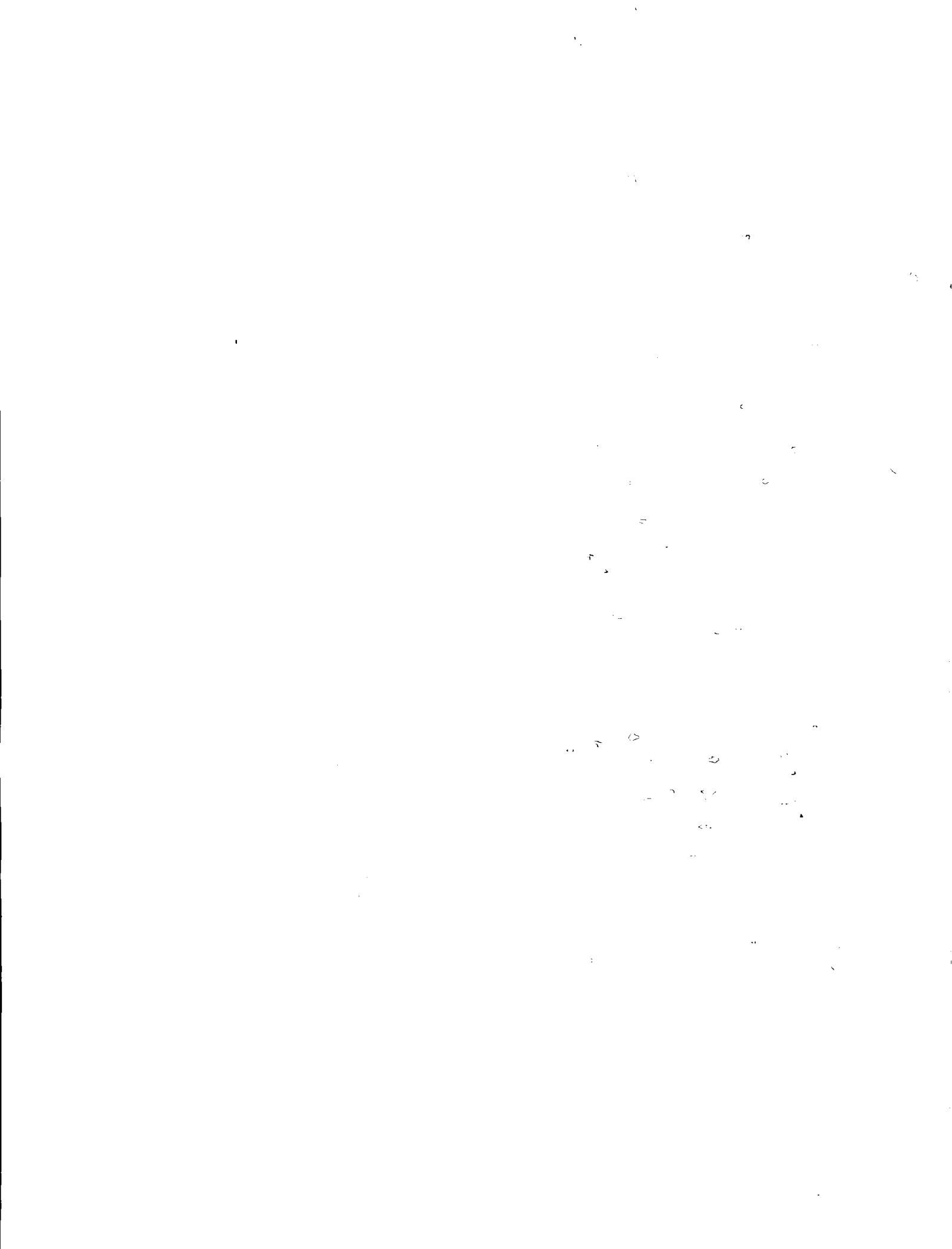
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Appendix 2

Telecommunications Infrastructure and Investment in the ASEAN Region

Table A-1
Telephone Stations (sets) of All Kinds Connected to the Public Network (000s)^a

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	13.8	15.7	18	21.9	na	na	na	32.9	35.6	39.5
Indonesia	392.6	442.1	512.9	584.2	669.3	717.7	788.4	796.3	804.3	890.1
Malaysia	434	na	598	716.8	836.6	967.5	1150.9	1278.8	1380.9	1500.5
Philippines	600	628	702	730.5	775.6	787.6	811.8	820.3	na	na
Singapore	540.2	625.1	702.2	774.6	852	992.6	1002.6	1074	1115.7	1163.8
Thailand	409	451	497	529.1	502.4	623.4	733.4	754.6	999.7	na

a. Tables A-1–A-15 were compiled from the *Yearbook of Common Carrier Telecommunication Statistics, 1978–1987* (Geneva: International Telecommunications Union, 1989). All figures have been rounded.

Table A-2
Main Telephone Lines (000s)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	8.2	9.5	11.1	14	na	na	na	20.8	22.3	24.6
Indonesia	275.1	317.9	369.8	427.2	475.5	503.3	536.1	602.4	677.3	759.1
Malaysia	271	325	396	488.7	585.4	700.1	849.1	958.6	1042.8	1131.7
Philippines	371	389	420	442.8	480.7	437.5	480.9	478	na	na
Singapore	396.9	464.8	523.4	575.5	630.4	679.8	743	796.8	830.5	875.7
Thailand	296	332	366	382.2	434.3	463.2	519.5	626.5	878.3	901.6

Table A-3
Percentage of Main Lines Equipped for International Direct Dial

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	0	0	75	78	na	na	na	81	85	85
Indonesia	na	na	0.37	0.59	na	0.77	1.3	1.37	1.79	3.34
Malaysia	na	0.1	0.18	0.21	0.3	0.4	0.9	2.2	3.9	6.7
Philippines	na	na	na	0.21	0.7	3.76	3.3	5.8	na	na
Singapore	na	na	na	na	na	4.73	5.97	7.87	10.9	7.6
Thailand	na	na	na	na	na	na	na	27	54	60

Table A-4
Percentage of Main Lines Which are Residential (%)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	na	na	na	na	na	na	na	na	na	na
Indonesia	na	na	na	na	na	na	na	na	na	na
Malaysia	52	55	58	60.7	62.7	64.5	66	68	69	71
Philippines	62.4	64.5	60.6	60.32	59.2	55.3	61.7	61.5	na	na
Singapore	72.8	73.7	73.9	73.6	72.9	72.3	72	72.9	71.6	na
Thailand	46.6	47.6	48.6	49.4	49.1	52	54.2	57	62.4	62.7

Table A-5
New Applications for Main Lines (000s)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	1.5	1.2	1.8	(not reported after 1980.)						
Indonesia	76.8	86.7	58.8	48.6	46.2	36.1	31.3	48	64	61.7
Malaysia	87	113	144	176.9	200.7	227.6	193.9	248.3	240.5	242.2
Philippines	54.4	60.9	49.8	na	62.3	61.1	68.5	56.5	na	na
Singapore	85.3	86.7	89.4	87.2	90.1	99.1	115	123.1	111.8	92.7
Thailand	69	139	85	93.4	101.5	138.5	121.9	168.8	102.4	145.9

Table A-6
Total Demand for Main Lines (including transfers) (000s)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	1.7	1.4	2.0	na	(not reported after 1981)					
Indonesia	125.5	129.6	103.5	178.1	228.7	287.8	357.8	428.9	447.5	478.1
Malaysia	355	431	529	638.6	786.1	899.9	1039.7	1141.2	1170.7	1216.4
Philippines	na	na	na	na	83.7	215.5	210.8	195.2	na	na
Singapore	112.9	113.4	121.3	117.5	123.8	136.7	176.7	192.3	171.2	140.4
Thailand	na	na	na	na	na	na	671.1	na	1448	177.5

Table A-7
Waiting List for Main Lines (000s)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	4.8	5.4	6.3	6.6	na	na	na	9.7	12	12.1
Indonesia	48.7	42.9	44.7	129.5	182.5	251.7	326.4	380.9	413.6	416.3
Malaysia	84.2	105.7	133	149.9	189.8	199.6	190.5	182.6	127.9	84.6
Philippines	81.9	122.3	154.3	198.2	132	199.4	186.8	173	na	na
Singapore	3.1	3.6	4	3	1.4	0.7	0.2	0.1	0.1	0.1
Thailand	83	194	264	337.1	386.8	437.4	347.9	359.9	287.3	289

Table A-8
Telex Service

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei										
Subscriber lines (000s)	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.5
National traffic (000 min.)	na									
Outgoing international traffic (000 min.)	155.8	184.4	300	419.3	610	659.3	784.6	814.2	811.4	742.7
Indonesia (pulses)										
Subscriber lines (000s)	2.9	3.6	4.7	6.2	7.4	8.6	9.5	10.4	11.7	13.5
National traffic (000 min.)	35.9	63.1	87.7	142.1	440.7	533.4	595.8	684.2	725.9	780.4
Outgoing international traffic (000 min.)	4.5	5.5	6.9	8.8	10.1	11	12.4	12.6	12.7	11.2
Malaysia (pulses)										
Subscriber lines (000s)	2	2.9	3.7	4.1	5.9	8	9.8	10.9	11.4	11.2
National traffic (000 min.)	33.7	38.3	47.9	na						
Outgoing international traffic (000 min.)	2867	3745	4637	5273	5972.8	6961	7214.8	9931.9	9638.8	6118.6
Philippines										
Subscriber lines (000s)	4.9	5.7	6.4	6.9	8.6	10.5	12.9	8.8	na	na
National traffic (000 min.)	2851	3198	2885	4116.2	5185.7	5211.2	3462.9	na	na	na
Outgoing international traffic (000 min.)	4690	6101	7372	8306.8	7743	9339.3	8319	7434.7	na	na
Singapore										
Subscriber lines (000s)	4.5	5.9	8	10	12.3	14.3	16	16.8	17.6	17.9
National traffic (000 min.)	2186	3341	5647	9680.9	14912.7	19968.3	25813.9	29420.3	32566	31835
Outgoing international traffic (000 min.)	10259	14146	19194	20667	25292.6	30143	32926	31306.6	30182.7	30133.7
Thailand										
Subscriber lines (000s)	1.2	1.6	2	2.5	3	3.9	4.9	5.4	5.8	6.2
National traffic (000 min.)	1283	1383	na	1723	2314	3242.5	4056.9	4817.4	4898.8	4842.3
Outgoing international traffic (000 min.)	2324	2987	na	4443	5110.5	6151.5	7490.5	8026	7465.2	7814.7

Table A-9
Equivalent Full-Time Telecommunication Staff

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei										
Operating staff	96	110	110	110	na	na	na	106	110	105
Technical staff	212	334	339	339	na	na	na	340	340	322
Other staff	100	114	137	165	na	na	na	215	202	166
Total staff	408	560	590	614	na	na	na	661	652	593
Indonesia										
Operating staff	6600	6378	6590	6222	6240	6778	7467	7404	7718	8051
Technical staff	11882	11424	11237	11260	12443	12880	15748	16310	17855	18778
Other staff	8024	8863	9181	9143	9803	10315	13347	13697	14771	15499
Total staff	26506	26665	27008	26625	28486	29973	36562	37411	40344	42328
Malaysia										
Operating staff	3400	3900	3900	4390	4900	9604	na	9368	9198	9900
Technical staff	8800	9900	11100	18810	20350	20707	16064	10626	10667	15500
Other staff	6100	6800	7200	3770	4560	na	14180	9404	9019	2915
Total staff	18300	20600	22200	26970	29810	30311	30244	29398	28059	28315
Philippines										
Operating staff	na	na	na	na	19738	20263	18939	9525*	na	na
Technical staff	na	na	na	na	12693	4119	3363	1675	na	na
Other staff	na	na	na	na	5927	3673	3744	2362	na	na
Total staff	16920	23790	27220	28545	29358	28055	26046	13563*	na	na
Singapore										
Operating staff	1968	2038	2100	2282	3730	3848	3869	3889	3671	3669
Technical staff	5235	5459	5732	5785	6209	6490	6086	5993	5879	5678
Other staff	2245	2345	2452	2470	2667	2698	2904	2846	2871	2642
Total staff	9448	9842	10284	10537	12606	13036	12859	12728	12421	11989
Thailand										
Operating staff	na	na	na	na	5142	6239	8215	9022	5415	6315
Technical staff	na	na	na	na	5625	5036	7272	7896	2513	7919
Other staff	na	na	na	na	4515	5272	2957	3092	9626	3512
Total staff	na	na	na	na	15282	16547	18753	20010	17554	22125

A-10

Total Income and Expenditures of All Telecommunication Services

	1981		1983		1985		1987	
	National Currency	\$US ^a	National Currency	\$US	National Currency	\$US	National Currency	\$US
Brunei (M \$B)								
income	20.2	9.6	na	na	39.4	18.3	47.5	22.8
expenditures	15.6	7.4	na	na	30.5	14.2	26.9	12.9
net (i-e)	4.6	2.2	na	na	8.9	4.1	20.6	9.9
Indonesia (M rupiah)								
income	275,100	420	519,300	520.3	718,579	635.9	970,807	586.6
expenditures	252,771	385.9	470,706	471.7	617,771	546.7	899,522	543.5
net (i-e)	22,329	34.1	48,594	48.6	100,808	89.2	71,285	43.1
Malaysia (M ringgit)								
income	633.2	285.2	960.8	410.6	1430.7	593.7	1561.7	627.2
expenditures	396.1	178.4	799.4	341.6	1082.5	449.2	1441.9	579.1
net (i-e)	237.1	106.8	161.4	69	348.2	144.5	119.8	48.1
Philippines (M pesos)								
income	2002.6	246.3	6043.3	431.7	6109.6	324.1	na	na
expenditures	2427.4	298.6	3077.3	219.8	4644.1	246.4	na	na
net (i-e)	(424.8)	(52.3)	2966	211.9	1299 ^b	68.9	na	na
Singapore (M \$S)								
income	554.9	270.7	803.1	377	867.9	411.3	1088.4 ^c	536.2
expenditures	337	164.4	505.2	237.2	622.8	295.2	2742.4	1350.9
net (i-e)	217.9	106.3	297.9	139.8	245.1	116.1	346	170.4
Thailand (M baht)								
income	2947.7 ^d	128.7	6309.5	273.7	9165.5	340.6	13839.9	532.3
expenditures	2279.3	99.5	3731.8	161.9	5676.2	210.9	9213.9	354.4
net (i-e)	668.4	29.2	587.9 ^{**}	25.5	3489.3 ^d	129.7	4626	177.9

a. \$US figure based on exchange rate of that year.

b. As reported.

c. Capital gains income not included.

d. Author's calculation.

Source: *ITU Yearbook of Common Carrier Statistics, 1978-1987.*

A-11

Annual Gross Investments in Telephone Switching Equipment

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei										
M \$B	0.8	13.6	6.7	2.1	(not reported after 1981)					
M \$US ^a	0.38	6.48	3.2	1.0						
Indonesia										
M rupiah	39125	10991	60922	15	16332	21892	13560	22747	53863	62377
M \$US	61.9	17.45	96.4	0.23	23.43	21.94	12.61	20.13	32.66	37.69
Malaysia										
M ringgit	564.5	681.4	852.7	111.9	117.1	191.2	181	388.2	1001.2	1018.3
M \$US	256.6	311.1	384.1	50.0	50.7	81.7	74.5	161.1	386.6	409
Philippines										
M pesos	1171	1361	1579	2667.4	4267.8	4572.5	7736.1	655.2	na	na
M \$US	158.9	183.7	208	328.1	439.5	326.6	389.7	34.8	na	na
Singapore										
M \$S	32.8	14.9	55.6	47.6	26.4	37.6	52.8	17.4	48.3	65.7
M \$US	14.1	6.9	25.6	23.2	12	17.7	24.3	8.2	22	32.4
Thailand										
M baht	353.8	317.8	1250.3	370.5	na	na	na	2883.7	1929.9	744.8
M \$US	17.3	15.6	60.6	16.2	na	na	na	107.2	74.2	28.6

a. All \$US calculated on that year's exchange rate.

A-12

Annual Gross Investments for Telephone Services

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei										
M \$B	4.2	39.4	30	16	(not reported after 1981)					
M \$US*	2	18.8	14.2	7.4						
Indonesia										
M rupiah	14536	65765	95143	47590	103128	70347	97566	86691	132625	390659
M \$US	23	104.4	150.5	72.7	148	70.5	90.8	76.7	80.4	236
Malaysia										
M ringgit	1476	1806.3	2302.5	511.3	545.3	618.7	451.6	1583.3	1270.1	4088
M \$US	670.9	824.8	1037.2	228.3	236.1	264.4	185.8	657	490.4	1641.8
Philippines										
M pesos	3532	4326	5052	9246	11529.5	20104.9	30136.3	1298.6	na	na
M \$US	479.2	583.8	665.6	1137.3	1187.4	1436	1518.2	68.9	na	na
Singapore										
M \$S	116	84.6	121	130.5	149.9	142.7	171	271.9	162.1	130
M \$US	50	39	55.8	63.7	68.1	67	78.8	128.9	73.7	64
Thailand										
M baht	544.1	1272.2	1886.3	690.1	152	34.5 ^b	499	5129	6752	4607.2
M \$US	26.7	62.4	91.4	30.1	6.6	1.5	21.1	190.6	259.7	177.2

a. All \$US calculated on that year's exchange rate.

b. International circuits.

A-13

Total Annual Gross Investment in Telecommunications (Not Including Land and Buildings)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei										
M \$B	4.4	42.4	31.2	20.6	(not reported after 1981)					
M \$US ^a	2.1	20.2	14.8	9.6						
Indonesia										
M rupiah	60046	66496	100963	57044	111285	71967	106521	103205	149678	460617
M \$US	95	105.5	159.8	87.1	159.7	72.1	99.1	91.3	90.8	278.3
Malaysia										
M ringgit	1593.4	1871.4	2384.7	623.1	622.3	809.9	632.5	1628.3	1290.4	4132.6
M \$US	724.3	854.5	1074.2	278.2	269.4	346.1	260.3	675.6	498.2	1659.7
Philippines										
M pesos	3019	4808	6275	9708.4	12107.5	21395.6	30348.7	1700	na	na
M \$US	409.6	648.9	826.7	1194.1	1246.9	1528.3	1528.9	90.2	na	na
Singapore										
M \$S	146.7	140.7	194.4	203.2	273.1	253.7	295.7	295.7	253.6	188.5
M \$US	63.2	64.8	89.6	99.1	124.1	119.1	136.3	140.1	115.3	92.9
Thailand										
M baht	na	na	na	778.8	868.7	896.3	881	na	na	na
M \$US	na	na	na	34	37.7	38.9	37.3	na	na	na

a. All \$US calculated on that year's exchange rate.

A-14

Telecommunications Investments as a Share of GDP (%)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	0.18	1.17	0.79	0.74	(not reported after 1981)					
Indonesia	0.29	0.21	0.25	0.11	0.2	0.10	0.13	0.15	0.22	na
Malaysia	4.65	4.62	5.04	1.25	1.24	1.54	1.07	2.32	2.03	8.47
Philippines	2.61	2.58	2.79	3.77	4.21	6.27	7.42	na	na	na
Singapore	1.08	0.88	0.95	0.83	0.83	0.89	0.91	1.11	0.8	0.51
Thailand	na	na	na	0.11	0.11	0.09	0.09	na	na	na

A-15

Telephone Main Lines per 100 Inhabitants

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Brunei	4.08	4.46	4.93	7.29	na	na	na	9.27	9.70	10.45
Indonesia	0.19	0.22	0.25	0.28	0.31	0.32	0.33	0.37	0.40	0.44
Malaysia	2.03	2.40	2.95	3.64	4.27	4.76	5.55	6.11	6.44	6.85
Philippines	0.81	0.83	0.87	0.90	0.96	0.85	0.90	0.88	0.88	0.88
Singapore	16.86	19.50	21.68	23.55	25.34	27.02	29.20	30.96	31.94	33.29
Thailand	0.65	0.72	0.79	0.80	0.89	0.94	1.03	1.21	1.66	1.67

A-16

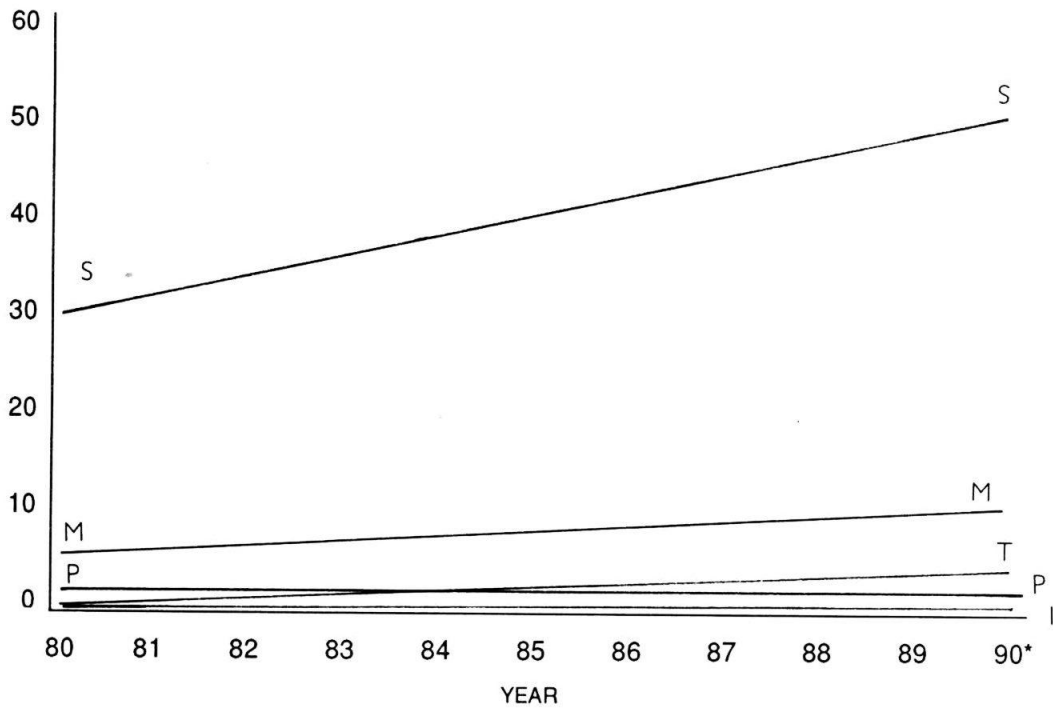
Density of Telephone Sets per 100 Inhabitants

	1970	1975	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 ^a
Brunei	na	na	6.87	7.37	8.00	11.42	na	na	na	14.65	15.49	16.79			
Indonesia	0.10	0.16	0.28	0.31	0.35	0.39	0.43	0.45	0.49	0.49	0.48	0.52	0.54	0.54	0.80
Malaysia	na	3	3.26	na	4.45	5.33	6.10	6.64	7.52	8.14	8.53	9.08	9.5	9.7	10.0
Philippines	na	1.2	1.31	1.34	1.46	1.49	1.54	1.53	1.52	1.51	na	na	na	1.3	1.61
Singapore	7.7	14.3	22.95	26.23	29.09	31.70	34.24	36.67	39.41	41.73	42.91	44.24	45.30	46.45	50
Thailand	na	0.8	0.90	0.98	1.07	1.11	1.03	1.26	1.45	1.46	1.89	1.95	1.99	2.04	3

Sources: Various annual reports of Singapore Telecoms, JTM/STM, Malaysia; TOT, Thailand; Perumtel, Indonesia; and PLDT, Philippines. *TDRI Quarterly*, 4, no. 2, 6/89. *ITU Yearbook of Common Carrier Statistics, 1978-1987*.

a. Projected in plans.

Density of Telephone Sets per 100 Inhabitants, 1980–1990



* Projected in plans (plotted from Table A-16 above).

Exports of All Communications Equipment to ASEAN Countries (US\$000)

Exporter	Philippines			Thailand			Singapore			Malaysia			Indonesia		
	1987	1986	1985	1987	1986	1985	1987	1986	1985	1987	1986	1985	1987	1986	1985
Austria	14	75	128	236	446	231	9142	7919	4883	Figures for Malaysia and Indonesia are not available.					
Belg/Lux	2	15	12	4462	3758	1038	8384	6441	4279						
Canada	1132	447	430	636	1501	3659	3304	2602	3513						
Denmark	36	1268	27	520	289	283									
Finland	na	na	na	4460	0	1									
France	788	129	116	1234	3246	1634	9132	5803	4587						
FRG	6700	11009	7537	17876	13552	3958	13404	13388	9506						
Hong Kong	12032	17954	16410												
Italy	114	14	102	770	4759	1826									
Japan	32318	19922	18701	56016	96025	79764	203235	313789	223866						
S.Korea	24610	13697	3882												
Malaysia							104042	68115	47311						
Netherlands	408	101	61	na	3638	3062									
Norway	112	35	958	192	125	39									
Sweden	666	183	690	4940	35036	12120									
Switzerland	56	135	985	460	317	232									
Taiwan							64808	49045	37399						
UK	714	2500	412	5616	6484	5444	12152	8602	14069						
USA	30508	30415	34235	40122	23892	27427	59354	74130	73729						

Source: *Asian Communications*, January–June 1989, and project collaborators.

Includes telecommunications (telephony), broadcast, satellite, consumer audio/video, etc.

* Figures for 1987 are extrapolated from January–June 1987 figures.

Exports of Radio and TV Broadcasting Equipment to ASEAN Countries (US\$000)

Exporter	Philippines			Thailand			Singapore			Malaysia			Indonesia		
	1987	1986	1985	1987	1986	1985	1987	1986	1985	1987	1986	1985	1987	1986	1985
Australia							180	111	201						
Belgium				-	-	348									
Canada							230	151	251	Figures for Malaysia and Indonesia are not available.					
Denmark	na	1261	1	412	231	10									
Finland				2784	-	-									
France				156	1396	192	438	318	191						
FRG	28	468	50	7228	3752	497									
Hong Kong							416	649	306						
Italy				142	1103	141									
Japan	3838	2569	860	4568	4432	17107	17246	17692	13471						
S. Korea							756	4	189						
Sweden				800	428	974	202	1263	21						
Taiwan							528	169	24						
UK	36	2124	38	4164	4445	1942	498	1418	694						
USA	1246	823	268	8226	7782	10533	3924	7047	5875						
USSR							1261	-	-						

Source: *Asian Communications*, January-June 1989, and project collaborators.

Exports of All Accessories for Communications to ASEAN Countries (US\$000)

Exporter	Philippines			Thailand			Singapore			Malaysia			Indonesia		
	1987	1986	1985	1987	1986	1985	1987	1986	1985	1987	1986	1985	1987	1986	1985
Australia							7940	6596	7566						
Austria	14	24	20	28	26	13									
Belgium	2	10	10	4460	3473	680	7061	4103	1363						
Canada	982	232	328	632	1204	2964	1916	1728	1232	Figures for Malaysia and Indonesia are not available.					
Denmark				-	13	15									
Finland				334	-	1									
France	56	56	37	760	864	289									
FRG	3892	2738	3595	4844	2481	1493	9050	8100	4756						
Hong Kong							6596	13067	4967						
Italy	114	14	92	1342	2350	1498									
Japan	17114	9989	5648	28756	43787	40945	264642	188554	124788						
Malaysia							88914	58913	39849						
Netherlands	216	79	1												
Norway	112	29	103	12	12	6									
S. Korea							17992	10468	2616						
Sweden	236	43	188	3660	18570	4392	2378	949	1494						
Switzerland	56	134	972	32	45	22									
Taiwan							48092	36314	29905						
UK	552	203	285	912	1127	917	4530	2865	4423						
USA	17574	20277	12727	17140	4949	1715	31688	47629	46414						

Source: *Asian Communications*, January-June 1989, and project collaborators.

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Key Economic Indicators, ASEAN, Japan, United States (as of August 1989)

	Pop.(M)	GNP/Capita (\$US)	GDP Growth (%)	Exports 12 mos. (\$US, B)	Surplus/Deficit current A/c (\$US, B)	Foreign Debt (\$US, B)	Inflation CPI (%)
Brunei	0.2	17000	4.5	2.3	.na	net creditor	2.3
Indonesia	178.0	520	5.7	16.6	- 2.150	50	7.4
Malaysia	17.5	1820	7.3	20.1	1.870	17.3	2.7
Philippines	60.5	650	6.6	7.1	- 0.743	28.5	8.1
Singapore	2.7	9455	11.0	33.0	1.640	net creditor	3.6
Thailand	56.0	995	10.6	16.0	- 1.762	15.5	4.0
Japan	123.8	23358	5.1	275	17.698	net creditor	2.1
U.S.A.	249.1	19750	2.7	300	- 125	533	4.2

Source: *Asiaweek*, September 22, 1989.

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Gross National Product, ASEAN

	1970		1975		1980		1985		1990 (est.)	
	Country Currency	\$US (B)	Country Currency	\$US (B)	Country Currency	\$US (B)	Country Currency	\$US (B)	Country Currency	\$US (B)
Indonesia (Rupiah, B)	3,290	1.85	12,087	6.779	43,435	24.40	80,924	45.46	164,756	92.56
Malaysia (Ringgit, B)	11.80	4.37	21.96	8.135	49.63	18.38	72.31	26.78	86	31.85
Philippines (Peso, B)	41.75	2.04	114.44	5.582	264.53	12.90	607.43	29.63	806.27	39.33
Singapore (S\$, B)	6.81	3.40	13.35	6.67	23.31	11.65	39.15	18.57	51.06	25.53
Thailand (Baht, B)	136.44	5.69	298.60	12.44	672.44	28.01	1010.48	42.10	1,337.30	55.72

Sources: International Financial Statistics, *International Monetary Fund (IMF) Yearbook*, 1986. *Asiaweek*, September 22, 1989. *Telecommunication and Economic Development*, World Bank, 1983.

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ASEAN Population (millions, mid-year estimates)

	1970	1975	1980	1985	Est. 1990	Projected*	
						1995	2010
Indonesia	119.47	135.67	146.36	163.39	178.0	192	229
Malaysia	10.39	11.90	13.44	15.6	17.5	19	23.5
Philippines	36.85	42.07	48.32	54.38	60.5	66	86.6
Singapore	2.11	2.26	2.41	2.56	2.7	2.8	3.1
Thailand	36.37	41.87	46.50	51.30	56.0	61	75.6

Source: U.N. World Population Prospects: Estimates and Prospects as in 1982, New York, 1985. "Population Indicators" (Appendix Table 1, p. 113) Asia-Pacific Report, Honolulu: East-West Center, 1989.

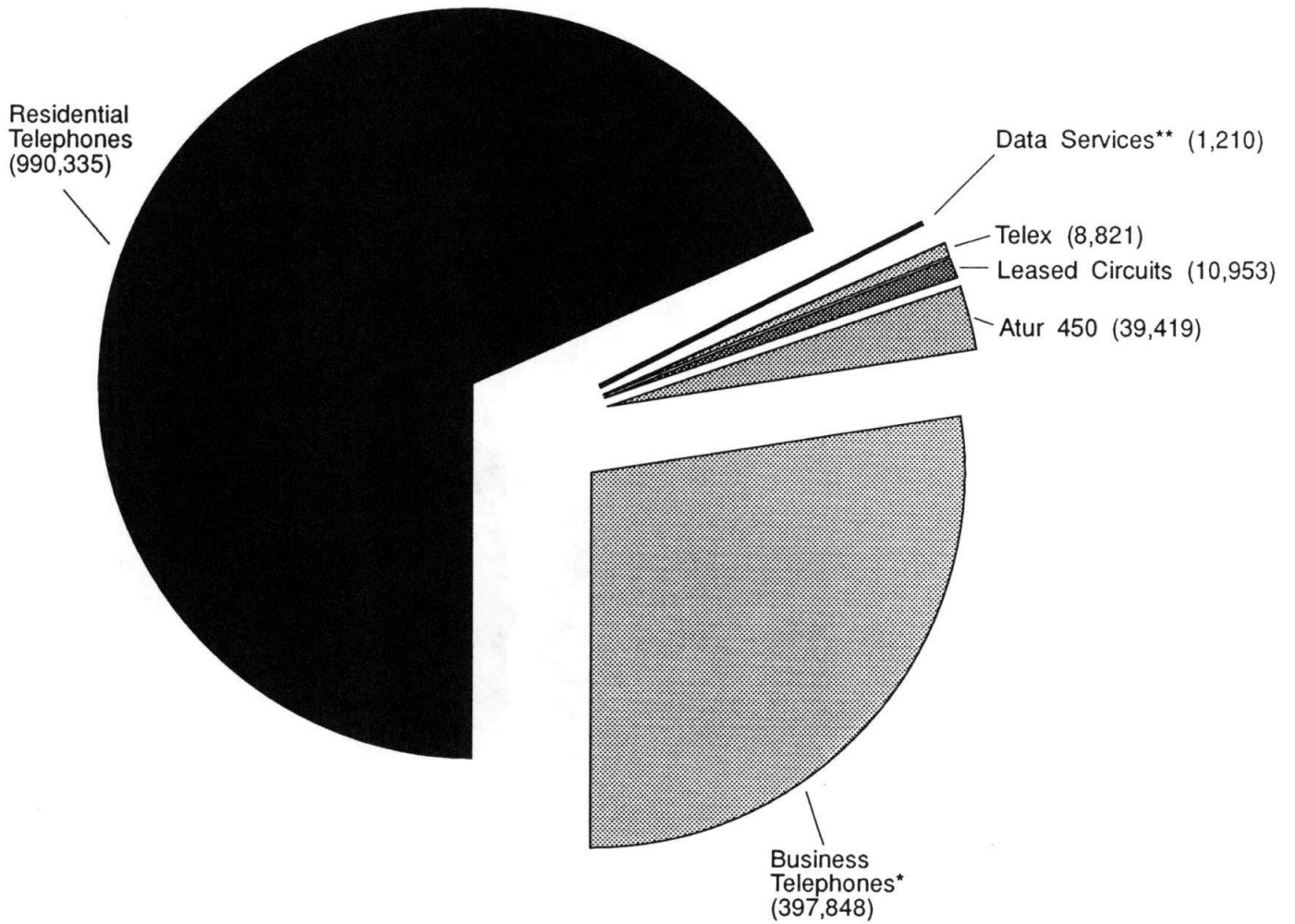
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ASEAN/U.S. Exchange Rates, 1978-1990 (1 \$US = listed currencies average for year)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Brunei (Brunei \$)	2.1	2.1	2.11	2.15	2.1	2.1	2.1	2.15	2.1	2.085	2	1.95	1.9
Indonesia (Rupiah)	632	630	632	655	697	998	1075	1130	1649	1655	1705	1780	1809
Malaysia (Ringitt or Malaysian \$)	2.2	2.19	2.22	2.24	2.31	2.34	2.43	2.41	2.59	2.49	2.5	2.6	2.7
Philippines (Peso)	7.37	7.41	7.59	8.13	9.71	14	19.85	18.85					
Singapore (Singapore \$)	2.32	2.17	2.17	2.05	2.20	2.13	2.17	2.11	2.20	2.03	2	1.95	1.9
Thailand (Baht)	20.4	20.38	20.63	22.9	23.05	23.05	23.61	26.91	26	26	26	25.4	25

Sources: *ITU Yearbook of Common Carrier Statistics* and author's calculations. The 1989 rate is based on actual country bank buy rates as of May 1989. The 1990 rate based on actual country bank buy rates as of March 1990.

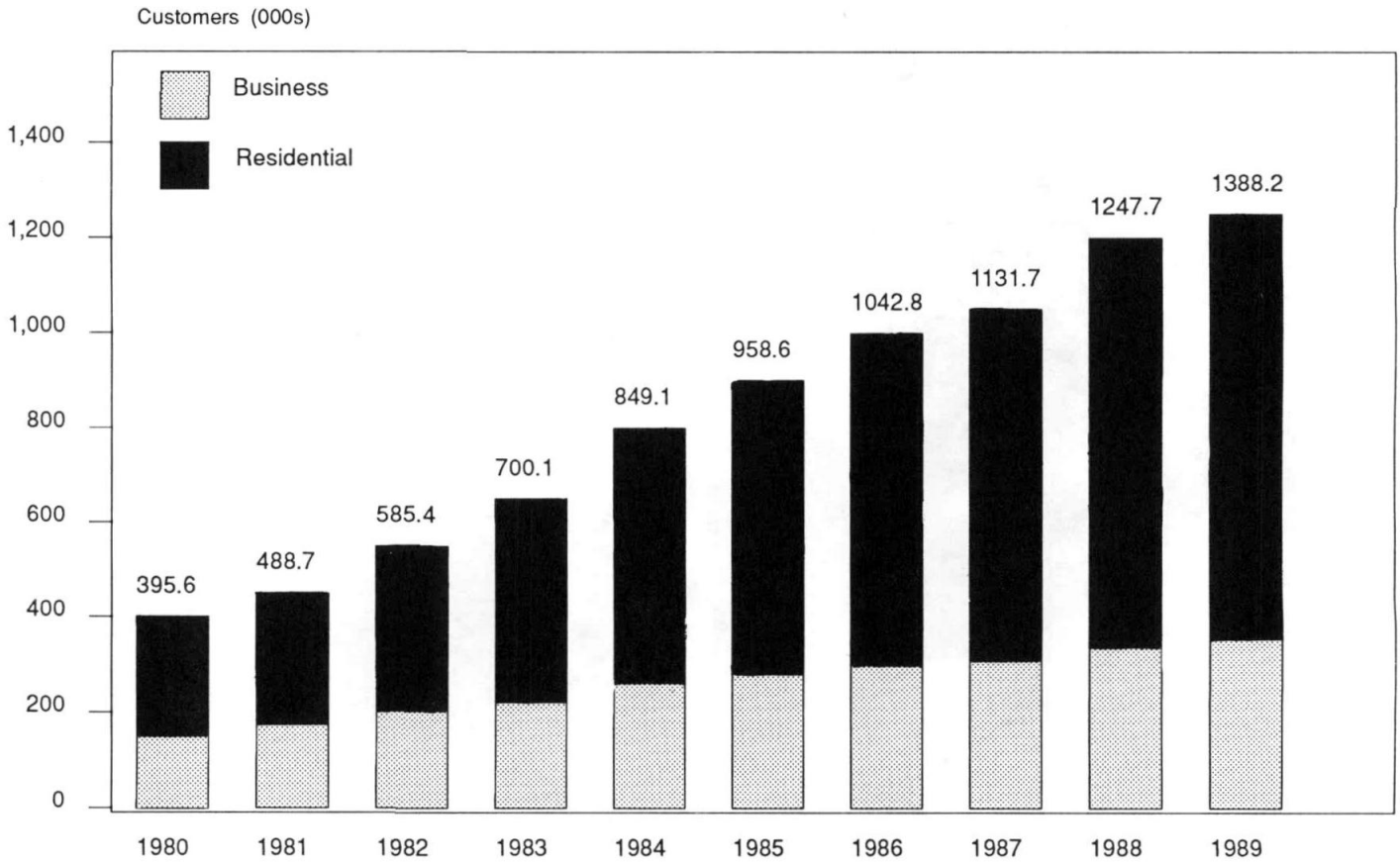
Overall Customer Status 1989



*Includes Telefax (24,864), public pay phones (22,353), Datel (4,235), and Telita (467).

**Maypac (909) and Maycis (301).

Telephone Customer Growth, 1980-1989



Average Growth (%)

	1971-75	1976-80	1981-85	1986	1987	1988	1989
Telephone	10.3	18.5	19.4	8.8	8.5	10.3	11.3
Business	8.7	12.4	13	3.3	4.3	9.2	9.4
Residential	12.5	24.6	23.3	11.4	10.4	10.7	12

Growth in Other Services, 1985-1989

CUSTOMERS

