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Indonesia

Telecommunications Sector Study

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CURRENCY EQUIVALENTS, 1988

Currency Unit = Indonesian Rupiah (Rp)

US\$1	=	Rp 1,700
Rp 1.0 million	=	US\$588

GOVERNMENT OF INDONESIA FISCAL YEAR

April 1-March 31

PERUMTEL FISCAL YEAR

January 1-December 31

WEIGHTS AND MEASURES

Metric

This study of the Indonesian telecommunications sector is based on the findings of a mission that visited Indonesia in November and December 1988 and in April 1989. The mission consisted of A. Shanmugarajah, J. Cowie, C. Ramsay, P. Smith, T. Takama, L. Backlund (consultant), P. Holm (consultant) and K. Lindquist (UNDP/ITU). The study also draws on several reports, in particular the "Republic of Indonesia Study Report on Long Term Planning for Development of Telecommunications System" published in 1987 by the Japan International Cooperation Agency. The assistance provided by PERUMTEL and MPTT for the preparation of this report and comments and suggestions provided by several reviewers* are gratefully acknowledged.

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ABBREVIATIONS AND ACRONYMS

AIC	Average incremental costs
ASEAN	Association of South East Asian Nations
BAPPENAS	National Development Planning Agency
BPPT	State Ministry for Research and Technology
CPE	Customer premises equipment
DEL	Direct exchange line (main line)
DGPT	Directorate General of Posts and Telecommunications
EIS	Electronic information system
EKUIIN	Coordinating Ministry for Economic, Finance and Industry Affairs
GDP	Gross domestic product
HRM	Human resources management
ICB	International competitive bidding
IDD	International direct dialing
ISDN	Integrated services digital network
ITT	International Telegraph and Telephone Co.
ITU	International Telecommunication Union
KORPI	Civil servants community
LCB	Local competitive bidding
LDC	Less developed country
MIS	Management information system
MTPT	Ministry of Tourism, Posts and Telecommunications
OMS	Operation and management system
OSP	Outside plant
PERJAN	Service enterprise
PERSERO	Enterprise with shares
PERTAMINA	State oil company
PERUM	Public enterprise
PERUMTEL	Telecommunications public enterprise
PID	Project initiating documents
PJKA	State railway company
PLN	National electricity corporation
PMC	Program management consultant
PT CSM	PT Chitra Sari Makmur--VSAT communication company
PT INDOSAT	State international telecommunications company
PT INTI	State telecommunications manufacturing company
PUSDIKLATTEL	Telecommunications education and training center
RTU	Regional training unit
Repelita	National five-year development plan
SCR	Successful call rate
SLDD	Subscriber long-distance dialed
TDC	Test and Development Center
UNDP	United Nations Development Programme
VSAT	Very small aperture satellite
WANAWAKI	Civil servants spouse association

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TELECOMMUNICATIONS SECTOR STUDY

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TELECOMMUNICATIONS SECTOR STUDY

Executive Summary

1. The telecommunications sector in Indonesia is dominated by Perusahaan Umum Telekomunikasi (PERUMTEL), the state-owned domestic telecommunications service provider, which operates approximately 800,000 exchange lines and earned revenues in 1987 of Rp 716 billion (approximately US\$436 million). All international telecommunications services are provided through PT IndoSat, also a state-owned company, with 1987 revenues of Rp 256 billion (approximately US\$156 million). The major manufacturer of telecommunications equipment in Indonesia is another state-owned enterprise, PT Inti. The private sector participates in the telecommunications sector through business ventures with PERUMTEL for the provision of cellular telephone and VSAT (mainly data) satellite telecommunications services. In addition, many kinds of terminal equipment are sold through commercial distributors, and private construction companies have been significantly involved in the installation of local network facilities. New legislation passed in April 1989 permits competition in the provision of nonbasic services such as store-and-forward electronic mail and computer database services.

2. The telecommunications sector is under the jurisdiction of the Ministry of Tourism, Posts and Telecommunications (MTPT). Other important government agencies that influence development of the sector are the National Development Planning Agency (BAPPENAS), the Ministry of Finance, the State Ministry for Research and Technology (BPPT) and the Coordinating Ministry for Economic, Finance and Industry Affairs (EKUIN).

3. The performance of the Indonesian telecommunications sector needs to be vastly improved. Registered excess demand for telephone service is more than 530,000 lines, i.e., more than 65% of existing supply, and growing. Statistics for the average successful call ratio (SCR) and for the average number of faults per line confirm high levels of network and terminal congestion and poor service levels. Furthermore, access to telephone service as indicated by a telephone density of 0.45 telephones per 100 persons is very low in comparison with other ASEAN countries. On the other hand, the overall financial performance of the three state-owned telecommunications-sector entities is satisfactory and is likely to improve in the future as measures are taken to control costs and enhance revenues.

4. Long-term Indonesian government objectives for the sector include (a) a rapid increase in the number of exchange lines and in the number of public call offices (b) increased availability of automatic telephone service, (c) extension of basic telephone service to more rural areas, (d) increased levels of self-financing for sector entities, and (e) significantly improved efficiency and productivity. These objectives are consistent with the Government's broader economic objectives, in particular the renewed emphasis on increasing foreign trade and tourism.

5. Three main external factors have contributed to PERUMTEL's inadequate service performance. First, until recently, government management of the sector has not given sufficient stimulus and incentive to PERUMTEL's management to strive for higher performance standards. In fact, the Government's close relationship with PERUMTEL has tended to blur accountability and responsibility in this area. Government procedures have contributed to delays in project approval and, at times, have hindered long-term planning. Second, PERUMTEL faces virtually no competition in the provision of network services and, therefore, has not been spurred by competition to improve its own performance. Third, customers for telecommunications services have not been influential in pressing for improved levels of service.

6. These external factors have contributed to PERUMTEL's weak institutional capability. The necessity of strengthening PERUMTEL's program implementation and system management capacity and of improving its operational efficiency during a period of rapid network expansion poses a major challenge. Significant problems have been identified in its organizational structure, organizational culture, and its management systems in many areas; these include finance, procurement, network management, network maintenance, management information, human resources, project management and materiel management. Furthermore, PERUMTEL's limited program implementation capacity has failed to keep up with the growth in demand throughout this decade.

7. To address these problems and challenges, initiatives are required in the following four broad areas: (a) government management of the sector; (b) competition and private sector participation; (c) appropriate strategies for investment, procurement and financing; and (d) PERUMTEL institutional strengthening.

8. Government Management of the Sector. The proposed strategy for increasing the effectiveness of government management of the sector consists of (a) greater emphasis on setting and monitoring service and financial performance targets via a process for the development and government approval of corporate plans for PERUMTEL, PT IndoSat and PT Inti; (b) increased commercial orientation and operational autonomy for PERUMTEL reflected in changing its status to a "PT," i.e., a limited liability company; (c) a strengthened regulatory, policy and planning capability in MTPT; and (d) creation of communication mechanisms that permit a dialogue between the Government and telecommunications customer (user) groups concerning sector services and priorities.

9. Competition and Private Sector Participation. Areas in the telecommunications sector where competition can be introduced economically are limited by significant economies of scale in network facilities. Nevertheless, in order to provide a competitive stimulus to PERUMTEL and to relieve it of certain tasks that can be performed well by others, increased competition should be encouraged in the provision of cellular telephone and nonbasic services, and of terminal equipment. In addition, private sector participation in the sector should be encouraged through joint venture arrangements with PERUMTEL.

10. Investment, Procurement and Financing. The total expressed demand for telephone service in Indonesia is believed to be significantly underestimated by current figures. In addition to the existing 800,000 telephone lines and the waiting list of 530,000 registered applications for service, there is an estimated hidden demand for at least 260,000 additional lines. Furthermore, strong growth in demand for telephone service is projected over the next 15 years. In order to address this situation, the study proposes a two-pronged strategy: (a) a review of tariffs to moderate demand and to ration scarce telecommunications resources (as well as to reflect costs more closely and to achieve financial targets); and (b) a major investment program coupled with appropriate engineering, procurement and financing plans. The recommended investment plan for the period 1989-2004 would cost approximately US\$7.0 billion equivalent. This would enable the installation of 3.3 million telephone lines and would raise telephone density to approximately 1.7 per 100 persons by 2004. Achievement of these investment program goals will require a significant amount of technical assistance, installation of integrated packages of outside plant network facilities, and a major program of institutional strengthening for PERUMTEL.

11. PERUMTEL Institutional Strengthening. A number of initiatives are critical to improving PERUMTEL's implementation capacity and operational efficiency. These include organizational restructuring involving greater decentralization and delegation of authority, improved organizational culture, expanded human resources management and development that would require literally thousands of staff-years of training, and "twinning" with foreign telecommunications entities to accelerate strengthening of management systems in many areas.

12. In implementing these recommendations for the four areas described above, neither the Government nor PERUMTEL will be starting from scratch. In April, 1989, the Government passed legislation to permit competition in the provision of nonbasic services and is currently considering further private sector participation in the provision of cellular mobile telephone service. Investment will be more than doubled in the coming five-year plan, Repelita V (1989-94) over previous levels, and will continue to rise rapidly in absolute terms through 2004 (para. 4.5). Under this plan, the proportion of satisfied demand would rise from approximately 34% in 1989 to 56% by 2004 and the number of telephone lines per 100 persons would increase from 0.45 to approximately 1.7 over the same period. In addition, the GOI has appointed new executive leadership at PERUMTEL, and given them a mandate to implement fundamental changes in the organization to improve its performance. PERUMTEL's management is well aware of the organizational challenge it faces and has initiated a number of reforms. Finally, with the assistance of consultants financed under World Bank Loan 2757-INS, considerable engineering design work has been completed for expansion of the network, and the Government has approved in principle a major network expansion program. PERUMTEL's weak institutional capacity cannot be changed overnight, and the accumulated underinvestment in the sector, coupled with anticipated strong growth in demand, will mean that unmet demand for telephone service will continue for many years. Nevertheless, the sector undoubtedly has the potential to rapidly improve its performance if the measures recommended in this study are taken.

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TELECOMMUNICATIONS SECTOR STUDY

I. THE TELECOMMUNICATIONS SECTOR

A. Sector Organization

1.1 The telecommunications sector in Indonesia is dominated by Perusahaan Umum Telekomunikasi (PERUMTEL), the domestic telecommunications service provider. It is a state-owned enterprise which operates approximately 800,000 telephone lines and earned revenues in 1987 of Rp 716 billion (approximately US\$436 million equivalent). All international telecommunications services are provided through PT IndoSat, a state-owned company with 1987 revenues of Rp 256 billion (approximately US \$156 million equivalent). In addition, cellular mobile radio telephone service is provided in the Jakarta-Bandung corridor by PT Rajasa Hazanah Perkasa, a private company, in cooperation with PERUMTEL in accordance with a revenue sharing agreement. Starting in October 1989, VSAT (mainly data) satellite private network telecommunications services are provided by PT CSM, a private company, in accordance with another interconnection and revenue-sharing agreement with PERUMTEL. Besides the public network, private network facilities are owned and operated by the National Electricity Corporation (PLN), the state oil company (PERTAMINA), the state railway (PJKA), the Indonesian armed forces and by other users with special requirements. In addition, many corporations lease circuits from PERUMTEL to establish private networks. PT Inti, also a state-owned corporation, dominates the manufacture of telecommunications equipment in Indonesia. It manufactures or assembles telephone instruments, radio and multiplex equipment, satellite ground stations, and digital switching equipment based on a Siemens license.

1.2 In the Government of Indonesia (GOI), the Minister of Tourism, Posts and Telecommunications is responsible for telecommunications. The Minister, assisted by the Secretary General of the Ministry and the Director General for Posts and Telecommunications (DGPT), has effective control of the sector both by virtue of the Government's statutory authority over public telecommunications and radio licensing and as owner of the major sector entities, PERUMTEL, PT IndoSat and PT Inti. The Secretary General is the most senior assistant to the Minister. He is particularly involved in overall coordination of the Ministry and sector policy. In addition, he coordinates the government economic planning process with the sector entities. Staff units reporting to the Secretary General include the Planning Bureau and the Bureau for State Enterprises. The Director General is responsible for telecommunications regulation and technical policy, and acts as a liaison with sector entities with respect to operational issues. Staff units reporting to the Director General include Telecommunications, Radio Frequency Licensing, and Posts (Annex B-1, Figure B.5). In addition to the Ministry (MTPT), important roles are played by the Ministry of Finance, the National Development Planning Agency (BAPPENAS), the State Ministry for Research and Technology (BPPT) and the Coordinating Ministry for Economic, Finance and

Industry Affairs (EKUIN). The Ministry of Finance is the shareholder for the government-owned sector entities. It is involved in budget approvals for them and particularly concerned with their financial performance. BAPPENAS coordinates and controls the government Repelita planning process and authorizes foreign exchange borrowing. BPPT has a lead role in determining which technologies are to be used. EKUIN's mandate can influence telecommunications sector policies in several areas.

1.3 In early 1989, new telecommunications legislation was passed (Annex A). The most significant change from the previous legislation is that PERUMTEL's monopoly in the provision of domestic telecommunications was modified to permit the provision of nonbasic services by other entities (para. 3.20). 1/

B. Sector Past Development and Performance

1.4 Several indicators confirm that the performance of the telecommunications sector in Indonesia needs to be vastly improved. With respect to access to telephone service, the current number of 800,000 telephone lines for a population of 175 million, corresponding to fewer than 0.45 telephones per 100 persons, is by far the lowest telephone density among the ASEAN countries (Table 1.1) but comparable to India and Pakistan. About 30% of the local exchanges are automatic. Public telecommunications service is currently available to all provinces (27), district capitals and municipalities (294) and 2,869 of the 3,539 subdistricts. But about 58,000 villages with a population over 2,000 still have no telephone service. International direct dialing (IDD) to 127 countries is currently available to subscribers in 8 cities: Jakarta, Bogor, Bandung, Semarang, Surabaya, Medan, Denpasar and Makale. The inadequate availability of telephone service implied by the comparison with other countries is confirmed by the fact that the registered waiting list for telephone service increased from approximately 90,000 in 1982 to more than 530,000 in 1988.

1/ "Basic" telecommunications services are expected to be defined in government regulations as telephone (including cellular mobile radio telephone), telex, telegram and leased circuits; "nonbasic" services are all other network services, such as information (data-base) services or store-and-forward electronic mail.

Table 1.1: TELEPHONE DENSITY IN ASEAN COUNTRIES (1986)

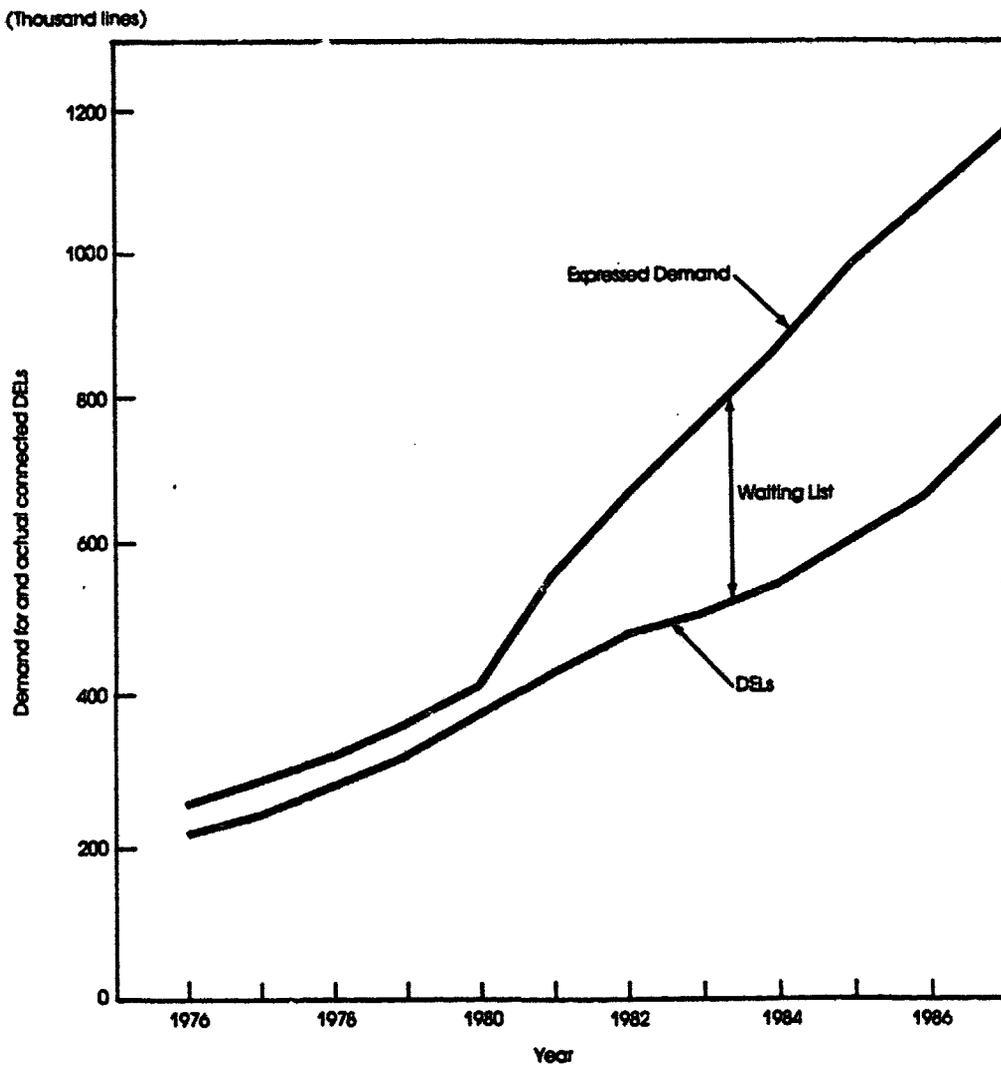
Country	Telephone lines per 100 persons
Singapore	32.5
Malaysia	6.5
Thailand	1.7
Philippines	1.0
Indonesia	0.4

1.5 Supply and expressed demand for telephone service are shown in Figure 1.1. ^{2/} Unmet demand for telephone service has increased as a proportion of total supply (number of telephone lines) from 39% of lines in 1982 to 68% in 1988. Real demand is substantially higher than indicated by these figures because, first, many prospective subscribers are discouraged from applying for service by the long delays (over five years) to obtain a telephone connection, and second, demand is not registered in areas which currently have no service. Despite the poor quality of service, many applicants, especially in Jakarta, reportedly pay US\$3,000-4,000 equivalent for immediate connection. (The official connection charge in Jakarta is Rp 500,000, or US\$300 equivalent).

1.6 Both the low successful call ratio (SCR) and the high number of faults per line indicate a seriously unsatisfactory quality of service. Due to the acute shortage of subscriber lines and interexchange equipment, the network is congested and a large portion of call attempts fail. For example, SCR nationwide for local, subscriber long distance dialed (SLDD) and IDD calls are 37.5%, 26% and 20%, respectively. (Well-dimensioned networks achieve 60-70% in each of these categories.) The poor call completion rate is due in part to PERUMTEL's inability to provide sufficient telephone lines. This has led to terminal congestion, particularly for high traffic business subscribers, since their repeated unsuccessful call attempts exacerbate network congestion. Additional problems are caused by PERUMTEL's ineffective traffic and facilities management. The average fault rate is about 8-9 faults per 100 telephone lines per month. The average time taken to correct a defective line is 6 days. In comparison, well-managed systems would average one fault per 100 lines per month with 90% of the defects corrected within 48 hours. These delays are partly due to inaccurate cable records and partly due to insufficient skilled staff. International telephone, telex and telegram services provided through PT IndoSat's facilities are satisfactory, but the state of the domestic networks, as regards access and quality, places

^{2/} Expressed demand = working lines + waiting applicants.

Figure 1
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DEMAND FOR AND SUPPLY OF TELEPHONE SERVICE
1976-87



Source: PERUMTEL; DEs Direct Exchange Lines.

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a constraint on the international services as well as affecting their quality (Annexes E-1 and E-2).

1.7 With respect to nontelephone services, the telex service, which is vital to the business sector, provides satisfactory levels of service quality and access. It reaches about 14,500 subscribers nationwide, 70% of whom are in the 6 major cities.^{3/} Packet-switched data service currently serves about 260 subscribers and is available in Bandung, Jakarta, Medan and Surabaya. It is also connected through the facilities of PT IndoSat to international packet-switched services. Public facsimile service is available in 16 provincial cities.

1.8 Overall, the financial performance of the telecommunications sector is satisfactory and likely to improve in the future as measures are taken to control operational costs and enhance revenues. All three state-owned companies in the sector (PERUMTEL, PT Indosat and PT Inti) are profitable, although there are wide variations in performance among them. PERUMTEL is the dominant company in the sector in terms of both revenues and investment levels. However, PT Indosat is the most profitable partly because it provides international telecommunications services (Table 1.2). High international tariffs, aligned with negotiated international accounting (i.e., settlement) rates, and continued growth in the volume of international traffic (particularly following the introduction of IDD in 1986) contribute to PT Indosat's strong financial performance. PERUMTEL's most recent tariff increase was in 1985, when tariffs were increased an average 25%. Since then, revenue growth from new subscribers and increased international traffic (PERUMTEL has received a 25% share of international revenues) has, on average, exceeded growth in operating costs.^{4/} This has allowed PERUMTEL to maintain profitability and generate adequate cash flows despite slower growth in local traffic due to network congestion and inadequate controls on operating costs. In 1987, PERUMTEL changed depreciation methods and revalued its assets by about 100% in accordance with government regulations. These changes significantly reduced taxable income and increased cash flows. PT Inti, which has undergone major expansion in the past five years with its start-up in production of the digital switch, is marginally profitable, and will need to increase production levels and secure longer-term procurement contracts if profitability is to improve. Comparative financial statements (1983-1987) of sector entities are provided in Annex E-1.

^{3/} Jakarta, Bandung, Surabaya, Semarang, Medan and Ujung Pandang.

^{4/} The share was recently increased from 25% to 40%.

Table 1.2: SELECTED FINANCIAL DATA, 1987
(Rp billion)

Financial data	PERUMTEL	PT INDOSAT	PT INTI
Operating revenues	717.0	256.7	57.1
Operating income	31.2	155.0	3.3
Net income	80.8	114	3.0
Return on net fixed assets (%) ^a	4.0	n.a.	n.a.
Return on total equity (%)	6.0	58.1	7.3
Net internal cash generation (%)	60.0	n.a.	n.a.

^a This is much lower than normally seen in telecommunications entities, and lower than PERUMTEL rates of return in previous years. The decline is due to the change in depreciation method from straight line to double declining method, and revaluation of assets, which increased net fixed assets by about 100%.

1.9 The telecommunications sector has generated a large percentage of funds used for capital investment from its own operational revenues. During the period 1983-87, as a result of delays in program implementation, PERUMTEL's net internal cash generation (after debt service and mandated contributions to the Government) on average exceeded 70% of capital expenditures. However, local financing as well as internally generated funds were underutilized. Of a total of Rp 828 billion in domestic loan funds secured for Repelita IV, about Rp 560 billion, or 68%, was undisbursed at the end of 1987 (an estimated Rp 380 billion credit was carried forward to Repelita V), and PERUMTEL's cash balance was Rp 530 billion, the equivalent of 74% of annual revenues and 22% of assets.^{5/} The foreign costs of PERUMTEL's capital investment programs were financed by foreign loans and grants secured through BAPPENAS, as is the case for other large public sector entities.

1.10 During the period 1983-87, the Government provided new equity to the sector by financing PT Inti's expansion (about Rp 33 billion) and by passing on the foreign funds secured for PERUMTEL's investment program as a mix of loan and equity. The sector in turn contributed funds to the Government through payment of dividends and a 35% corporate tax. Over the same period, the sector's total contribution to Government was Rp 726 billion and the net contribution Rp 587 billion (Table 1.3).

^{5/} Investment planning for PERUMTEL follows the national five-year planning cycles, called Repelitas. Repelita IV ended in March 1989.

Table 1.3: FISCAL IMPACT, 1983-87
(Rp billion)

	PERUMTEL	PT IndoSat	PT Inti	Total
Sector				
Dividends	242	151	2	395
Taxes	138	193	--	331
Total	380	344	2	726
Government				
Equity	106	--	33	139
Net contribution of sector to government <u>/a</u>	274	344	(31)	587

/a Excludes interest paid to Government on subsidized loans and grants on-lent on commercial terms. Actual contribution is somewhat more, when this is included.

C. Development Objectives

1.11 Indonesian government objectives for the telecommunications sector are:

- (a) In the long term, to:
 - (i) establish a sound and efficient network,
 - (ii) increase automated switching to improve service quality and reduce costs,
 - (iii) extend coverage of basic telephone service to rural areas currently not connected,
 - (iv) increase the extent of self-financing of sector investments,
 - (v) develop sound, professional construction, and consulting capabilities and, where economically justifiable, also develop manufacturing industries to support the telecommunications sector;

- (b) In the medium term, (1989-94) under the Repelita V program (Annex E-4), to

- (i) expand the network switching capacity by 1.4 million telephone lines and the number of actual working lines by 1 million,
- (ii) increase access to service for the public by installing 42,000 pay phones,
- (iii) extend data communications services to an additional 23 provincial cities,
- (iv) improve efficiency and productivity of PERUMTEL,
- (v) expand international network facilities to provide IDD to an additional 23 countries and to extend this service to another 12 provincial cities within Indonesia.

1.12 In order to achieve these objectives, the government plans to implement a major expansion and modernization program, increasing annual investment in the sector from the current US\$ 150 million to as much as US\$800 million by the year 2000. The GOI has set ambitious growth objectives for the sector. In the medium run, PERUMTEL is being asked to more than double the size of its network between 1989 and 1994, increasing the number of lines per 100/population from the 1989 figure of 0.45 to 0.95 in five years. Long run plans call for an eventual telephone line density of 1.74 lines per 100 population by 2004 under one investment program, and 2.5 lines per 100 under a second, more accelerated plan.

1.13 A number of strategic reforms will be crucial to the success of the plan: the strengthening and revitalization of PERUMTEL, increased participation by the private sector, recently enacted legislation to permit competition in the provision of nonbasic services, and periodic reviews and revisions of the structure and level of PERUMTEL's tariffs. The Government's objectives for the sector are consistent with its broader economic objectives, in particular the renewed emphasis on increasing foreign trade and tourism. While the longer-term objectives are clearly desirable and should be kept as ultimate goals, the medium targets may not be achievable within the proposed time frame. Given the limitations posed by PERUMTEL's present staffing and organizational capacity, the telecommunications investment plan for the Repelita V program (1989-1994) will probably take at least seven years to complete. Details of PERUMTEL's Repelita V investment program and costs are given in Annex E-4.

II. SECTOR ISSUES

2.1 In the early 1980s, Indonesia's telecommunications sector sustained a 13% annual growth rate in the number of connected telephone lines at the same time that digital technology was introduced into the network. However, in recent years, growth has slowed to an annual rate of 10% as investment has declined, and the limited implementation capability of the telecommunications service provider (PERUMTEL) has impaired the sector's ability to serve the country's growing needs. In response, the GOI has placed a new emphasis on rehabilitation and expansion of the telecommunications system and during 1988 appointed new executive management in PERUMTEL. This new leadership is strongly supportive of dynamic change and improvement for the sector. Moreover, an integrated planning and investment program is being shaped for the sector which will extend through the next three five-year planning periods (Repelita V, VI, and VII) from 1989 to 2004.

2.2 However, simply investing more money will not resolve the situation. PERUMTEL has not upgraded its organization, human resources and management systems to adequately maintain the existing network, let alone to expand it further (Annexes B-2 and E-5). Furthermore, given the need to undertake rapid expansion and modernization of Indonesia's network, a series of measures involving government management of the sector and sector policies should be taken by MTPT to respond. As the driving force in achieving sustained sector development, PERUMTEL must also greatly strengthen its operations and management capabilities. Since PERUMTEL dominates the sector as the main service provider and main customer of PT Inti and all other domestic telecommunications equipment suppliers, and given the generally problem-free operation of PT IndoSat, many of the important issues for improved sector performance will in practice involve either the Government's interface with PERUMTEL, policies to increase private sector participation in the sector, or the performance of PERUMTEL. Although the performance of PT Inti also affects sector performance, issues related to its efficiency are more properly addressed in the context of a study of the manufacturing sector, particularly electronics.

2.3 The issues that must be addressed in order to optimize sector performance fall into four broad areas: (a) overall government management of the sector, (b) government telecommunications policies, (c) investment in the sector, and (d) institutional reform of PERUMTEL. The issues that arise in each area are described below in this chapter, while chapters III, IV, and V present a discussion of development strategies that respond to them.

A. Sector Management

2.4 Currently the Government's management and regulation of the sector exhibits a number of strengths, including a functional separation of telecommunications operations from both the government ministry and from the postal administration. Other strengths include carefully followed budgeting procedures, highly motivated leadership at the top levels of the Ministry, PERUMTEL, PT IndoSat and PT Inti, and good communications between the Ministry and the management of each of these state-owned enterprises.

2.5 At the same time, the existing modalities of sector management, in particular the framework for PERUMTEL's interactions with the Government and government regulation of the sector, need improvement. Thus, the separation in 1964 of government regulatory responsibilities in the telecommunications sector from the provision of service, by creating a state telecommunications enterprise (the predecessor of PERUMTEL), was a positive step that in many respects has not been carried far enough. Many operational decisions continue to be controlled in part by the Government.^{6/} Moreover, on occasion delays have occurred when responsibility between the Ministry and PERUMTEL for initiating actions and taking decisions was not clear. Other significant delays, for example in initiating investment programs, have occurred as a result of uncertainty concerning foreign exchange authorization. Another weakness in the current process of interactions between the Government and PERUMTEL involves performance targets for PERUMTEL. At present there is no agreed set of annual, quantified and achievable performance targets. Although a process to submit PERUMTEL's corporate plan to the Government was beginning in 1989, it is not well established nor is it suitably tied to the approval of the budgets. The accountability of PERUMTEL's management for performance is therefore weakened.

2.6 The insufficient separation between the roles of PERUMTEL and the Ministry is reflected in the very high proportion of management and professional staff at the Ministry who are on secondment from PERUMTEL. Although PERUMTEL is a natural source of qualified and experienced professional telecommunications staff, dependence on this source does not contribute to the desired degree of institutional separation. Furthermore, as competition in the provision of nonbasic services develops and the Ministry's role as economic regulator of a more commercially oriented PERUMTEL increases, the Ministry's regulatory capability will need to be strengthened. A high level of dependence on PERUMTEL staff will be inconsistent with the provision of impartial analysis and advice by Ministry staff to the Government.

B. Sector Policies

2.7 Current Policies. Telecommunications sector policies and practices are significantly more liberalized in Indonesia, in the sense of allowing private sector participation and competition, than in many other developing countries. Private sector participation is permitted in the provision of cellular mobile telephone service, paging services, VSAT satellite data telecommunications services and in the provision of a wide range of terminal equipment. In areas where local telephone service is unavailable, the government has encouraged PERUMTEL to make arrangements with local interests such as real estate developers to construct local network facilities. In addition, in areas where PERUMTEL cannot provide suitable service in a reasonable period of time (usually in rural locations), the government's radio licensing policy permits the operation of private microwave radio links. Furthermore, in new telecommunications legislation passed in April 1989,

^{6/} PERUMTEL is bound by GOI salary scales and internal procedures and requires approval from other agencies for major investments, operating budgets, imports and technology.

PERUMTEL's legal monopoly on domestic telecommunications services has been modified to permit competition in the provision of nonbasic services (para. 1.3). Other significant sector policies permit the provision of leased circuits for private networks and subscriber financing of network expansion.

2.8 These policies have contributed positively to the performance of the sector. Nevertheless, important improvements in overall sector policy can be made in the following areas: (a) tariffs for telecommunications services should be reviewed in order to moderate demand, ration scarce network resources, reflect costs and achieve financial targets (paras. 3.10-3.16); and (b) other sector policies should be reviewed to identify areas, such as nonbasic services, customer premises equipment, cellular mobile radio, joint ventures and subcontracting, where private sector participation can be extended (paras. 3.17-3.30).

C. Investment, Procurement and Financing

2.9 Investment In the early 1970s, Indonesia embarked on a program to develop a modern telecommunications network. This led to a rapid expansion of telephone exchange capacity (especially automatic exchanges), an even more rapid increase in telephone traffic and a transition from telegraph to telex facilities (Table 2.1). Indonesia was also the first developing country to introduce satellite transmission for its own domestic network. This growth, however, lagged behind the explosion in growth of demand which occurred at the same time and, over the past seven years, the pace of development has slowed. Access to telecommunications services remains very limited for the great majority of the population (para 1.4). This is the predictable result of low levels of investment; in 1985, telecommunications investment was only .14% of GDP, and it averaged only .16% of GDP per annum for the period 1981-1985. By comparison, countries that have rapidly expanded the provision of telecommunications services have generally invested 1-3% of GDP annually in the sector (Table 2.2).

**Table 2.1: GROWTH IN TELECOMMUNICATIONS SERVICES, 1969-87
(annual % growth)**

Indicator	1969-74	1975-79	1980-84	1985-87
Telephone exchange capacity	1.9	16.3	7.0	9.1
Automatic	9.4	24.8	9.5	9.6
Manual	-4.5	1.2	-3.8	5.9
Direct exchange lines	7.1	8.4	12.8	12.3
Telephone traffic				
Domestic (pulses)	28.6	27.9	18.9	8.1
International (minutes)	44.8	40.3	23.2	17.7
Telex traffic				
Domestic (pulses)	27.9	29.4	56.4	7.6
International (minutes)	81.1	36.0	23.3	-4.3
Telegraph traffic				
Domestic (words)	17.2	7.4	9.9	8.2
International (words)	4.2	-8.3	-19.4	-10.4

Source: Government of Indonesia statistics

**Table 2.2: INTERNATIONAL COMPARISON OF TELECOMMUNICATION INVESTMENT
AS A PERCENTAGE OF GDP**

	1981	1982	1983	1984	1985
Malaysia	1.25	1.24	1.54	1.07	2.32
Singapore	0.83	0.82	0.89	0.95	1.11
India	0.23	0.35	0.37	0.37	0.38
US	0.71	0.65	0.50	0.51	0.56
Japan	0.72	0.75	0.70	0.64	n.a.
France	0.73	0.69	0.67	0.71	n.a.
INDONESIA	0.22	0.20	0.10	0.14	0.14

Source: ITU statistics

2.10 In hindsight, two factors should be noted. First, because PERUMTEL set unrealistic objectives that were beyond its implementation capacity, each Repelita ended with major shortfalls and imbalanced network development, with the result that the undoubted improvement in the technical quality of the network through the installation of new technology and equipment was overshadowed by the problems resulting from network overloading and inefficient utilization of the network. In fact, network congestion is reflected in a much lower rate of growth of domestic telephone traffic in

1985-87 than in earlier years (Table 2.1). Second, the Government's funding of sector investments has fluctuated, in part because of inadequate coordination between local and foreign funding (para. 4.29). Consequently the economy is now paying a high price in terms of inadequate capability, low quality and high costs of communications.

2.11 Network growth under PERUMTEL's proposed 1989-94 plan, while badly needed, would vastly exceed its past achievements. Attaining expansion objectives will require major adjustments and improvements, both within PERUMTEL and in its domestic suppliers and contractors. Under the plan, PERUMTEL would increase the number of lines added from its average of 50,000 p.a. in 1987-89 to over 100,000 lines p.a. in the early years of the plan and to about 400,000 additional lines p.a. by 1994. Thus, the planned growth in telephone lines would average 19% p.a. whereas PERUMTEL achieved only 10% p.a. in 1984-88. High as they are, these expansion rates are not without precedent elsewhere, and if PERUMTEL can adapt to the new environment of change, the objectives are indeed feasible. For example, Korea, Singapore and Taiwan averaged 20% growth in the decade 1970-80.

2.12 Procurement. PERUMTEL's overall procurement policy suffers from inefficiency and high costs, and needs to be revamped. The first problem is that procurement is not done by International Competitive Bidding (ICB). The adoption of competitive procurement strategies would bring significant cost savings, compared to current practice. In the past, the Government and PERUMTEL have made extensive use of bilateral assistance. Under these circumstances, equipment purchases are often tied to the funding, which has resulted in high network expansion costs estimated at \$3,500 per line added (para. 4.9). This is about double the unit cost typically prevailing in LDCs under Bank-assisted projects where planning is internalized and procurement is largely done through ICB. More seriously, it has also led to the introduction of nine different switching systems (Annex E-1) in the country, each of which require different operations and maintenance procedures, staff training, interconnection equipment and spare parts. This has had a serious and adverse impact on network operations and maintenance. A second problem is that PERUMTEL's low and fluctuating level of investment has hampered development of efficient local telecommunication support industries with the result that purchase of domestically manufactured material has also contributed significantly to higher equipment and service costs.

2.13 Financing. Although the major constraint to sector development has been PERUMTEL's lack of implementation capacity rather than a lack of financing, problems have also occurred due to delays in securing foreign funds. Procedures applicable to foreign financing have led to uncertainties in investment planning, and the result has been suboptimal dimensioning of facilities and higher long-term costs (e.g., when multiple orders have to be placed for network cable materials). Difficulties have been encountered in developing an agreed financing plan and in obtaining timely commitment of foreign funds for the program as a whole. The causes of these problems are (a) a lack of communications and coordination between relevant government agencies, donors and PERUMTEL; and (b) insufficient awareness of procedures for securing funds from the numerous bilateral and other creditors who provide sector financing. This has led to unbalanced program implementation, with

critical network components delayed pending the finalization of financing arrangements.

2.14 While financing from domestic sources was underutilized during Repelita IV due to slow program implementation (para. 1.9), measures are being put in place through the ongoing Bank-financed Technical Assistance Project (Loan 2757-INS) to develop PERUMTEL's capabilities to ensure timely implementation of future investments. In the coming years, it will be necessary to review the current financing strategy, and to diversify sources of funds to ensure that adequate financing can be secured as the financing requirements rise. The total required financing will be Rp 3.2 trillion (US\$1.9 billion equivalent) in Repelita V, and Rp 4.6 trillion (US\$2.3 billion equivalent) in Repelita VI, compared with an estimated US\$0.76 in Repelita IV.

D. PERUMTEL Institutional Factors

2.15 PERUMTEL is managed by a Board of Directors that reports to the Minister and is headed by a President Director appointed by the President of Indonesia.^{7/} The five other Directors are responsible for Finance, Logistics, Development (investment planning and implementation), Operations and Engineering, and Personnel and Administration, respectively. (The organization chart is shown in Annex B-1.) Although day-to-day operational responsibility is decentralized to the 12 regional offices, the functions of planning, finance, procurement and development are fully centralized at PERUMTEL headquarters in Bandung.

2.16 For nearly a decade PERUMTEL's organizational structure has undergone only minor modifications. This relatively stable organization has managed the routine tasks of the existing telecommunications systems reasonably well. However, inefficient management of investment programs, due in part to overcentralization, has resulted in poor absorption of funds and delays in providing service. As PERUMTEL's facilities grow in size and technical sophistication, existing organizational weaknesses may become acute. A careful review of PERUMTEL's management systems to improve performance in several key areas--planning, implementation, customer orientation, maintenance, finance and decision making--is needed. The new leadership of PERUMTEL appointed in 1988 with a mandate to bring about needed reforms is dynamic and forward looking. It can be expected to support implementation of reforms wherever they are required.

2.17 Program Management. The main constraint to rapid network expansion is likely to be PERUMTEL's capacity to install the cable network (which connects subscribers to exchanges) and to process new subscribers from application to installation, commissioning and billing. This bottleneck persists, in spite of work done in this area as a part of the ongoing Bank Technical Assistance Project (Loan 2757-INS). Delays in installing the local cable plant will greatly delay achievement of benefits from all other investments. At present, cable installation and house wiring are done by

^{7/} As in other Indonesian State enterprises, all members of this Board of Directors are executive staff.

local contractors. Considering the very large amount of cable work that needs to be done, local contractors cannot be expected to increase their capability without outside assistance. Special initiatives to enhance the capacity of the local contractors to plan, design and manage large-scale construction works will be needed (paras 4.9, 5.19). An association between domestic contractors and foreign companies that can provide management and train local contractors would be one approach to meet the above need.

2.18 PERUMTEL has insufficient in-house expertise to design and supervise its network expansion program. As a result, network planning depends substantially on technical assistance from consultants, and detailed system design and engineering are done mostly by equipment suppliers. Originally, it was hoped that this expertise would strengthen PERUMTEL's own institutional capabilities, particularly in the areas of project appraisal, design, and implementation. Although PERUMTEL has generally benefitted from the assistance provided by foreign consultants, there have been several instances where projects designed and implemented with such assistance have not provided maximum benefits. Problems such as overdesign, lack of complementary investments (e.g., inadequate switching capacity to match junction system capacity in Jakarta) and insufficient supervision of physical construction have contributed to high network expansion costs as well as to idle assets. In addition, PERUMTEL lacks sufficient staff to supervise the consultants adequately.

2.19 Operational Efficiency Along with the rapid expansion in size of the telecommunications network, PERUMTEL's planning should also give emphasis to efficient utilization of these assets. Much effort will be needed to raise the quality of service to provide customers with an adequate successful call rate (SCR) and an adequate degree of service availability. Currently, the maintenance staff are too few and lack sufficient training to provide proper, timely attention to customers' needs. In view of PERUMTEL's inability to maintain the planned quality of service levels even for its existing system, a concerted, systematic effort should be made to improve maintenance practices in order to respond to increased demands in the next five to ten years. This would include the introduction of computerized facility management systems. It is important that the quality and availability of service should at least attain the level assumed for planning, for both existing and future facilities.

2.20 Human Resources Management. PERUMTEL is one of the largest employers in Indonesia, with a staff of approximately 40,000. As the organization enters a period of enormous change involving rapid network expansion and increasing technical sophistication, human resources development and management will become critical. Policies and procedures affecting staffing, accumulation of experience, promotions, and the facilities and capability to provide literally thousands of staff-years of training must all be addressed. A coordinated management and technical training program for the whole staff will need to be developed, since the established corporate culture has not, in the past, put sufficient emphasis on business efficiency, productivity and customer service. Although PERUMTEL is generally overstaffed at lower levels (the ratio of 50 staff per 1,000 working lines is far above Malaysia (27), Singapore (15) and Thailand (20)), there exists a serious shortage of skilled managers and professional staff, especially in the areas

of engineering, computer operations, finance, marketing and general management.^{8/} This shortage has constrained the efficient and effective development of the sector. PERUMTEL's ability to attract and retain high-caliber staff is limited by the low salaries it must offer, since government regulations link PERUMTEL salaries to levels paid elsewhere in the civil service (Annexes B-2, E-5).

2.21 Management Information System. A pervasive problem that undermines the effective management of PERUMTEL relates to data and information. Deficiencies exist both at the stage of primary data collection and at subsequent processing stages. Problems involve the availability, coverage, structure, timeliness, reliability and accuracy of data. An organization of the size and geographic extent of PERUMTEL must have reliable information processing systems. MIS information must be tied in to specific decision making frameworks.

2.22 Overall, PERUMTEL's new management is well aware of the institutional shortcomings outlined here, and they are committed to improving performance. Already, in the second half of 1988, they initiated a number of reforms including improving staff communications, delegating authority to regional managers and improving the accounting and financial system, and they are actively pursuing further measures. However, adapting and strengthening PERUMTEL's institutional capabilities is a long-term process for which a supportive external environment is extremely important. It is important that the Government provide all necessary support to PERUMTEL to enable it to carry out the needed institutional changes efficiently.

^{8/} Top and middle-level management and technical staff account for only 5% of the total work force.

III. SECTOR MANAGEMENT AND POLICY

3.1 In this and the next two chapters, the discussion focuses on development strategies that respond to the challenge of expansion which the sector faces, based on issues that were outlined in Chapter II. Three broad goals underlie the kinds of measures that are presented. First, as the provision of telecommunications services evolves from a government controlled social service into a dynamic, large-scale, multifunction service business, a clear separation between the operations function and regulatory function becomes increasingly important. This approach contributes to objective government management of the sector and allows the operating company to concentrate on its main purpose, which is to provide efficient, high quality communications services. A second thrust is towards increased commercialization of the dominant operating entity, PERUMTEL. As evolution of the industry continues, it puts increased demands on the existing organization. The need to increase efficiency, reduce costs, improve service quality, and respond to customers' needs can often best be met by adopting a streamlined, commercial approach. The third direction, a corollary to the second, is that commercial efficiency is stimulated by competition. Because of the cost structure of the telecommunications sector, competition can only be feasibly introduced into certain areas of the sector, but such stimulus, where practical, will be very important in improving the performance of PERUMTEL.

A. Sector Management

3.2 A wide range of options for government management of the telecommunications sector have been considered in the preparation of this study.^{9/} For example, one option would be to adopt the sort of model used in the US, the UK, and Canada, where economic regulation of telecommunications carriers is placed with an independent regulatory agency outside of a government ministry. This kind of structure is often favored where the government wishes to distance itself from sometimes controversial tariff decisions and where there is a tradition of independent administrative tribunals outside of ministries. However, in the case of Indonesia, given state ownership of PERUMTEL and PT IndoSat, the relatively modest (albeit growing) requirements for economic regulation in the short to medium term, the desire to avoid creating new government institutions, and a preference for ministerial authority, this option is not proposed.

3.3 Instead, the proposed strategy for increasing the effectiveness of telecommunications sector management consists of the following four elements: (a) establishing a process for the development and government approval of corporate plans for PERUMTEL, PT IndoSat and PT Inti; (b) establishing

^{9/} See "Restructuring and Managing the Telecommunications Sector--A World Bank Symposium" (1989) and "The Changing Telecommunication Environment--Policy Considerations for the Members of the ITU" International Telecommunication Union (1989).

PERUMTEL as a "PT" corporation;^{10/} (c) developing a strengthened regulatory, supervisory, and policy capability within MTPT; and (d) establishing communication mechanisms that provide the government with the views of telecommunications users as well as those of PERUMTEL and PT IndoSat.

3.4 Corporate Planning Process. The corporate plans of PERUMTEL, PT Indosat, and PT Inti would serve, in part, as a contract between the government and the management of each of the government-owned sector entities. In the case of PERUMTEL, the management would commit itself to the achievement of specific, quantified performance targets with respect to services, prices, costs, financial results and other matters, and the Government would agree in principle to the associated investments and their financing and other government actions necessary to achieve the targets. The corporate plan would have a five year (or longer) horizon and would be revised and updated annually. The corporate planning development and approval process would involve a number of periodic interactions both within the Government and between PERUMTEL (and the other sector entities) and the Government. Eventually the plan would be finalized, approved by the Minister responsible for telecommunications and by other relevant government agencies. A monitoring process would require PERUMTEL to submit periodic reports on its performance which would be reviewed and assessed by MTPT staff and reported to the minister. Although important matters that need to be resolved between the ministry and PERUMTEL will arise outside of this framework, the corporate plan will provide a consistent reference point for assessing the sector's performance, and the corporate planning cycle will provide a mechanism to adjust targets and priorities each year (Annex C).

3.5 Corporate Status of PERUMTEL. Given the profitability of the telecommunications sector, the efficiency and productivity of PERUMTEL can be increased most rapidly if the company becomes more commercial in structure and practice. There are three categories of state-owned enterprises in Indonesia: a PERJAN which is primarily oriented to the provision of social services rather than profits; a PERUM (e.g. PERUMTEL) which is expected to recover the costs of its services as well as fulfill social responsibilities; and a PERSERO or PT (like PT IndoSat) which is a limited liability company with a commercial orientation no different in law from privately owned PT corporations (see Annex A, item 7). Establishing PERUMTEL as a PT would provide additional operational autonomy and incentive for efficient operation. In addition to the legal distinctions between a PERUM and a PT, which in some cases are minor, the changed status would permit PERUMTEL to pay commercially competitive (rather than lower civil service) wages. The government's new relationship with a commercially oriented PT version of PERUMTEL would place more responsibility and accountability on management. Changing PERUMTEL to a PT should also be accompanied by government policies that will specify PERUMTEL's new mandate, establish a procedure to compensate PERUMTEL for providing uneconomic service at the request of the Government, and establish a dividend policy.

3.6 Regulation. As PERUMTEL takes on a more commercial orientation and as competition in the provision of nonbasic services develops, the GOI will

^{10/} see paragraph 3.5 for explanation of "PT" in Indonesia.

need to ensure adequate regulation of the sector, in particular to ensure that PERUMTEL does not abuse the market power it derives from its control of network facilities. The Government should monitor and regulate the availability of service, the quality of service, the structure and level of tariffs, access to leased lines for the provision of nonbasic services, interconnection arrangements and revenue sharing or settlement arrangements.

3.7 MTPT Capability. A strengthened telecommunications regulatory, supervisory and policy capability within MTPT is necessary to undertake the sector regulation described above to implement the corporate planning development, review, negotiation, approval and monitoring process (para. 3.4) and to provide analytical expertise and impartial advice to the Government with respect to telecommunications policy issues. MTPT should develop a schedule or agenda, for the Minister's approval, to further address the telecommunications policy issues raised in this study.

3.8 Views of the Users. Currently, no mechanism exists whereby customers' views can be routinely presented to the Government on telecommunications matters. Government management of the telecommunications sector needs to take account of many factors and strike a balance between the legitimate interests of service providers (PERUMTEL and IndoSat) and customers. Given that the Ministry regularly hears the views of PERUMTEL on various issues, a balance involves establishing mechanisms for users' views to be communicated to the Government. Several mechanisms have been proposed for this purpose, including the distribution of discussion papers to users for comment, periodic meetings with representatives of users, or a combination of both of these. Consideration of the views of large business users should be balanced with attention to the views of individual subscribers, as well.

B. Sector Policies.

3.9 In the coming years, telecommunications policies will need to address issues associated with (a) the structure and level of tariffs, and (b) market structure and participation of private investors in the telecommunications sector.

3.10 Tariff Policies. Tariff policies for telecommunications services need to respond to several goals. In order to contribute to economic efficiency, tariffs should reflect costs and, where unmet demand exists, serve to ration scarce capacity. For the operating entity to achieve satisfactory financial returns, tariffs must also attain financial targets. Finally, they should be seen as reasonably equitable by the public. In order to provide access to telephone service for those who cannot afford private connections at such prices, the tariff policies should be accompanied by a serious program to provide service through public call offices (pay phones). Such a program has been included in PERUMTEL's Repelita V plan (paras. 1.11 (b) and 5.28).

3.11 PERUMTEL's tariff schedule for telephone and telex service, last revised in February 1985, is summarized in Annex D. Over the last two years, PERUMTEL has significantly strengthened its capacity to analyze and assess its tariffs by creating a tariff team and arranging extensive training for the team members by consultants from Canada. As a result, in the fall of 1988, the tariff team was able to prepare a review of PERUMTEL's telephone and

telex charges. Although additional tariff analysis will be required, the appropriate direction of certain changes in the level and structure of charges has become clear. Telephone installation charges (currently Rp 500,000 or approximately US\$300 equivalent in the Jakarta area) should be increased in order to moderate the excess demand for new service. An alternative (or additional) measure would be to reserve a significant proportion of new lines that become available at each exchange for customers who would pay, for example, double the normal installation fee in return for priority service within a one-month time frame.

3.12 Telephone service monthly subscription charges (currently Rp 3,500 or approximately US\$2 equivalent per month in Jakarta) are very low compared with costs and with charges in other countries. Significant increases in monthly subscription charges are therefore appropriate, and will tend to remove the existing incentive for certain subscribers to retain telephone service that has a very low utilization. Telex service remains important in Indonesia and accounts for approximately 7% of PERUMTEL's operating revenues. Both monthly telex subscription and pulse charges are low, compared with costs, and should also be increased.

3.13 Telephone usage is charged at Rp 75 (US\$0.045) per pulse, with the length of the pulse declining from 3 minutes for local calls to 6 seconds for long-distance calls up to 100 km, down to 2 seconds for long-distance calls over 1,000 km. In other words, while local calls are relatively inexpensive, long-distance calls, especially those over 1,000 km, are comparatively expensive relative to tentative estimates of long-run marginal costs and to equivalent long-distance rates charged in other countries.^{11/} Therefore, it is proposed that the structure of telephone usage charges be reviewed and adjusted as necessary. Furthermore, given the congestion problems on the network, it is proposed that peak and off-peak charges be introduced, for local and long distance service.

3.14 Tariffs for both telephone and telex/data leased lines provide discounts of more than 50% for government users compared with charges that apply to business or private users. This aspect of PERUMTEL's tariff should be reviewed (a) to assess the appropriate size of discount(s) for large volume users; (b) to consider making similar volume discounts available to private business customers; and (c) to ensure that appropriate rate relationships between leased circuits and regular long-distance telephone or telex charges are maintained if the latter are revised.

3.15 In addition to the structure and level of rates, other important factors to be considered are: (a) tariff changes designed to moderate excess demand and to support the financial viability of PERUMTEL should be considered as integral to the ambitious Repelita V telecommunications investment program, and therefore tariff changes should be implemented early in the Repelita V period beginning by April 1, 1990; (b) PERUMTEL and the GOI should agree to periodic revisions of telecommunications tariffs (for example, every two

^{11/} "Draft Review of PERUMTEL's Tariff and Outline of PERUMTEL's Tariff Analysis" by Mark Tomlinson, World Bank, 1987, and "Study on National Telephone Tariffs World Wide" (Status January 1, 1988): Siemens.

years) in order to avoid drastic rate changes that might otherwise be required;^{12/} and (c) PERUMTEL and the GOI should consider how best to explain to customers and the public the reasons for rate changes.

3.16 Another consideration concerning telecommunications tariffs in Indonesia is the need to establish principles for setting and changing prices. The results of tariff reviews and recommended changes should then be incorporated into the process for government approval of PERUMTEL's corporate plan described earlier (para. 3.4). Finally, as costs of international telecommunications services continue to drop faster than the costs for other telecommunications services, a review of IndoSat's tariffs and the sharing of international service revenues with PERUMTEL should be undertaken.

3.17 Market Structure and Participation of Private Sector. The most far-reaching telecommunications policy issues to be addressed by the GOI are: (a) How extensive should PERUMTEL's monopoly be? and (b) To what extent should private sector participation in the sector be increased?

3.18 Monopoly vs. Competition. The merits of monopoly versus competition in different parts of the telecommunications services sector have been intensively analyzed, discussed and debated in many forums during the last decade. As a result of this work, certain general conclusions have emerged:

- with existing technology, economies of scale are most important for local wire-line telephone service, with the result that competition in the provision of these services is generally undesirable;
- economies of scale exist to a significant extent in long-distance networks but become less important as traffic volume increases; therefore, as the volume increases, the introduction of elements of competition can be considered;
- competition in the provision of terminal equipment such as telephone sets, telex and facsimile machines, and PBXs is generally beneficial, subject to properly designed and enforced technical standards, in order to promote diversity of supply and to relieve the main operator of tasks that others can do well;
- similarly, competition in the provision of value-added and information services, usually through the resale of leased lines, is beneficial to promote diversity of supply;
- where competition is permitted, the established carrier faces competitive pressure to offer improved service and prices to its customers;

^{12/} One approach is to establish approved prices and price changes for, for example, five years in advance. This is the "price-cap" approach, whereby the government gives approval in advance for price increases that stay within a specified ceiling, usually the rate of inflation minus anticipated productivity gains.

- furthermore, where long-distance competition is permitted, pressures to move prices towards costs, probably involving higher local charges and reduced long-distance charges, can be expected;
- where the established carrier competes against new entrants, regulatory measures are required to prevent the existing carrier from predatory pricing, or cross-subsidizing competitive services-- in short, to ensure that competition can occur under reasonable conditions.

The implications of these factors for the Indonesian telecommunications sector are discussed below.

3.19 Nonbasic Services. The GOI has already recognized the merit of permitting competition in the provision of nonbasic services in the new telecommunications law (Annex A, item 10). This category is expected to include all services except telephone, telex, telegraph and leased lines (para 1.3). This approach should be developed by strengthening MPTP's supervisory and regulatory capability (para. 3.7) to monitor PERUMTEL's cost allocations and tariffs (to prevent cross-subsidy of competitive services) and by requiring PERUMTEL to publish in its tariffs the conditions under which resale of leased lines will be permitted. In addition, the Government will need to establish the criteria for licensing the provision of nonbasic services. Furthermore, from time to time, the Government should review the appropriate division between monopoly (currently basic) services, and competitive (currently nonbasic) services. For example, cellular service, although basic according to expected government definitions, could be an appropriate area for the introduction of competition (see para. 3.22).

3.20 Customer Premises Equipment. PERUMTEL does not exercise a monopoly on the provision of customer premises equipment (CPE), and customers can buy many kinds of terminal equipment from various suppliers. This practice should be encouraged by: (a) specifying in the tariff schedule the conditions and technical standards under which competitive provision of CPE is permitted, (b) reviewing whether the area of permitted CPE competition should be extended, and (c) consideration of the option of "unbundling" PERUMTEL's tariff charges for equipment (e.g., telephone sets) from charges for services.^{13/} DGPT should follow up on each of these points to ensure that appropriate public policy is established and implemented.

3.21 Private Networks. MPTP should review its radio frequency licensing policy and administrative procedures. In particular, it should review and publish the categories of users and conditions under which microwave licenses will be issued, to ensure that economic activities are not hindered by an inappropriate failure to issue a radio license. Currently MPTP permits, subject to licensing, private telecommunications networks operated by PLN (the electricity utility), PJKA (Indonesia railways) and PERTAMINA (the government-

^{13/} Unbundling refers to separating out the customer charge for the telephone station equipment rental on the customer billing, making it possible for the customer to forego leased equipment altogether, and choose the option of purchasing his/her own equipment.

owned oil company) and by certain other organizations. Both PLN and the railway need private networks to serve their unique requirements. PERTAMINA also has unique requirements in that, in order to undertake oil and gas exploration activities, it often needs temporary telecommunications services at remote locations where it is the only potential customer. PERTAMINA has established a streamlined arrangement with PERUMTEL and DGPT's radio-licensing office whereby, if PERUMTEL is unable to provide timely service, a radio license is issued to PERTAMINA. On occasion, cooperative arrangements are made in which PERTAMINA will construct telecommunications facilities for its own use and subsequently turn them over to PERUMTEL to operate and maintain. A second aspect of private networks is to ensure that optimum utilization of network resources is achieved by encouraging the interconnection of private networks with PERUMTEL's, subject to appropriate conditions. For example, PERUMTEL could lease capacity on (or have an ownership interest in) the fiber optic transmission system being developed by PLN, the state electric utility.

3.22 Cellular Mobile Radio. Currently, cellular mobile radio telephone services are available only in the Jakarta-Bogor-Bandung corridor and are provided primarily by a private company, PT Rajasa Hazanah Perkasa, in cooperation with PERUMTEL, further to a revenue sharing agreement. The GOI should consider designating cellular telephone service as a nonmonopoly service. Such an approach has a number of advantages. First, cellular service is a business activity that is already separate from PERUMTEL. Second, because the cost of cellular telephone service is so much higher than that of conventional wireline service, the cellular market will remain relatively small and, therefore, revenues from this source will never be critical to PERUMTEL. Yet, while the extent of competition will be small, the existence of this element of competition, principally for business customers, will give a competitive stimulus to PERUMTEL to accelerate its commercial and customer orientation. Furthermore, as the costs of cellular service decline, this element of competition for PERUMTEL will increase.

3.23 If the GOI decides to adopt this approach, a number of other steps will need to be taken: (a) cellular telephone service would have to be designated as a nonbasic service in the new telecommunications legislation (Annex A) or other legislative changes would need to be made to alter the definition of PERUMTEL's monopoly; (b) legislation may also be needed to ensure that government regulatory authority over private-sector telecommunications carriers is in place and operating smoothly; (c) the GOI should select cellular telephone carrier(s) in such a way as to maximize the potential for good service and price performance. For example, applications could be requested and carrier(s) then could be selected on their basis of the financial and technical credentials. In addition, because of the potential profitability of the service, the issuing of franchises (by license or contract) could be linked to applicant commitments to expand service and could be made a condition of holding the franchise. Regardless of whether or not the GOI adopts this approach, it should ensure that cellular carriers provide adequate, periodic performance data, including both service and audited financial data, and ensure that procedures are implemented to give it the authority to examine the operations and finances of these private operators.

3.24 Privatization. As discussed in para. 3.5, an important factor that will facilitate improved performance by PERUMTEL, associated with increased

commercial orientation and greater operational autonomy from the Government, will be to change its corporate status from "PERUM" to "PT." A further step in the same direction, not recommended at this time, would be the policy alternative of privatizing all or part of PERUMTEL, in the sense of selling equity in the enterprise to private investors. Such action would reflect the same kind of transition from the traditional government ownership of telephone companies and other publicly owned enterprises that one sees not only in large, developed markets such as the UK, Japan and Canada but also in smaller ones such as New Zealand and Malaysia. Privatization can take different forms and can be implemented in stages. One option would be to sell part of PERUMTEL to either individual or institutional investors--still leaving the Government with effective control, both through a controlling ownership interest, as well as through its statutory powers.

3.25 However, there are several prerequisites for successful privatization actions. One is an assessment of how the privatized institutions will better serve national objectives. In the case of PERUMTEL, assessment would focus on increased access to service, improved quality of service and financial performance. Second, a corporation should already be operating smoothly in a quasi-commercial way (e.g., Japan Air Lines, Teleglobe Canada) prior to privatization. A third prerequisite is that significant unresolved matters concerning a corporation should be resolved prior to privatization in order to reduce risks to investors and to allow the Government to obtain a fair price for its assets. In the case of PERUMTEL, it must be noted that this report proposes extensive measures to strengthen PERUMTEL's organization and management with the central objective of improving its productivity and efficiency. All of these measures will contribute to making PERUMTEL a better candidate for eventual privatization should the Government eventually choose to pursue that option. However, given that only a finite amount of institutional change can be assimilated in a given time period without causing undue disruption, privatization options should not be considered in the short term but could be considered towards the beginning of the Repelita VII (1999) program.

3.26 Other forms of increased private sector participation in the sector, possibly based on joint ventures with PERUMTEL, would seem to offer more promise at this time. The role of the private sector in providing nonbasic services (para. 3.19), terminal equipment (para. 3.20) and cellular mobile radio telephone service (para. 3.22) has been discussed above. In addition, joint ventures or franchise arrangements for the operation of public call boxes and telecom service retail shops offer the potential to increase private capital and know-how in the sector and should receive active consideration. One feature of PERUMTEL's current commercial agreements with business partners is that they sometimes require that investments made by the partner be turned over to PERUMTEL at the end of a ten-year period. MPTT and PERUMTEL should consider the benefits of alternative kinds of agreements whereby private-sector investors could retain their investments and thereby be encouraged to adopt a long run perspective on the development of the sector.

3.27 Revenue Sharing. The concept of revenue sharing has been relatively common for some time in certain sectors such as the real estate and the hotel and leisure industry, but has only recently begun to be applied to the infrastructure and energy fields, where it has attracted considerable attention. There is no international experience in regard to its application in the provision of basic telephone service. However, revenue sharing seems to have been successfully implemented in Indonesia for the introduction of cellular radio and should be considered in other areas.

3.28 The revenue sharing approach is considered to be most suitable for new and separate facilities construction where boundaries are clearly distinguished, such as cellular radio, satellite, submarine cable, optical fiber cable and value added networks (non-basic services). It becomes complex and unclear when applied to the public telephone network, especially in the context of an existing network. Hence, while the concept seems to hold promise, it needs careful planning and effective implementation to avoid inefficiency caused by duplicate investment and by costly interconnection of different systems. Because little relevant experience with revenue sharing projects exists, and given the complexity of a commercial revenue-sharing structure, PERUMTEL needs to work closely with a capable consultant to evaluate and develop such a concept. The study would include (a) a preliminary engineering and feasibility study, (b) prequalifying contractors through issue of a letter of interest and clear terms of reference, (c) coordinating with the Government and other state entities, and (d) negotiating commercial terms and agreements with successful bidders selected through competition.

3.29 Subcontracting to the Private Sector. PERUMTEL has made extensive use of local private consultants and contractors; in fact, installation of the telecommunications system has played an important role in the development of the local construction and consulting industry. Services contracted to the private sector include outside plant construction, construction of ducts, installation of primary and secondary cables, wiring of subscriber premises and maintenance of buildings and ancillary facilities such as towers, etc. However, fluctuations in PERUMTEL's investment levels have somewhat hampered the efficiency and growth of the local contracting industry.

3.30 Subcontracting, if done carefully, can lower PERUMTEL's overhead costs and personnel requirements and should be further encouraged. However, PERUMTEL's capacity to supervise this kind of arrangement is crucial to getting cost reductions, and ensuring high quality work. As pointed out in paragraph 4.9, a large majority of line installation costs occurs in the distribution network, where subcontractors are most active, and cost reduction efforts must focus on increased efficiency in this area. However, joint-venture arrangements to transfer know-how and better planning by PERUMTEL in the future will increase the efficiency of subcontracting firms and allow PERUMTEL to reap the benefits (lower unit costs) of access to competitively supplied services. Use of private sector companies can be extended further to include maintenance of the outside plant network, special services such as public call office collections and maintenance (especially important in rural areas), and maintenance of motor vehicles.

IV. INVESTMENT, PROCUREMENT AND FINANCING

4.1 Given the large demand for telecommunications services and strong projected growth (paras. 1.5, and 4.3) and given the low level of telephone penetration in Indonesia compared to neighboring countries, investments in the sector will need to be significantly increased from the current level of US\$150 million to about US\$800 million per year by 2000. The discussion that follows addresses strategies for three areas--investment, procurement, and financing--that the GOI and PERUMTEL need to adopt to manage this growth.

A. Investment

4.2 Since the GOI is willing to support the required increases in investment for the sector, at least for the immediate future, the major factor in the successful implementation of the major expansion effort will be how fast PERUMTEL's capacity to plan, implement and manage the expanded network can be developed. PERUMTEL faces a tremendous challenge to match the demanding pace which will be set by the integrated planning and investment timetable for expansion. Hence, in the initial phase of the program (1989-1994), PERUMTEL should aim at implementing a manageable investment program as proposed in Plan A (para. 4.5). As staff capability develops, the size of the program should be increased, to eventually attain the desired growth rate of 14% per year, as proposed in Plan B.

4.3 Demand for Services. A demand forecast was carried out by PERUMTEL with the assistance of the Japan International Cooperation Agency (JICA) in 1987 as part of the long-term development plan. This forecast focused on the growth in demand for connections to the national network for telephone services, that is, the number of telephone and telex lines. Demand projections have been based on a standard forecasting model that is commonly used in the telecommunication sector. Normally, demand includes the number of working connections, the waiting list for new connections, and estimated hidden demand. However, no attempt has been made by PERUMTEL to quantify the current level of hidden demand in Indonesia. Experience in other countries suggests that it may be as much as 50% of unmet expressed demand, so that the total demand in 1988, including the estimated hidden demand, is probably at least about 1,590,000 lines, compared with 800,000 existing line connections (Table 4.1).

Table 4.1: ESTIMATE OF TOTAL DEMAND, 1988

	Units
Teleph. lines	800,000
Waiting list	530,000
Est. Hidden demand	260,000
<u>Total Demand</u>	<u>1,590,000</u>

Because of the lack of accurate time-series data in Indonesia, the demand model formulated by PERUMTEL is based on a multiple regression analysis using a variety of official statistical data taken from 20 countries for the 10 year-period 1973-82, published by the ITU. ^{14/} The model projects demand to grow at an average 8.5% p.a. during 1989-2004, which is below the historical trend in Indonesia of 10% p.a. Table 4.2 summarizes two telephone demand projections derived from this model for possible GDP growth rates of 3% and 5%, respectively, with the assumption that the tariff will remain constant in real terms. A third projection based on historical trends indicates that growth in the number of lines will be 10% p.a..

Table 4.2: DEMAND ESTIMATES FOR TELEPHONE LINES
('000 lines)

	January 1			
	1989	1994	1999	2004
Demand (GDP growth 3% p.a.)	2,330	3,709	5,496	7,633
Demand (GDP growth 5% p.a.)	2,584	4,431	6,930	9,872
Demand (historical growth)/ <u>a</u>	1,590	2,560	4,124	6,642

/a Ten percent growth per annum in number of lines

4.4 Despite rehabilitation to bring idle assets into service and a large increase in investment, the supply of telecommunications facilities and services will remain inadequate relative to demand throughout the current plan period and beyond. Thus, the forecasts of demand listed above that underlie the development program for the years 1989-2004 are satisfactory, and even the lowest of the three estimates will not affect the plan targets because of the large overhang of unmet demand. Network expansion and new telephone line connections are planned to grow at a rate of 10% and 12% p.a. respectively during 1989-2004, while examination of underlying economic and demographic projections suggests that growth in demand will be sustained at the rate of 8-10% p.a. The forecasts for later years (1994-2004) will need to be revised when the results of tariff revisions scheduled for 1990 become available. However, Bank experience elsewhere is that demand for telecommunications is price inelastic until penetration rises considerably. Although a narrowing of the gap will occur as the plan progresses, a large volume of unmet demand will persist for the foreseeable future.

4.5 Long-term Investment Levels. To achieve the long-term objectives set out in para. 1.11, PERUMTEL has proposed two investment plans (as shown in

^{14/} Growth of demand is calculated as a function of tariff rates, GDP per capita, population growth and number of existing subscribers.

Table 4.3) for the three five-year plans in the period 1989-2004 (para. 4.31). The main determinants of the proposed investment plan are based on the following considerations. Plan A, the more manageable and realistic of the two alternatives, calls for adding a total of 3.3 million telephone lines in order to achieve a density of 1.7 lines per 100 population by 2004. This would represent an average growth rate of 12% p.a. in telephone lines between 1989 and 2004. This is the recommended "catch-up" plan. The more ambitious Plan B would add 4.45 million telephone lines by 2004, representing an average growth rate of 14% p.a. and would result in a density of approximately 2.5 telephone lines per 100 population by 2004. Under Plan A, the 3.3 million additional lines would be divided among Repelitas V, VI and VII as 0.9, 1.1 and 1.3 million lines respectively. By 1999, a ratio of 1.34 lines per 100 population could be achieved under Plan A and 1.94 under Plan B. The cost of the plan is based on the average unit cost Rp 3.7 million (US\$2,050) per line added that would be realized if PERUMTEL adopts: (a) cost-effective technology, (b) competitive procurement and financing strategy, and (c) an integrated system approach in project implementation as described in paras. 5.17-5.20. Summary targets and costs are given in Table 4.3. Although the implementation of Plan A would not substantially reduce the number of outstanding applicants, there will be substantial improvement in relative terms in that about 49% of total demand would be met in 1994, compared with 34% in 1989 (Table 4.4). Most important, the quality of service and access to service would be vastly improved.

Table 4.3: PERUMTEL'S 15-YEAR DEVELOPMENT PLAN, 1989-2004

	Repelita IV	Repelita V	Repelita VI		Repelita VII	
			Plan A	Plan B	Plan A	Plan B
Added capacity (mln DELs)	0.25	0.9	1.1	1.65	1.3	1.9
Density (DELs/ 100 pop.) ^{/a}	0.45	0.95	1.34	1.94	1.74	2.5
Average annual DEL growth rate (%)	7.2	12.0	10	11	8	9
Estimated cost Rp trillion	1.3	3.2	3.9	5.9	4.6	6.8

^{/a} Figure at end of five year period

4.6 As part of the long term planning process, mechanisms for tracking technical change in today's fast-changing technology environment will play an important role in determining investment plans. PERUMTEL should organize a high-level committee, chaired by a senior PERUMTEL manager, to review plans for the evolution of its networks, including the upgrading of its existing facilities and the introduction of ISDN. The conclusions of this committee would need to be reviewed at regular intervals, perhaps every three years. The committee membership structure would need to encourage the input of views from interested parties outside of PERUMTEL such as MTPT, PT Indosat and PT

Inti. As more experience with ISDN is accumulated in other countries, the committee should monitor the evolution of costs of the emerging telecommunication services and make projections. It is likely that plans for an ISDN pilot project would need to be laid before 1995 so that they could be implemented early in Repelita VI.

Table 4.4: SUMMARY TARGETS OF 1989-2004 DRAFT PLAN

	December 31			
	1988	1993	1998	2003
<u>Telephone lines</u> ('000)				
Demand	2,330	3,709	5,096	7,633
Additional DELs	250	900	1,100	1,300
Total DELs	800	1,700	2,800	4,100
DELs/100 population	0.45	0.95	1.3	1.7
Demand satisfied (%)	34	49	57	56
<u>Population</u> ('000)	179,000	190,000	219,000	244,000

4.7 Repelita V Investment Program (1989-94). The Repelita V telecommunications investment program will cover investments made by PERUMTEL for domestic services and by PT IndoSat for international telecommunications. The latter represents a relatively small part (about 5%) of the total compared with the PERUMTEL program. The overall size of the investment is still being discussed within the Government. PERUMTEL's proposed Rp 6.4 trillion (US\$3.7 billion) investment plan would expand network switching capacity by 1.4 million lines (a net increase of 0.9 million working lines), thus more than doubling the network's capacity.^{15/} The program includes two relatively self-contained parts: Part I is already being implemented (para 4.5), except for the local cable networks, and is planned to result in the installation of 600,000 new lines, while Part II would follow upon completion of Part I, and would involve the installation of 800,000 additional lines.

4.8 The proposed program, which requires an average growth of telephone lines of 19% p.a., is not likely to be implemented on schedule and would probably take at least 7 years to complete (para. 1.13). Therefore, the Repelita V investment program needs to be scaled properly to make it consistent with the sector's overall place within the national economy and to make its targets more consistent with the capabilities of PERUMTEL. For Repelita V, the following expenditure priorities appear to be appropriate: (a) accelerating the completion of work on 476,000 lines carried over from Repelita IV program; (b) ensuring effective utilization of idle capacity through rehabilitation of existing networks and commissioning of available

^{15/} Includes possible investment for a second switching system and revenue sharing arrangement.

circuits to connect about 125,000 telephone lines; and (c) based on progress achieved in (a) and (b), undertaking the new works to expand the network by at least 300,000 lines during the latter part of Repelita V.

4.9 High Investment Costs. The current high investment costs for the proposed program result from a combination of two factors: (a) the physical difficulties of constructing and maintaining the network, given the geography of the country, and (b) the relatively small size of the customer base outside the major cities (Jakarta, Bandung, Surabaya and Medan). These features are common to many developing countries. Nevertheless, costs need to be reduced to a practical minimum (say, Rp 5 million or US\$3,000 equivalent for areas outside major cities). Although the streamlined implementation system developed under the Bank-supported TA project would significantly reduce unit cost per line in the urban areas, the extremely high cost per installed line in rural areas--for example, Kalimantan, (US\$6,000 equivalent), Sulawesi, (US\$8,000 equivalent), and Irian Jaya, (US\$9,000 equivalent)--needs to be reduced (Figure 2). Based on the JICA study, most of the cost (approximately 81% of the total cost) per added telephone line is for local cable network distribution and transmission systems. Hence, to reduce costs in the long term, PERUMTEL needs to develop a strategy to (a) use cost effective technology such as shared service, pair gain system, exploiting sharing common facilities (e.g., poles) with PLN and time division multiaccess cellular radio systems combined with small terminal exchanges (200-500 line units) and remote line units and concentrators, (b) create an environment in PERUMTEL which provides training and incentives to staff to contain costs, (c) establish a monitoring system to measure progress towards achieving this objective, and (d) concentrate on increasing the efficiency and reducing costs of local contractors involved with installing local network distribution facilities (para. 2.17).

4.10 Reducing Switching Equipment Unit Costs. The cost per line of newly installed, domestically produced switches reportedly averages about Rp 850,000 (US\$500 equivalent) for PERUMTEL (including power supply, engineering and installation, telephone instrument and a government tax of 35%), and is comparable to prices prevailing in international markets. Nevertheless, through optimal factory loading of PT Inti, a considerable cost reduction could be achieved. This is especially relevant, since with technological innovation and economies of scale, unit prices are expected to fall in the international market in the future. Optimal factory loading is inseparably linked to PERUMTEL's investment level (para. 4.16). A government commitment of about Rp 0.7 trillion (40% in foreign exchange) in annual investment in the sector will be required to ensure uninterrupted production flows in PT Inti and, more importantly, to maintain price and performance of domestically produced switching equipment comparable to those available on the international market. Although the overall unit cost per installed telephone line is expected to be reduced from US\$3,500 equivalent in the previous Repelitas to US\$2,050 equivalent in the Repelita V program, measures to effect further reductions and to achieve levels prevailing in other LDCs (around US\$1,800) need to be given priority. To achieve further significant unit cost reductions, GOI and PERUMTEL need to review the latter's procurement strategy and promote increased competition among domestic manufacturers of telecommunications equipment.

Figure 2: constr cost per line u by witel (Rp mln, dec 86)

B. Procurement

4.11 Telecommunications is a highly capital intensive sector. International experience has shown that with well thought out procurement and financing strategies, telecommunications entities can secure equipment at competitive prices and significantly reduce the costs of development. Further, in this era of hard-fought competition among major telecommunications equipment manufacturers, telecommunications entities can obtain attractive financing terms for selected equipment items. Hence, entities like PERUMTEL, that have large investment programs that are highly attractive to potential suppliers, need to give high priority and attention to development and adoption of competitive procurement and financing strategies.

4.12 In PERUMTEL, these core functions of procurement of capital goods and selection of financing sources have suffered from benign neglect by past administrations over several years, and as a result, the current unit costs of development are very high (para. 2.12). To exploit the large potential for competition, and hence reduce development costs, PERUMTEL needs to develop competitive procurement policies and the required institutional capacity for implementing such strategies.

4.13 To achieve economy and efficiency in procurement, the Government and PERUMTEL should adopt the following strategies for the telecommunications development program:

- (a) adopt ICB as the basic strategy for procurement of goods and services, including those manufactured domestically (under certain conditions, domestic suppliers may be given limited preference [e.g., 15% per World Bank Guidelines] in evaluation of bids);
- (b) secure to the maximum extent possible multilateral and bilateral funds which do not exclude ICB procurement;
- (c) adopt international price and terms bidding for items covered by tied, bilateral funds (Under this procedure, suppliers would be required to quote not only for the items but also offer financing on attractive terms for such items; evaluation of offers and selection of contractor would then be based on least present value);
- (d) from offers of bilateral funds, select first those which permit at least some form of competition;
- (e) restrict use of tied, bilateral funds to (i) those goods which are required for standardization and compatibility with existing equipment, and (ii) technical assistance based on well-defined terms of reference.

4.14 For switching equipment, there is currently only a single, domestic supply source, PT Inti. This situation is expected to continue in the near future because of standardization issues. Under these circumstances, PERUMTEL should begin to place multi-year, fully commercial contracts, to establish a system of performance penalties and rewards, and to move away from cost-plus arrangements. This would enable PT Inti to plan its production and optimize

costs (para 4.16). Prices should be set based on an independent assessment of competitive costs of production and on prevailing market prices for similar products, and the agreement should be subject to negotiation where necessary.

4.15 In addition to adoption of the above procurement strategies, PERUMTEL should develop and implement an integrated computer-based procurement and inventory management and control system to enhance its development and operating efficiency and profitability.

4.16 Domestic Manufacture of Telecommunications Equipment. The issue of domestic manufacture of telecommunications equipment in Indonesia, although of considerable importance to telecommunications sector development and the costs thereof, is not covered by this sector study. Nevertheless, during the preparation of this study, it was noted that some of the objectives pursued by the Government with respect to domestic manufacture of telecommunications equipment, particularly digital switching equipment, do not give adequate consideration to their implications for PERUMTEL. For example, the requirement that PERUMTEL procure equipment from PT Inti on a "cost plus" basis could lead to costs significantly higher than if the same item were procured through international competition. Cost-plus purchasing not only conflicts with PERUMTEL's objective to reduce unit costs of development, but also tends to slow the rate of overall development by consuming a greater portion of available fiscal resources. Hence, a comprehensive review of the current government policies covering domestic telecommunications equipment manufacture is required, particularly the recent government decision to manufacture a second digital switching system in Indonesia. The higher costs imposed on PERUMTEL and/or the direct budgetary transfers to the industries in question should be carefully weighed against the advantages such a program might bring to the country's development of high technology equipment manufacturing capabilities.

C. Financing Strategy

4.17 An appropriate financing strategy that ensures that sufficient foreign as well as local funds are available to support sector development will necessitate (a) continued emphasis on improving PERUMTEL's financial performance through productivity increases and periodic tariff adjustments; (b) diversification of financing instruments used to secure local funds; and (c) establishing procedures for securing foreign funds that will facilitate long-term planning, synchronize the availability of funds with the planned implementation of the investment program and enhance PERUMTEL's ability to purchase equipment at competitive prices.

4.18 Improving PERUMTEL's Financial Performance. The proposed change in PERUMTEL's status from Perum to PT will require greater commercial discipline with an increased emphasis on financial performance. While PERUMTEL's past financial performance has, in general, been satisfactory, further improvements will be required to support an expanded investment program. To achieve this, revenue growth needs to be maintained through appropriate tariff adjustments, network performance must be improved, and existing facilities and financial assets will need to be managed more effectively. In addition, more emphasis needs to be placed on reducing operational costs, on improving cash flows by establishing more stringent control of expenditures, on improving financing,

accounting, and information systems, and on building the capability of the financial and managerial staff to analyze and use this data for operational control.

4.19 Overall, PERUMTEL's tariff levels have declined in real terms since the last tariff adjustment in 1985. In fact, whereas a 1985 Siemens survey of international telecommunications tariffs found that the average level of tariffs in Indonesia were among the highest in the world, a more recent (1988) Siemens survey shows that tariffs are now approaching the average of countries surveyed. In order to maintain PERUMTEL's financial health and its ability to generate the funds required for investments, tariffs will need to be reviewed and adjusted regularly.

4.20 Inadequate network and facilities management is currently restricting growth in traffic and revenues, and needs to be improved. Although international traffic has been growing rapidly, particularly since the introduction of IDD in 1986, network congestion and poor capacity utilization have slowed the growth of local traffic. In addition, there are large numbers of nonrevenue-earning subscriber lines (an estimated 30,000 in Jakarta at end-1988). Measures to improve traffic management and increase capacity utilization during Repelita V (para. 2.19) will help reverse this trend.

4.21 PERUMTEL also needs to increase the productivity of its financial assets. The recent deregulation of the financial sector in Indonesia provides more flexibility and opportunities to increase interest earned on financial assets through expert cash management. Since October 1988, PERUMTEL has been permitted to place up to 50% of its funds on deposit with private banks that offer better terms than public sector banks. The potential for increasing revenues will be particularly important in the first years of Repelita V when projected disbursement schedules indicate that cash balances will continue to be well above minimum required levels. As the company expands (subscribers and total assets are projected to double by the end of Repelita V), minimum cash balances will increase and there will continue to be considerable scope for increasing revenues through management of financial assets.

4.22 Further improvements in PERUMTEL's financial performance and cash flow can be achieved by better control of expenditures, e.g., materials and supplies, improved management and control of physical assets, particularly inventories and capital assets, and increased human resource productivity (paras. 5.21-5.24). Costs have also been inflated to some extent by lack of adherence to internal procurement procedures. The auditor's opinion on PERUMTEL's financial statements has been qualified because of concerns regarding overpricing and other irregularities with respect to procurement of supplies and services. Consultants financed under the Bank's Technical Assistance Project also identified weaknesses in PERUMTEL's internal controls and accounting systems which contribute to high operating costs. PERUMTEL's management is currently working to improve its procurement practices; a key target, which is expected to be met, is to obtain an unqualified opinion for the 1989 financial statements. Additionally, a new accounting system is being installed which will facilitate more timely and accurate financial data. Nevertheless, more remains to be done to develop underlying subsystems that

will allow better control, and differentiation of fixed assets, inventory, and materials and supplies.

4.23 Financial data have not been used effectively by PERUMTEL's management as a tool for operational control due to the existing weaknesses in PERUMTEL's internal financial systems and the lack of analytical skills in the finance department. In parallel with current efforts to improve financial systems, the skills of the finance department need to be upgraded and the capability of PERUMTEL's management to use financial data in the management of operations should be improved (paras. 5.8 and 5.34). More relevant indicators need to be established for measuring financial and operational performance, as well.

4.24 Diversifying Financial Sources. Financing required for Repelita IV was provided by a combination of bilateral credits, PERUMTEL's internally generated funds and medium-term loans from local banks. The foreign costs (roughly 45% of the implemented total program) were met by bilateral credits from West Germany, Japan, the US and several other European countries, and passed on to PERUMTEL by the Government as a mix of loan and equity. Because of slow program implementation, local bank credits and available funds were underutilized (para. 1.9).

4.25 Although the prevailing low level of sector investment has reduced the incentive for PERUMTEL to identify new sources of sector financing, a number of efforts have been made in this direction. A PERUMTEL proposal to issue subscriber bonds was turned down this year by the Ministry of Finance, pending receipt of an unqualified opinion from PERUMTEL's auditors, although authority was secured to issue over-the-counter bonds.

4.26 In the future, the availability of adequate financing will become more important as improvement in PERUMTEL's project management capability gives rise to significant increases in investment levels for Repelitas V through VII, compared to actual investments in Repelita IV. PERUMTEL will need to adjust its financing plan to include sources such as subscriber financing, bond issues, and other forms of private sector funding. This will not only reduce PERUMTEL's reliance on and absorption of long-term funds from the banking sector, but it will also help to stimulate the development of financial markets in Indonesia.

4.27 Previous government policies had created a bias against bonds that has since been eliminated by recent measures to deregulate and liberalize the financial sector. Thus, the environment is now more conducive to the development of an active bond market, including a secondary market for subscriber bonds. Successful implementation of a subscriber bond scheme for PERUMTEL will require measures to (a) develop a secondary market for resale; (b) facilitate installment payments by subscribers or provide financing to subscribers for purchase of bonds; and (c) differentiate types of bonds, i.e., bonds issued for installations in higher-demand areas could be priced higher to reflect the difference in value of obtaining service, and therefore, greater willingness on the part of subscribers to contribute to network development. It is essential that these bonds are clearly established and perceived as marketable securities and not as an additional installation fee.

Thus, the terms and conditions of the bonds should be attractive and facilitate resale to investors.

4.28 Telecommunication sector policies already permit, on a limited scale, user credit financing of those parts of the telecommunications network where construction is carried out by the private sector and subsequently handed over to PERUMTEL. For example, the state oil company, PERTAMINA, has both financed and constructed parts of the public network. Expansion of such schemes and other options to increase private sector investment in the sector should be explored. Such arrangements could take the form of temporary or permanent telephone associations and cooperatives, and could be organized either by user groups for businesses and residential customers, or by municipal governments. The telephone association would then work with PERUMTEL to design an appropriate network and to collect funds from the potential subscribers to finance, process and install the system. Once the system was built, the ownership would be taken over by PERUMTEL but maintenance, especially the local network, could be done as a joint venture with the telephone association. This mechanism would greatly assist PERUMTEL in mobilizing, financing and supplementing managerial resources (especially in rural areas such as Sulawesi and Kalimantan), thereby permitting faster and more cost-effective expansion than could otherwise be achieved.

4.29 Securing Foreign Funds. Procedures need to be established to ensure that foreign funds are secured in a timely and efficient manner. There are three problem areas which need to be addressed. First, Government and donor commitment of funds on an annual basis makes it difficult for PERUMTEL to enter into longer-term procurement contracts which would reduce annual equipment costs. Second, PERUMTEL's requirements for its five-year investment program are listed in the Government's "blue book" as separate projects; the Government's efforts to secure project financing then proceeds independently, with priorities determined by the degree of interest of potential donors and their loan processing procedures rather than project implementation requirements. Third, selecting financing sources prior to identification of suppliers limits PERUMTEL's ability to secure competitive prices through ICB.

4.30 To overcome these problems, the Government (BAPPENAS, MTPT, the Ministry of Finance) and PERUMTEL should agree in principle on a financing plan, once the overall investment program has been approved by relevant agencies (para. 5.20). The financing plan, which would be included in the corporate plan (para. 3.5), would identify project components to be secured through multilateral sources and price and terms bidding. In addition, donors would be identified for items which can be purchased efficiently with direct bilateral funds. A strategy for ensuring procurement efficiency while utilizing bilateral funds is discussed in para. 4.13. Once the financing plan has been agreed on, the Government should give PERUMTEL authority to enter into multi-year contracts. To facilitate the Government's annual budget preparation, disbursement schedules should be prepared prior to the start of procurement and updated annually.

4.31 Sector Financing Plan. Table 4.6 shows estimated investments and sources of financing under Repelita IV and outlines a possible sector financing plan for Repelitas V, VI and VII. Investment levels for Repelita VI and VII are based on development targets established under Plan A, the more

realistic and manageable of the two plans outlined in PERUMTEL's long-term development plan (para. 4.5). The Plan assumes that (a) the foreign costs of investments would average 40% of total costs, (b) PERUMTEL would self-finance a minimum of 40% of the total investment costs, (c) local bank borrowing would be maintained at current levels, and (d) subscriber bond financing would be introduced in the latter half of Repelita V and would provide about 12% of local cost financing in Repelita VII. These projected financing plans are based on the premise that foreign costs will continue to be met by foreign loans and credits. However, with a change to PT status, the Government may allow PERUMTEL more flexibility to adjust the mix of foreign and local borrowing to meet its total financing requirements.

Table 4.6: SECTOR FINANCING PLAN
(Rp trillion)

FY ending March 31	Repelitas			
	IV 1984/89 /a	V 1989/94	VI 1994/99	VII 1999/04
Sources of Funds				
PERUMTEL	0.32	1.49	1.67	2.02
External financing				
Foreign credits	0.67	1.28	1.56	1.84
Local banks	0.45	0.38/b	0.4	0.4
Subscriber bonds and others	0.0	0.05	0.27	0.34
<u>Total</u>	<u>1.44</u>	<u>3.20</u>	<u>3.90</u>	<u>4.60</u>
Application of Funds				
Investment				
Local	0.67	1.28	1.56	1.84
Foreign	0.77	1.92	2.34	2.76
<u>Total</u>	<u>1.44</u>	<u>3.20</u>	<u>3.90</u>	<u>4.60</u>

/a Estimated.

/b Credit already available.

V. PERUMTEL INSTITUTIONAL STRENGTHENING

5.1 Over the next five years, PERUMTEL will face a major challenge to achieve the goals set out in Repelita V. The organization will grow substantially and will eventually become one of the largest in the country. PERUMTEL's development has been constrained by a number of factors, including problems with staff motivation and productivity, slow procedures (for procurement, investment approval and staffing), inadequate delegation of responsibility at all levels, and in general, a mode of operation geared more towards maintaining the existing system than to rapid and efficient telecommunications development. Fundamental changes are required to improve PERUMTEL's institutional efficiency and effectiveness. However, the reform process is complicated by PERUMTEL's size, its multiple objectives (profitability, meeting demand in urban and rural areas, and employment), and by the divergent views and interests that exist within the GOI and PERUMTEL regarding the best solutions to these problems. Although many of these fundamental problems may persist in some form well into the long term, major steps can be initiated now towards solving them. These steps are described below.

A. Organization and Management

5.2 PERUMTEL is currently giving considerable attention to internal organizational and management issues. Many of these have been identified by PERUMTEL's management and are being analyzed for remedial action. The following important needs should be addressed on a priority basis in the forthcoming restructuring and reorientation process:

- (a) to decentralize all aspects of project implementation from headquarters to the regions except where centralization at headquarters leads to efficiency;
- (b) to develop general managerial skills and a new management culture in terms of project planning, project control, project implementation, project monitoring and human resources management;
- (c) to delegate decision-making authority with accountability to the lowest practicable managerial and operational levels;
- (d) to strengthen horizontal communication between functional units;
- (e) to improve customer relations, adopting mechanisms to make the organization responsive to customers needs and market pressures.

5.3 Decentralization. Traditionally, PERUMTEL headquarters has assumed overall responsibility for the planning and management of all development projects. This mode of operation must be modified if implementation of the development program is to be accelerated. As the organization grows, the need to decentralize further and break down organizational responsibilities into manageable pieces will increase. This process will be evolutionary, transitional and gradual, and will extend into the following five to ten years, i.e., well into Repelita VI. In this process, functions relating to

short and medium run planning, procurement and day-to-day project management must be transferred from the headquarters to the regions, while activities like long-term planning, coordination and policy formulation that are more suitable for the headquarters organization should be retained. In the short term, priority should be given to decentralizing the Directorate of Development and the Directorate of Human Resources. Possible new organizational structures are shown in Annex B-1. A human resource management strategy is discussed beginning at para. 5.29.

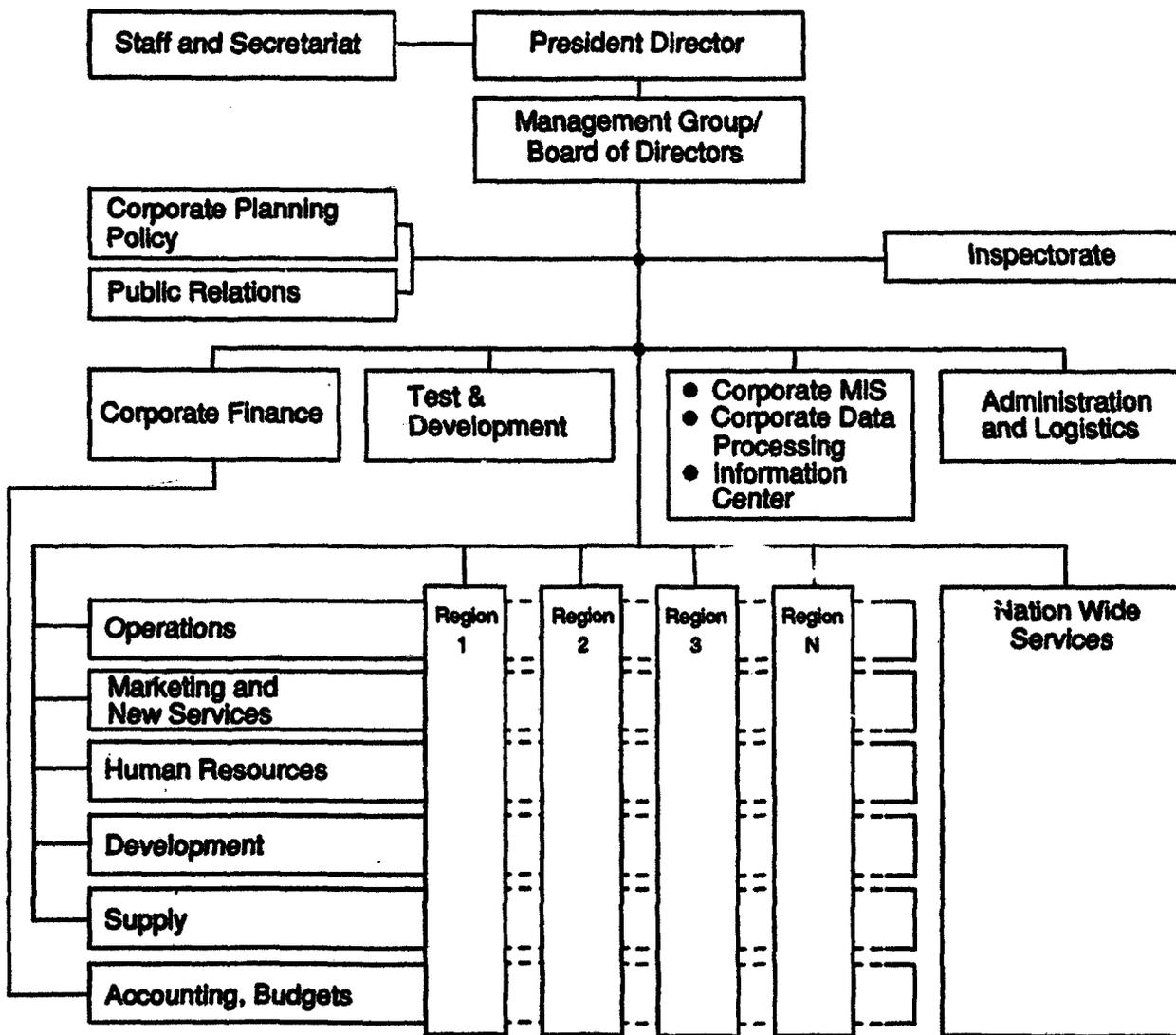
5.4 The current President Director of PERUMTEL has made decentralization one of his top priorities for the coming years. However, PERUMTEL has recently reviewed its internal organization and given a proposed structure for the next three to five years that is not greatly changed from the present structure, as shown in Annex B-1. The proposed structure concentrates strong and centralized functional responsibilities at headquarters, leaving the regions subordinate, much as they were before.

5.5 Long-Term Organization. In order to achieve an efficient organizational structure, a long-term organizational goal has to be developed that will permit fundamental changes. Figure 3 gives an example of a decentralized organization and may serve as a starting point to define this goal. The general role of headquarters in the example would change from being the central implementing body to overseeing nationwide planning, coordination and regional support. In particular, the present Directorates of Personnel, Development and Supply would be transformed, with their new focus being to provide central support to the regions. The Directorate of Personnel should also be seen in a broader context as dealing with human resource management, including traditional personnel functions as well as training and personnel development as further described in Annex B-1. The Directorate of Supply must take on responsibility for centrally procuring bulk orders for cables, accessories, switching equipment and other major equipment items. Moreover, a separate function should be created to coordinate new services, marketing efforts and special attention to key customers.

5.6 The regional headquarters would then progressively develop into "operating companies" with little need for day-to-day support from headquarters. In addition to planning, development, and operational capabilities, the regions would have local functions for administrative, human resource and finance matters. At the same time, specialized nationwide services such as packet-switched, satellite, or advanced business services could be organized as separate units.

5.7 Corporate functions should remain at headquarters. In summary, these will be: overall policies, corporate planning, corporate finance, testing and development, corporate management information systems, data processing, and information data bases. Administration and logistics should also be a central function. An Inspectorate for internal audit can also be retained as an independent unit reporting to the President Director. Appointments to the corporate management group (board of directors) should be made from the key functional units. Each member should be given well defined areas for which he is responsible and on which he reports to the management group. In particular, one member should be specially appointed to act as a liaison between the regional directors and the management group.

Figure 3
PERUMTEL: Possible Long Term Organization



5.8 The corporate finance function should also be strengthened. PERUMTEL's financial management will become increasingly important as its financial assets and financing requirements expand (para. 4.17). PERUMTEL needs to establish a corporate finance unit with a core of experienced finance professionals. The unit should have responsibility for (a) preparing comprehensive financial models to project PERUMTEL's financial performance, cash flow, and borrowing requirements; and (b) establishing financial policies, including those governing PERUMTEL's cash management and borrowing strategy.

5.9 Improved information processing should be coordinated with the development of efficient corporate management information systems (MIS). Currently, administrative processes are hindered by voluminous paperwork and detailed statistics collection without equivalent benefits. If PERUMTEL can bring order and efficiency to the many information flows, a drastic reduction in the movement of nonstandard forms will result. There will be fewer discrepancies due to less data transcription, and standardization throughout PERUMTEL will simplify training, tracking and data management. More important, in the long run, a standard service order will help position PERUMTEL for orderly implementation of computer-based systems with a minimum of difficulty. Although computerization of procedures and methods is necessary and desirable, it can be accomplished only after the work procedures have been simplified and rationalized. Otherwise, the existing inefficiency will be incorporated into the new mechanized system.

5.10 An Information Center should be established by upgrading the present computer center. This would provide end-user support, computer training, standardization, and assistance in software and hardware acquisition. The Information Center would establish user support centers in the regions, and take on responsibility for the corporate data network and electronic mail system for effective communication between PERUMTEL's central and regional management. PERUMTEL should define and promulgate the roles and responsibilities of key personnel for the new management information systems, and carefully implement the coordinating mechanisms to ensure the participation of line departments, agreement on priorities and monitoring of progress on the total MIS program.

5.11 General Management. PERUMTEL has not yet established a working system where long-term goals are reflected in annual plans which, in turn, are then translated into performance objectives for departments and/or individuals in the organization. The lack of clearly expressed performance objectives makes it difficult to measure progress, to get early warning of problems, and to make necessary corrections. In the absence of accountability, there are no consequences if objectives and targets are not met. Job descriptions do exist, but updating them is complicated and hence many are obsolete.

5.12 Improved management systems need to be put in place so that every manager in the organization knows precisely what he is supposed to do (job description), what he is supposed to achieve (performance objectives) and how well he is performing (appraisal). There must also be accountability for each manager's performance and consequences if it is below acceptable levels. Every manager must also be given well-defined responsibility for planning, monitoring, delegation and organization of his unit's work and for continuous

development of his staff. This is the "unit president concept," under which every manager at every level behaves and takes on responsibility as if he were the president of the organizational unit that he manages. With this kind of management system, a high degree of tolerance must be demonstrated for legitimate errors that may be committed by "unit presidents" in the enthusiastic pursuit of their objectives, within a framework of safeguard procedures established to prevent financial, personnel and other abuses.

5.13 Delegation of Authority. Currently, the decision-making process in the organization is hierarchical and formal. A request for a decision has to ripple through the organization all the way up to the director level and be returned in a similar fashion. Delays at each step can be substantial because of the large number of items involved. Frequent travel absences by managers slow the process even further. To resolve this problem, three issues have to be addressed. First, authority should be delegated to the lowest practicable level, so that there is proper allocation of decision-making freedom and accountability at all strategic, managerial and operational levels. Second, deputies should be assigned for each manager and, in the absence of the manager, have equivalent authority to decide on all matters. Third, time spent away from the office by managers should be curtailed drastically.

5.14 Horizontal Communication. Organizational performance is handicapped by the lack of communication between adjacent functional units in the hierarchy. Coordination between units dealing with, for example, exchanges, outside plant and transmission, is not continuous, direct, and spontaneous, but rather formalized through the immediate superiors. Staff in different units do not cooperate and coordinate directly with each other, with the result that productivity is reduced and an unnecessary workload is placed on the managers. This behavior arises in part from the traditional organizational culture in PERUMTEL, but this does not preclude change, and ways should be found to resolve simple day-to-day coordination issues. A decentralized organization will depend even more on individuals' own initiative to communicate and coordinate with others at equivalent levels without going through formal channels.

5.15 Customer Relations. PERUMTEL needs to become more market-oriented and needs to devote a great deal of time and energy to its relations with both residential and business customers. The needs of these two categories are different and many modern telecommunications administrations thus find it advantageous to have separate units to deal with each. User advisory groups could be formed to provide further suggestions for improvement. The task of these Customer Strategic Units would be to (a) conduct, from time to time, demand surveys for sophisticated services for business users; (b) clarify factors that affect customer satisfaction and identify ways to improve service; and (c) seek new venture opportunities in cooperation with service companies, manufacturers and other users. Marketing support for large customers needs to be augmented with account management support. Most of this activity should be located close to the major clients.

B. Operational Strategy

5.16 In order that the proposed investments under Repelita V and later plans are implemented efficiently, and to ensure that the installed assets are

operated at optimum level, PERUMTEL must formulate an effective strategy to increase operational efficiency (para. 2.19) and implement key reforms. It must take positive steps to increase productivity through effective management of the network, provide reliable services, and achieve progressive reductions in its operating costs. Major changes and reforms cannot be expected to take place overnight. However, as a first critical step, there needs to be an agreement by all government agencies involved on (a) the need for fundamental reforms to improve PERUMTEL's institutional efficiency and (b) a timetable for the implementation of the required reforms.

5.17 Program Management. Recognizing the need to strengthen PERUMTEL's capability to manage a large investment portfolio, consultants were appointed in April 1987 to assist PERUMTEL in this task. The assignment was financed by a Bank loan (Ln. 2757-INS). After reviewing PERUMTEL's program management procedures, the consultants are currently (a) establishing an MIS system for project monitoring and control, (b) improving project planning, (c) improving tendering systems, and (d) introducing an integrated system approach which ensures that all the essential resources--site or building, power supply, local cable network, junction network, switching and manpower are specified and committed according to a firm schedule. Although those important steps have been taken, further changes and improvement of the organization are necessary.

5.18 On the organization side, PERUMTEL needs to establish project teams for each major project to track emerging issues, evolve timely solutions and to strengthen project management, procurement and construction monitoring activities. Such teams will help solve small problems which currently occupy the time of senior decision makers and, more importantly, will speed up the decision-making process and ensure timely completion of projects.

5.19 As regards local cable network construction using contractors, PERUMTEL will need to build its internal planning and supervision capability, possibly by twinning with an efficiently run telecommunications entity to accomplish especially critical tasks. Specific functions of the selected entity would be to help PERUMTEL staff to (a) upgrade and standardize outside plant technology used in Indonesia, (b) provide engineering designs for cable additions, (c) prepare bid packages and evaluate bid offers, (d) supervise contractors and conduct acceptance tests, and (e) computerize local cable network mapping and records systems.

5.20 GOI also needs to consider setting up a mechanism within PERUMTEL, possibly involving BAPPENAS and EKUIN, the function of which would be to examine project initiating documents (PID) and give authorization to go ahead with specific projects, which would then be integrated into the larger investment program. This mechanism would rely on detailed PID engineering designs and feasibility studies and would be similar to the appraisal process used by lending agencies. It would reinforce the existing mechanisms within PERUMTEL and within GOI that give approval to overall investment programs (e.g., corresponding to Repelita periods) by providing a concrete, objective basis for decision making. This mechanism should enable the GOI and PERUMTEL to arrive at a prompt and definitive decision for each specific project, and would help them to overcome many of the implementation delays experienced in the past. The same mechanism should be used regardless of the source of the

finance for the project. This will also avoid situations in which a particular project is approved for implementation without being part of the integrated program. Recent examples of this are (a) the Java-Bali optical fiber system; (b) Trans-Sulawesi; and (c) Trans-Sumatra Phases II and III.

5.21 Materiel Management and Project Coordination. Inadequacies in materiel management, planning, procedures, and coordination have also led to low levels of asset utilization and, therefore, unnecessarily high costs. The lack of coordination in the supply of exchange equipment, local cables, subscriber equipment, and all other minor but essential items needed to provide service has significantly delayed commissioning of telephone connections. Furthermore, even when plant components were properly dimensioned and coordinated by PERUMTEL, the final coordination was handicapped by the complicated contract approval procedures which caused delays at higher government levels. (Examples of delays in commissioning the complete system due to poor coordination are given in Annex E-3.) The implementation strategy for Repelita V needs to consider measures such as establishing a project management group, improving supervision and introducing an integrated package system approach to improve timely completion and effective asset utilization.

5.22 Currently, in PERUMTEL, there is insufficient assessment of actual field network performance, making it difficult to organize improvement programs. The Test and Development Center (TDC) should become a more active participant in this type of work, and the center's work program should involve preparation for the introduction of modified network or product elements. Furthermore, line departments do not have enough input into the content of the TDC work program. They can get involved by commissioning work that addresses their priority concerns, and by mapping out the contribution that can be made by the TDC. The TDC should cooperate with line departments in more field studies, examining the performance of the network and proposing improvements. An increasing proportion of the TDC work program should be commissioned by line departments.

5.23 Increased Productivity. Several types of improvements can be made quickly to increase productivity with minimal investments. The first is to fully utilize existing assets through recovery and rehabilitation. For example, current outside plant (OSP) maintenance procedures in PERUMTEL provide for changing a defective pair to a good pair to correct defective telephone lines. This is a practical and customary procedure to provide good maintenance response. However, PERUMTEL lacks a process for following up on the defective pair discarded in the process of service restoration. As a result, without plans for their recovery, large quantities of discarded OSP materials and facilities are wasted. The second improvement would be to

ensure that maintenance is made available in all areas. In some key areas such as Bandung and Jakarta, the lack of OSP facilities leads to unfulfilled service requests, even though other complementary items (e.g., switching) are available. The result is inefficient utilization of existing productive capability.

5.24 Productivity also can be significantly improved in the area of repair of defective customer lines and equipment. In Indonesia, the number of faults carried over for more than six days is quite high. By way of contrast, in most industrialized countries, 80-90% of complaint faults are cleared by the end of the next working day (in less than 48 hours), and the percentage of faults carried over for more than 6 days is virtually zero as compared to 27% in Indonesia. Furthermore, the average number of faults repaired by one lineman per day at PERUMTEL is 1.17 faults, which is a low level of productivity compared with a desirable average of five repaired faults per lineman per day (para. 1.6). PERUMTEL's management should set performance targets in consultation with each of its regional divisions to improve productivity and gradually reduce operating costs by a specific percentage, increase the speed of repair over time, and raise the availability of service to a targeted level. A suggested list of key indicators would be: (a) fault reports per period; (b) mean time to clear faults; (c) successful call rates: local, long-distance, international, outgoing, incoming; (d) mean time for exchange connection: telephone, telex; and (e) operator time to answer. For each of these, studies should be undertaken to establish current standards of performance and prescribe feasible targets for improvement in each Witel.

5.25 Quality of Service--Successful Call Ratio (SCR). In Indonesia, the SCR for local, SLDD calls and IDD calls is not satisfactory (para. 1.6). Unsatisfactory SCR not only causes inconvenience to telephone subscribers but also considerable lost income to PERUMTEL. Based on the PMC consultants' study, it is estimated that, if the SLDD call completion ratio were increased by 10%, PERUMTEL's revenue would increase by Rp 1,170 million (US\$680,000) per year. Given the high levels required of an optimally designed network (for example in a well-dimensioned network, the SCR values are 75% for local and 70% for SLDD calls), PERUMTEL cannot be expected to achieve these targets in the short run. A step-by-step strategy to reach progressive, agreed targets in each of the three Repelitas, commencing with Repelita V, needs to be developed.

5.26 Improved Facility Management. The inventory and traffic data associated with junction (interexchange) and intercity transmission networks are two other areas of concern that need priority attention. Currently a number of expensive facilities remain underutilized. For example, although there is congestion on routes originating from and destined to Jakarta, excess system capacity on the Jakarta-Bandung, Jakarta-Semarang, and Jakarta-Medan routes is not being fully utilized.^{16/} Because of poor information processing systems, these unused facilities are not only not recognized as idle, but are also not being taken into consideration when computing expansion needs. Such

^{16/} Idle capacity on Jakarta-Bandung route is 59 voice circuits; Jakarta-Semarang, 208; and Jakarta-Yogyakarta, 34.

shortcomings in facility management contribute not only to higher investment costs but also to loss of revenue due to poor capacity utilization.

5.27 Demand Management. The status of demand management in the various regional offices needs to be reviewed based on the findings of the PMC consultants financed under the Bank-financed TA project and based on actions initiated to decentralize demand management and planning to the regional offices. Because of the absence of a sound demand management system, PERUMTEL has often installed several additional small pair cables on a route to meet pressing demands, although proper demand management would have indicated installation of one large cable at considerably less cost. This ad hoc approach to meeting short-term demands is not in accordance with the basic concept of least-cost cable network design and engineering, and hence needs to be avoided. The basic outside plant must be designed to ensure that the capacity will be sufficient to cover a specific plan period, say five years' demands for local cables including possible deviation from estimated demand at the design stage.

5.28 Improving Access to Telephones. An effective method of improving access to telephone service at a reasonable cost is to install more public call offices (pay phones), both in telecommunications service centers and in other accessible locations. PERUMTEL currently has fewer than 1,000 pay phones in operation. Many more public telephones could be economically justified. PERUMTEL's revenue per pay phone is in excess of Rp 3.5 million per year, compared to an average of Rp 500,000 from residential lines.^{17/} The installation and maintenance costs of pay phones are higher but need not be so great as entirely to offset the gain from higher revenues. Modern designs using magnetic cards are more reliable and require less attention as they are less prone to vandalism. Given that MTPT has recently decided to allow the private sector to operate the telecommunications service centers, a strategy to improve public access to telephone service based on pay phones needs to be developed.

C. Human Resources Management

5.29 PERUMTEL faces enormous challenges in its human resources (HR) management, and must recognize and strengthen this area in order to:

- (a) dynamize the corporate culture to improve motivation and productivity,
- (b) organize and implement a massive training program,
- (c) reduce the currently high number of 50 staff per 1,000 lines,
- (d) reconfigure the relative proportions of lower-level versus professional staff,
- (e) undertake a large recruitment exercise,
- (f) decentralize management of the corporation,

and (f) establish effective career development programs. In order to meet these challenges, PERUMTEL needs to develop an integrated approach to human resources management and the following section describes some important areas for attention.

^{17/} Thirty thousand residential lines in Jakarta (about 10% of city's total) are reportedly generating zero revenue.

5.30 Personnel Directorate. The Personnel Directorate, which currently fills a role that is primarily administrative, needs to increase its participation in strategic policy making. The directorate should be more actively involved in the corporate planning process, develop central and regional HRM strategies interactively with line management, and assist in facilitating a wide range of performance improvement measures. Most of the operational personnel administrative tasks, especially for lower-level staff, would be better implemented closer to the job locations, i.e., more extensively processed by the line management and the regional headquarters. With greater decentralization of personnel administrative tasks, there would be an increased need for more systematic corporate development objectives and explicit human resource strategies, policies and procedures. The main role of the HR management function in PERUMTEL headquarters should be to develop these, coordinate their implementation and monitor the results.

5.31 Essential to effective, integrated and decentralized human resource management is the installation of efficient communication channels between regions and departments, using synchronized data bases and information systems. Existing personnel data bases need to be standardized, made more accessible to HR officers and integrated with PERUMTEL's corporate MIS system.

5.32 Human Resource Planning. PERUMTEL's human resource planning process is not clearly defined and a number of deficiencies exist in planning procedures. There is a need to: (a) forecast staffing needs; (b) define skills required; and (c) identify associated training needs. Currently human resource planning is largely an exercise of extrapolation, implemented as an activity carried out after the technical planning has been completed. The estimates for human resource requirements are determined on the basis of arithmetic ratios (i.e., the number of technicians per exchange) without any reference to the quality of personnel required for planning and managing an ever more sophisticated network. Consequently, the staff configuration is skewed. The present human resource planning system and procedures need to be reviewed and revamped to eliminate overstaffing, and to improve the low ratio of engineers and qualified technicians to administrative and operational personnel.^{18/}

5.33 Training Organizational and Management. Training activities carried out today by PERUMTEL generally take place in the classroom, rather than on-the-job via in-service training, although in-service learning is essential to enable engineers and technicians to cope with new technological developments. The major load is placed on the central training institution, PUSDIKLATTEL, and the potential of the regional training units has been left undeveloped. With the increased demand for training at all levels, a redistribution of the training load between PERUMTEL's rural and urban institutes is required. Much of the technical and operational training could be decentralized to the regional training centers (RTCs). However, the RTCs are currently ill-equipped to do this. A time-bound upgrading program for the RTCs is urgently needed, both in terms of the instructional facilities, and the technical equipment available to practice on.

^{18/} The ratio of technicians:other staff in Malaysia is 60:40, in Singapore 46:54, in Thailand 40:60, but in Indonesia it is 25:75.

5.34 Management Development. In the past, PERUMTEL's management has given limited attention to training in the management, accounting, finance and marketing disciplines as compared with the technical and engineering fields. Those disciplines, along with operation and maintenance, will be extremely important to PERUMTEL as the size of the organization and the complexity of its operations increase rapidly. There are three specific areas where PERUMTEL needs strengthening: (a) general management (corporate planning, personnel management, marketing, human resource development); (b) financial management (financial planning, financial projections, cost accounting, tariff and pricing policies, computer analytical models); and (c) operations management (operational and maintenance practices--network planning, exchange maintenance, outside plant maintenance). Training in these areas can best be achieved through a close and functional association (twinning) with an established telecommunications operating company. This kind of training can take place at the facilities of PERUMTEL or at the facilities of the "twinning" partner.

VI. CONCLUSIONS, RECOMMENDATIONS AND ACTION PLAN

A. Conclusions

6.1 In closing, a number of broad observations may be made about the role of telecommunications in Indonesia's economy, and about the future directions that the sector might take in the next fifteen years.

- (a) Telecommunications networks and services are elements of economic infrastructure which are critical to the growth of the Indonesian economy as a whole and, in particular, support the growth of trade, financial services, and tourism. In addition, telecommunications services are important for increasing the productivity of government administration and the delivery of government services to the public; they also provide significant benefits and convenience to the general public.
- (b) Government organization and processes for the management of the sector have not been adequate to optimize its performance. Nevertheless, they exhibit certain strengths which can be effectively developed and built on.
- (c) Demand for telecommunications services greatly exceeds supply. The quality of service is often poor. The availability of telephone service with respect to per capita GDP is very low by international standards, and the lowest amongst the ASEAN countries.
- (d) Although there is scope for increased private sector participation in several areas in the telecommunications sector, PERUMTEL will remain the dominant vehicle for provision of basic telecommunications services in Indonesia.
- (e) Unlike many other Indonesian state-owned enterprises, PERUMTEL has been a net contributor to the public treasury. Nevertheless, there is a large potential for increased productivity, a potential which is enhanced by on-going world-wide improvements in the costs and performance of telecommunications equipment.

6.2 The next three five-year plans will see enormous growth in overall demand for telephone service in Indonesia, compounding system difficulties and existing supply shortages. The factors that have affected the sector's performance to date are concentrated in the service provider, PERUMTEL, and therefore, reform measures aimed at institutional improvement will have a fundamental, positive effect on the situation. Increased GOI pressure for improved service, increased competition in some areas, and increased input from customers are needed to stimulate PERUMTEL from the outside, while comprehensive internal reforms to strengthen PERUMTEL's management, organizational structure, and operational efficiency are called for from the service provider itself. In particular, procurement and the installation of cable distribution systems have been singled out as bottlenecks in the future expansion of the system. The GOI is well aware of the challenge facing the sector and has given the new, top management at PERUMTEL a mandate to

implement a comprehensive program of institutional reform, modernization, and expansion.

6.3 The investment plan currently proposed by PERUMTEL is extremely ambitious; it would more than double the size of the network in terms of added telephone lines, raise the number of telephone lines per 100 population from .45 to 1.74 by the year 2004, and increase satisfied demand as a percentage of total demand from 34% to 56%. The plan will place a heavy demand not only on PERUMTEL's institutional capability to implement and manage the envisaged expansion, but, in the long term, on the financial resources of the sector. Although the availability of sufficient funds is not in doubt in the immediate future, the higher investment levels proposed in Repelitas VI and VII will require more diversified sources of domestic financing, improved PERUMTEL financial management, and the timely provision of funding for foreign exchange costs.

B. Recommendations

Sector Management

6.4 In order to achieve a significant improvement in the GOI's management of the telecommunications sector, four related measures are recommended:

- (a) Establish an entity-to-government interactive process for corporate planning development, approval, monitoring and feedback (para. 3.4).
- (b) Establish PERUMTEL as a PT corporation (para. 3.5);
- (c) Establish a strengthened supervisory and regulatory capability in the MTPT (para. 3.7);
- (d) Establish a mechanism for MTPT to receive and assess service users' views at least once a year (para. 3.8);

Sector Policies

6.5 The GOI needs to address the following telecommunications policy issues in the immediate future:

- (a) Modifications to PERUMTEL's tariff should be implemented (paras. 3.10-3.16);
- (b) MTPT should prepare and issue a statement of PERUMTEL's mandate once it becomes a PT corporation (para. 3.6); and
- (c) MTPT should develop a schedule or agenda, for the Minister's approval, to consider a number of other policy issues (para. 3.7) including:

- a policy for compensation of PERUMTEL for the provision of uneconomic services at the request of the government (para. 3.5);
- a dividend policy for a PT PERUMTEL (para. 3.5);
- the establishment of a consensus within the Government of the benefit of periodic reviews and adjustments to the tariffs of PERUMTEL and Indosat, at least every two years, and development of criteria to assess future tariff adjustment proposals (paras. 3.15 and 3.16);
- a review of PT IndoSat's tariffs (para.3.16);
- a policy to improve the content of PERUMTEL's tariffs to specify the conditions of service with respect to resale of leased circuits for the provision of nonbasic services and the technical standards that apply to terminal equipment to be attached to network facilities (paras. 3.19 and 3.20);
- a policy to determine the criteria and conditions that will apply to licenses for the provision of nonbasic services (para. 3.19);
- a review of radio licensing policy and administrative procedures to ensure that economic activities are not hindered by an inappropriate failure to issue radio licenses (para. 3.22);
- a policy for encouraging more private-sector participation in the provision of cellular telephone service and development of a process to select the best corporate candidates for such participation (para. 3.23);
- an assessment of alternatives to PERUMTEL's current type of "build-operate-transfer" agreements whereby PERUMTEL's partners hand over their investments to PERUMTEL after ten years. The ministry should assess the benefits of agreements that give private investors a longer-term interest in investing in and developing the sector (para.3.26);
- the development and assessment of approaches, such as subscriber bonds, to increase private sector investment in the sector (para. 4.26);
- a policy for technical evolution of the network including ISDN (para. 4.6); and
- the development of proposals to extend the telecommunications service center concept into rural areas (para. 5.28).

Investment, Procurement and Financing

6.5 Investment. To facilitate efficient and predictable expansion of telecommunications services in Indonesia in a chronological framework, the following measures are recommended:

- (a) Decide on the investment level (Plan A) for the next 15 years (para 4.5);
- (b) Review the Repelita V investment program (paras. 4.7 and 4.8);
- (c) Develop a strategy to reduce investment cost per line (para 4.9)

6.6 Procurement To achieve economy and efficiency in procurement, the following actions are recommended:

- (a) Develop competitive procurement policies (ICB) and develop the required institutional capacity in PERUMTEL for procurement of goods at least cost (para. 4.13);
- (b) Initiate a comprehensive review of the current policies relating to domestic manufacture of telecommunications equipment (para. 4.16).

6.7 Financing. To improve PERUMTEL's financial management and financial performance and to ensure that sufficient funds are available to support sector development, the following actions are recommended:

- (a) Upgrade skills of the Finance Department to allow better management of financial assets and more effective use of financial data for operational control (paras. 4.21 and 5.8);
- (b) Establish financial and accounting systems which will permit more stringent control of expenditures and improve management and control of physical assets (para. 4.22);
- (c) Diversify financing sources by tapping private sector resources through subscriber bonds and other financing instruments (para. 4.24-4.28);
- (d) Streamline procedures for securing foreign financing (paras. 4.29-4.30);
- (e) Agree on a financing plan with BAPPENAS, MTPT, Ministry of Finance, once the overall investment program has been approved (para. 4.31).

PERUMTEL Institutional Strengthening

6.8 Organization and Management. To address its organizational and management weaknesses, PERUMTEL needs to do the following:

- (a) Develop, in the short term, a strategy for decentralization of the Directorates of Development and Human Resources (para. 5.3);

- (b) Develop long-term organizational goals (para. 5.5);
- (c) Design and implement an efficient management information system (paras. 5.9 and 5.10);

Operational Strategy

6.9 In order to ensure effective and efficient implementation of investments and their utilization, the following strategies are recommended:

- (a) Establish project teams for each major project (para. 5.18)
- (b) Develop PERUMTEL's capability in planning and supervising outside plant works through twinning with another telecommunications operating entity (para. 5.19);
- (c) Establish a steering committee comprising representatives from the Ministry of Finance, EKUIN, BAPPENAS and Regional Planning Agency (BAPPEDA), to ensure consistency with government policy and open, cooperative relationships between these agencies and PERUMTEL with specific reference to approval to proceed with specific projects (para. 5.20);
- (d) Establish network performance and maintenance standards (para. 5.24);
- (e) Take all necessary actions to improve SCR (para. 5.25);
- (f) Establish standards for demand forecasting and decentralize demand management and local cable network planning to the regions (para. 5.27);
- (g) increase public access to telephone services through (i) installing pay phones and (ii) establishing telecommunications service centers (para. 5.28); and

Human Resources Management

6.10 To address the weaknesses in human resource management PERUMTEL needs to do the following:

- (a) Develop policies and procedures for improving human resource planning and development (para. 5.29);
- (b) Expand and upgrade Regional Training Centers (para. 5.33);
- (c) Introduce modern management training techniques (para. 5.34).

C. Action Plan

Objective/activity	Responsibility	Timing	External assistance
I. <u>Sector Management</u>			
(a) Establish government-entity corporate planning process, initiate plan and prepare performance targets	MTPT PERUMTEL	90-92	Yes
(b) Establish PERUMTEL as a PT	Ministry of Finance MTPT	90-95	No
(c) Strengthen regulatory, supervisory and policy capability in DGPT/MTPT	MTPT	90-93	Yes
(d) Establish mechanism for communication of users' views to government	MTPT	90-92	No
II. <u>Sector Policies</u>			
(a) Complete review of PERUMTEL's tariff and implement changes	PERUMTEL MTPT	90-92	Yes
(b) Prepare and issue a statement of PERUMTEL's mandate as a PT corporation	MTPT	90-91	No
(c) Establish an agenda (schedule) for a review of various sector policies	MTPT	90-92	Yes
(d) Undertake a review of sector policies	MTPT	90-92	Yes

Objective/activity	Responsibility	Timing	External assistance
III. <u>Investment</u>			
(a) Decide on investment level and define policy on service offering plan for each of three Repelitas V, VI and VII. - service categories - network categories	BAPPENAS/MTPT/ PERUMTEL	Jan. 1990	No
(b) Review Repelita V's investment program and its targets	PERUMTEL	Jan. 1990	No
(c) Develop strategy to reduce investment costs	PERUMTEL	June 1991	Yes
IV. <u>Procurement</u>			
(a) Develop procurement policies to enhance competition	BAPPENAS/MTPT/ PERUMTEL	June 1990	Yes
(b) Initiate review of policies on domestic manufacturing of telecommunications equipment	BPPT/MTPT/ PERUMTEL	Dec. 1990	Yes
V. <u>Financing</u>			
(a) Upgrade skills of PERUMTEL's Finance Department	PERUMTEL	Dec. 1990	Yes
(b) Establish improved financial and accounting systems	PERUMTEL	Dec. 1990	Yes
(c) Develop plan for subscriber and other private sector financing	MTPT/PERUMTEL	Dec. 1990	No
(d) Streamline procedures for securing foreign financing	BAPPENAS/MTPT/ PERUMTEL	Dec. 1990	No
(e) Agree on a financing plan once the overall investment program has been approved	BAPPENAS/MTPT/ PERUMTEL	Dec. 1990	No

Objective/Activity	Responsibility	Timing	External Assistance
VI. <u>PERUMTEL Institutional Strengthening</u>			
(a) Adopt and implement a decentralization strategy	PERUMTEL	1990-96	Yes
(b) Develop a long-term organizational strategy	PERUMTEL	1990-91	Possible
(c) Design and implement a management information system strengthened and initiate programs to address weaknesses	PERUMTEL	1990-95	Yes
VII. <u>Operational Strategy</u>			
(a) Establish project teams to implement Repelita V investment program	MTPT/PERUMTEL	Jan 1990	No
(b) Select twinning partner to strengthen PERUMTEL capability in local cable network construction supervision	PERUMTEL	Dec 1990	No
(c) Establish steering committee to streamline project approval	BAPPENAS/ EKUIN MOF/MTPT/PERUMTEL BAPPEDA	June 1990	NO
(d) Establish network performance and maintenance standards	PERUMTEL	June 1990	Yes
(e) Agree on strategy for improving SCR for each of the three Repelitas V, VI and VII and take necessary actions to improve SCR	PERUMTEL	June 1990- June 2000	Yes
(f) Decentralize demand management and local cable planning to the regions	PERUMTEL	Dec 1990	Yes

Objective/activity	Responsibility	Timing	External assistance
(g) Increase public access to telephone service	PERUMTEL	Dec. 1990	No
VIII. <u>Human Resource Management</u>			
(a) Improve human resources planning and development	PERUMTEL	1990-94	Yes
(b) Upgrade training facilities and training content	PERUMTEL	1990-2000	Yes
(c) Introduce modern management techniques	PERUMTEL	1990-2000	Yes
