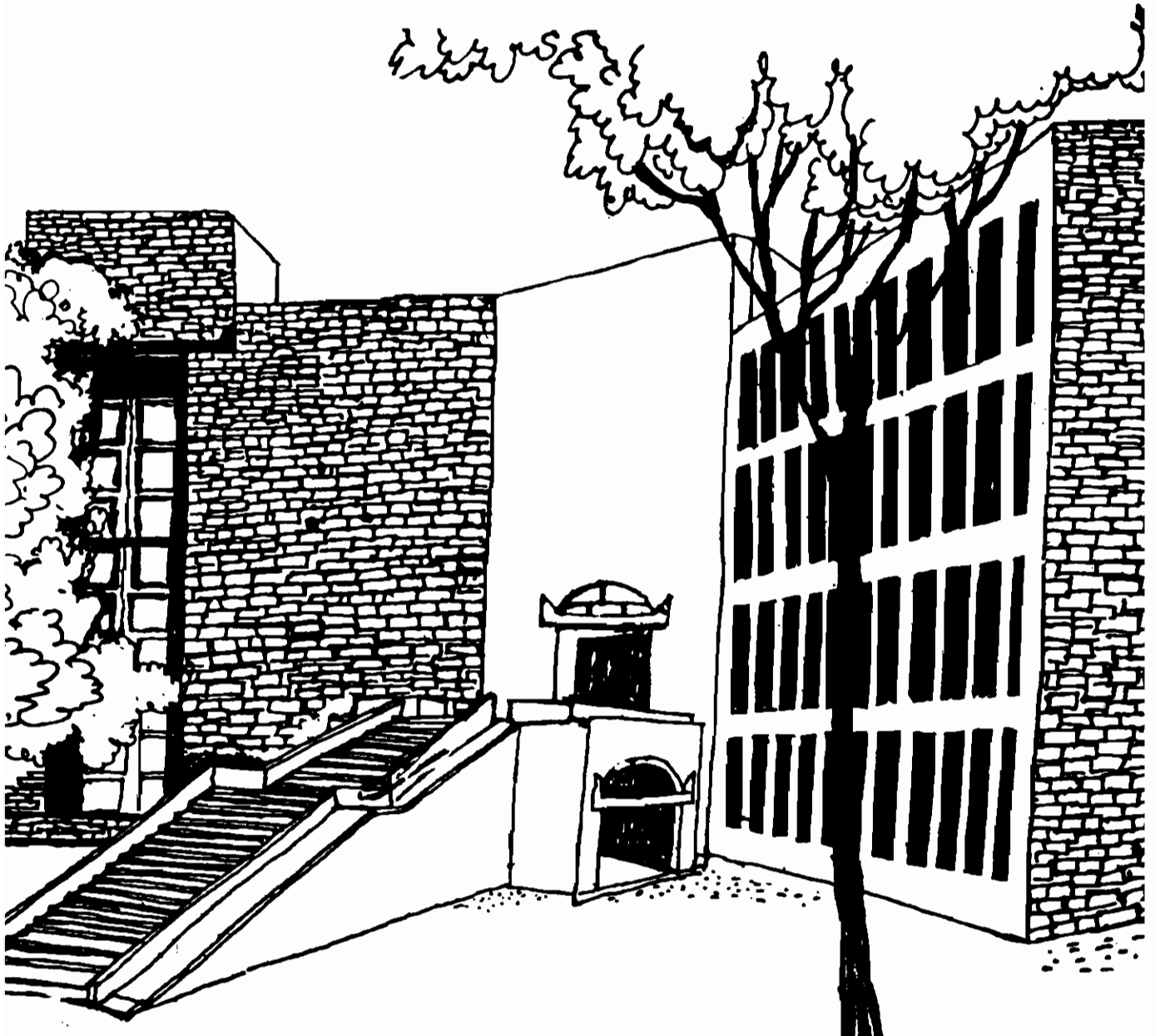




Working Paper



**REVIEW OF MALAYSIAN TELECOM SECTOR:
ASSESSMENT OF POLICY CHANGES**

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Review of Malaysian Telecom Sector : Assessment of Policy Changes

Abstract

The Malaysian economy has been growing rapidly, with concomitant demand for telecom services. With a view to reducing the role of the government in economy and introducing efficiency, the government planned to corporatize public sector organizations as a first step towards privatization. The telecommunication sector was chosen as one of the initial government departments to be corporatized and its experience was going to be used as a basis for deregulation and privatization in other state controlled sectors. In 1987, legislation was enacted to bring in major reforms in the telecom sector. Malaysia was the first ASEAN country to introduce such reforms. Due to the pervasive effect of telecom in the economy, management of this initiative was of interest in various quarters.

This paper documents the state of Malaysian telecom sector and highlights the policy changes that have been initiated since 1987. These changes range from deregulation to privatization of the state owned telecom monopoly. Experience of managing this change and comparing it with similar initiatives in other developing countries provides important guidelines to decision makers on management of reform process.

The paper emphasizes that effective separation of policy, regulation and operations, presence of effective regulatory body and fair regulatory guidelines, access to capital and trained human resources is crucial to the success of the reform program. In comparison to many other developing countries (e.g. India, Thailand, Philippines etc), Malaysia has been able to successfully implement a reform program on these dimensions.

Review of Malaysian Telecom Sector : Assessment of Policy Changes¹

The Malaysian economy has been growing rapidly, showing growth rates of 13% per annum between 1987-1990. This has accelerated the demand for telecom services.² Malaysia has set for itself the target of being a developed nation by 2020 and having telecom services of the same quality as in any other developed nation by 2005 AD. Its current telephone density is 12 per hundred, which it plans to increase to 20 per hundred by 2000 AD.

With a view to reducing the role of the government in economy and introducing efficiency, the government prepared a comprehensive draft plan on privatization in 1985. In this framework, corporatization of public sector organizations was viewed as a first step towards privatization. The telecommunication sector was chosen as one of the initial¹ government departments to be corporatized and its experience was going to be used as a basis for deregulation and privatization in other state controlled sectors. In 1987, legislation was enacted to bring in major reforms in the telecom sector. Malaysia was the first ASEAN country to introduce such reforms. Due to the pervasive effect of telecom in the economy, management of this initiative was of interest in various quarters.

This paper documents the state of Malaysian telecom sector and highlights the policy changes that have been initiated since 1987. These changes range from deregulation to privatization of the state owned telecom monopoly. Experience of managing this change provides important guidelines to decision makers in other countries where such changes are being contemplated.

Sector Overview²

During Japanese occupation of Malaysia, the postal and telecom department were separated. They continued as separate departments during British reign and even after Malaysia got its independence. Thus unlike many other countries where the separation between the postal and telecommunication department took place in seventies and eighties, telecommunication services in Malaysia were provided by a separate government department Jabatan Telekom Malaysia (JTM) since Malaysian independence.

Given the geographic location and the presence of violent tropical storms over the entire country, radio communication with their independence from the ground/overhead cables have been the mainstay of Malaysian telecommunication.

By end of 1991, the sector had a mixture of both digital and analog technologies. The target is to achieve 100% digitalization by 2000 AD. By 1991, 77.8 per cent of the exchanges and 55.9 per cent of the long distance exchanges were digital.

This study was done by Prof. Rekha Jain as a part of IDRC funded project.

¹Klang Port Authority was the first government body to be privatized.

²Data for this section has been excerpted from the Annual reports and publications of Telekom Malaysia.

Though the telephone density was 12.4 per cent, it was skewed in favor of urban population. The telephone density in rural areas is only 2.8 per cent. The network offers a variety of services including public data networks, cellular mobile and telefax services.

Network

The trunk network is predominantly optic fibre. Submarine optic fibre has been chosen as the medium for connecting to islands which are far away. Satellite and microwave along with fibre optic cables is used for international communication. Existing 10,000 km of fibre optic cable was planned to be augmented to 50,000 km of fibre optic by 1993. There are plans to provide fibre optic cable in the local loop not only to improve quality of service but also to provide ISDN connectivity. The capacity of the local network has increased from 2.67 million cable pairs in 1987 to 3.40 million cable pairs in 1991. During the same period, the capacity of the switching exchange increased from 2.31 million exchange lines to 2.71 million exchange lines. The trunk and junction network capacity increased from 0.65 million circuits to 0.97 million circuits. As of 1991, 53.4% of the local network, 77.8% of the switching network and 55.9 of the junction and trunk network was digital. ISDN services were planned to be commercially available from 1993 over some areas. By the year 2000, complete digitalization is planned. Exhibit 1 gives details regarding the network expansion and modernization.

Exchanges

There are a total of 597 telephone exchanges with a combined capacity of 2.7 million exchange lines. The local network had a capacity of 3.40 million exchange lines. Malaysia has indigenous switch manufacturing capability for 500 - 50000 line. It is planned to raise the indigenous capability to 80000 lines by 1995. There are three predominant foreign switch suppliers.

Basic Services

Exhibit 2 provides data on availability of telephones as of June 1993 and Exhibit 3 gives data on growth in the residential, business and public pay-phones since 1987. Malaysia has achieved a penetration of 12.4 telephones per hundred population, with the urban penetration being 28% and rural penetration of 2.8%. Though on the face of it, the rural penetration appears to be very small, this figure is more than the national penetration figures in many other developing countries such as India (0.7%), Indonesia (0.6%) etc.

Value Added Services

There are a host of value-added services, include MAYPAC - the packet switched public data network, satellite business service or INTELSAT which provides data transmission over high speed digital leased lines between Malaysia and the USA, videotex service, MAYCIS - a circuit switched public data network which complements the MAYPAC system, TELEMAL, an electronic mail service which is connected to many other mail systems across the world such as Sprint in the US and UK, Telebox in Singapore, and Japan's Acemail and a host of other services such as toll free, home country direct etc. These services are provided by Telekom Malaysia. Exhibit 3 provides data on the growth of these services. Paging services and cellular mobile phones are provided by a host of operators. Growth in usage of mobile phones has been phenomenal. Rural areas are planned to be connected using Multi-access radio receivers and cellular technology.

Changes In Policy

Though the revenue of JTM had increased from \$772 million to \$1559 million during the years 1982-86, its profits had declined from \$264 million to \$160 million. Investments in fixed assets mostly from foreign loans almost doubled from \$3239 million to \$6492 million. The value of foreign loans increased from \$ 1667 million to \$4595 million. Stock increased from \$141 million in 1982 to \$597 million in 1984. Although it reduced in 1986, value of stock and debtor remained high at \$1093 million (about 70% of the revenue). In terms of network expansion, the Direct Exchange Line (DEL) increased by less than 80% from 1982 to 1986, Exchange Line Capacity (ELC) increased by 150% reducing the DEL/ELC ratio from 0.7 to 0.5. [Source : STM Progress and Growth : TM Internal paper]. Exhibit 4 highlights these performance parameters. Declining performance in this sector coupled with the general objective of improving the efficiency and reducing the direct role of government in the economy had prompted the government to introduce policy reforms.

As a part of the action plan of this policy, legislation was enacted in 1987 to separate JTM, into two parts - the regulatory unit called JTM and an operating company called Syarikat Telekom Malaysia (STM), a government owned company. STM was issued a license by Minister of Telecommunication to operate the basic telecom network as a monopoly for a period of 20 years. Suitable amendments were also made to the Employees Provident Fund Act and Pension Act to protect employees interests and enable them to continue with provident fund facility in the new organization.

The following legislative changes were formulated prior to the formation of STM

- 1) STM took total responsibility for management of operations of erstwhile JTM.
- 2) STM took over both the assets and liabilities of JTM
- 3) STM took over the staff of JTM who opted to stay with STM

The function of JTM is to monitor and enforce the licenses granted by Minister to STM and other private operators. Other functions of JTM are

- a) establishment of standards and their enforcement.
- b) to act in the interest of consumers, purchasers of telecommunication equipment and services in terms of quality and price.
- c) regulate usage of radio frequency
- d) promote research and development in new products and services
- e) promote international transit services
- f) to represent the government of Malaysia in international forum.

In 1990, STM was partially privatized by selling a part of the shares to the public and renamed Telekom Malaysia (TM). TM was listed on the Kuala-Lumpur stock exchange on 7.11.90. Shares of TM contributed to about 15% of the total market capitalization. About 75% of the shares are held by the government and approved institutions, while out of the remaining 25%, about one third are held by foreigners and the remaining by the public. Shareholders contributed \$7 billion to the company as shareholders fund and long term loans.

The government also introduced competition, initially in the subscriber equipment segment and subsequently in value added services segment. Lately, it has proposed to introduce competition in basic

services also. Initially, those companies which had been supplying paging receivers to JTM were allowed to provide paging services. Subsequently, other companies were also allowed to participate.

Responding To Changes

Groundwork had to be done before corporatization and subsequent privatization in terms of seeking stakeholder participation in the process. The move to corporatization was followed by legislative changes in Acts pertaining to Employees Provident and Pension fund. At the time of privatization, the executives were given the option of buying shares in the new corporate entity, and a deal was negotiated with the other staff to retain them for the next five years and provide training to them. Privatization also implied that employees had to be given bonus and other financial incentives. Such issues were worked out with mutual understanding.

Corporatization implied that STM had to follow commercial accounting processes and could not depend on government subsidies. Organizational processes had to be streamlined in line with those followed in commercial organizations. Though the operating costs increased just after corporatization, by 1988, growth in fixed assets and loans had been checked. An examination of network usage (Exhibit 1) shows that even with increasing usage by 1991, no part of the network was utilized more than 67% ; and hence growth in fixed assets had been unwarranted.

Internal Processes

As a consequence of corporatization, STM and later TM adopted business processes such as commercial accounting and taxation. Some organizational processes had to be redesigned. Massive training programs were undertaken before corporatization. STM and TM laid great stress on the strengthening of internal processes and systems to enable them to respond to both competition and customer requirements. A cross-functional team from within the organization coordinated with Bell-Canada to develop a computerized MIS for TM. In the first phase, the manual system was converted to a computerized system without much change. In the currently on-going second phase, the entire underlying organizational processes are being re-examined with the assistance of consultants in order to be able to streamline them.

Purchase procedures and inventory management were computerized with the objective of implementing just-in-time inventory management. Computerized logistics management system to coordinate the availability of spare parts etc over the 32 geographically dispersed stores of TM was designed. Efficiency and productivity of employees became important concerns. Massive training of existing managerial staff in business practices was undertaken.

Financial performance

Immediately after corporatization, operating costs increased due to higher wage rates and other costs which are associated with corporate sector. It was planned to offset the higher costs by increasing the customer base both by expansion of the network, and improving product range and quality of service. Financial performance from 1988-1992 is provided in Exhibit 5. It can be seen that operating income after corporatization had steadily increased by 14.5% in 1988 to 16.7% over 1990. Return on total assets increased by 0.1% over 1987 and by 11.5% over 1991 in 1992. Earning per share which was 0.3 sen in 1988 rose to 55 sen in 1991.

Marketing

In order to have a marketing orientation, organizational restructuring was undertaken. A marketing division and a business product division were set up. Computer systems to improve customer service were implemented. Several new products and services were introduced.

Quality of service was made to improve both by introduction of new technology and streamlining existing procedures. For example a Computerized Automated Service System (CASS), an integrated order, billing, accounting and production application was implemented. By 1992, CASS supported 3000 terminals and 400 printers, and covered the entire country. As of September 1993 it supported a subscriber base of 1.6 million, expected to grow to 3.5 million by 1995. It handled approximately 100,000 orders per month which by 1995 will increase to about 150,000. CASS is designed to manage about 1.5 million toll-messages per day. By 1995, this number is expected to go up to 3 million per day. Exhibit 6 provides data on the expected growth volumes for CASS application. The benefits of CASS have been financial (e.g. in terms of increase in the amounts charged, a decrease in outstanding unpaid) and operational (e.g. in reducing the time and drudgery in providing telecom services). Exhibit 7 gives data showing the financial and operational benefits in quantitative terms. At the time the application was conceived, its objective was to provide operational support. Over a period of time, it has evolved into a decision support tool for managers operating in the present more stringent and competitive market. It has also been marketed to other telecom entities in Asia such as Hong-Kong, Vietnam etc.

In order to improve quality of service, STM and TM implemented a fault monitoring system as a part of CASS. This was augmented by having telephone operators have real-time access to fault repair and monitoring system. Exhibit 8 gives data about the total fault reports per line, total complaints per line, and total restoration within 24 hours for the period 1987-1991. In addition, TM set itself the goal of providing response to all operator assisted calls to within ten seconds by 1995. In 1992 this figure was approximately 94 per cent.

Thrust on marketing and innovative solutions to existing problems led to the development of new products and services such as the MASA terminals. TM had identified that there was congestion in some of the exchanges due to stock-exchange related traffic. Unsuccessful calls triggered more congestion. Most of these exchanges were also located in the busiest part of the city with highest concentration of corporate offices, hotels and other commercial enterprises. Whereas, customer query related traffic to brokers was increasing, the brokers were finding it increasingly more difficult to respond to the queries due to shortage of manpower. TM analyzed that more than half of such queries were related to price information and therefore implemented a price information system linking the customers and brokers through specially designed terminals called MASA. Now remisers and brokers obtain on-line share information through specific MASA terminals linked to the KL stock-exchanges via leased lines. By keying in a four digit number that represents a certain counter, share information is shown on the screen, which the brokers can read to the customer on the phone. Subsequently, TM also designed the function of the keypad into the phone so that phones can directly be linked to the KL stock-exchange. Brokers and remisers are now free to trade. The customer gets voice-recorded information by dialling a special number. This number is an index number of the share counter. Each call allows information on two scrips. Information is available in a choice of three languages. Thus, TM has successfully been able to use information technology for reducing congestion at the exchange and provide a service to the brokers and the customers. The R&D required for developing the MASA terminal was done at TM.

Interfacing to regulator

TM was originally to be the dominant provider in the area of basic services for domestic and international segment while it had been excluded out of paging and EPABX segment. But subsequently another operator was issued a license for provision of telephone service. TM, on the other hand is still excluded out of certain segments. From JTM's perspective, TM's stronger position vis-vis other operators justifies this view. However, TM has felt that if basic services were opened for competition, it should be allowed to participate in segments it has so far been excluded out of. From its perspective the regulator seems to be encouraging competition while heavily regulating the dominant provider.

In addition, TM bears the sole burden of provision of rural telecommunication. About 27% of its revenue is set aside for rural communication development, though this segment provides only 16% of the total revenue.

In an effort to negotiate with JTM for higher pricing to meet the growth plans, TM has undertaken an organization-wide project to evolve cost-based pricing for its entire range of services. TM hopes that at the end of this exercise, it would have a better case for higher pricing.

Regulation

JTM, the regulatory body is headed by a Director General, assisted by a Deputy Director General and a Technical Director General. There are five Directors covering areas such as regulation, standards, frequency management, finance and licenses.

The licenses for operation are currently provided by the Ministry of Energy, Post and Telecommunication. JTM is responsible for determination of price for basic services (which is provided for in the license and in the legislation) and monitoring quality of service. Approval of any investment of more than \$20 million has to be obtained from Ministry of Finance. For such cases, JTM also chooses the suppliers and technology for TM.

Though legislation provides for increase in basic service price in relation to the increase in consumer price index, in practice, call charges have not increased since 1985 and rentals since 1983. This may put the dominant entity at a disadvantage, since the major portion of its revenue is derived from provision of basic service. Exhibit 9 shows that business and domestic telephones contributed 57.2% and 28.4% to TM's operating revenue.

Assessment Of Policy Changes

Impact on TM

The experience of privatizing TM has been positive in respect of its financial and business growth. Until the introduction of competition in the basic services segment, TM was the monopoly service provider. Basic telephone service contributes more than 80 percent to TM's operating revenue. For example, telephone services (business and residential) contributed 85.6 per cent of the operating revenue in 1991. But in the future, TM would have to contend with competition even in the basic service segment, which is the core area of operation for it. To offset the negative effect of this, TM must increase the customer

base, improve quality of service and build a strong case for itself for competition in those segments where it has been excluded.

TM has been able to develop a marketing perspective as evidenced by introduction of MASA terminals and availability of host of value-added services. Its move to create a Business product development and marketing unit are pointers to its greater focus on marketing. Reorienting or imparting a market-driven outlook to the executives who earlier had technical background will be important. To improve its marketing effectiveness further, TM may need to assess its present marketing strategies and design improved ones. For example, an in-depth analysis of its customers on the basis of revenue generated (say for example, ABC analysis), the product "requirement" and the customers' price sensitivity could assist TM in identifying various customer segments and designing specific marketing and pricing strategies for each segment. In addition, development of a cross functional MIS and easy availability and accessibility of database to senior managers would be critical in determining the business success of TM.

To enhance its competitive position, TM may have to work out strategic alliances in those areas where it is not so strong. To tap financial resources, it has already worked out an alliance with the largest bank in Malaysia for funding development of a large telecom tower. In future, such alliances may be required in the area of consumer marketing, financial instruments, technology and R&D.

TM would have to emphasis employee productivity and efficiency to remain competitive with new entrants. The newer entrants may have a leaner personnel structure. They could also be employing technology aggressively to further reduce their manpower costs. In contrast, TM maybe required to work within existing or slightly modified manpower structure. The issue of attitudes of personnel who have come from the government department and are now a part of TM, would need to be addressed.

Issues Facing JTM

The JTM needs to evolve guidelines which are fair and unambiguous. Since telecommunication is the first sector to be privatized by the government, an unsatisfactory set of regulation could have an impact on the subsequent privatization efforts of the government.

One of the key issues that JTM would need to formalize is the basis of interconnection charges and transfer pricing. With the government having allowed competition even in the basic services sector, the issue of interconnection becomes more critical. Inter-connectivity guidelines would facilitate growth of network, especially in rural areas. Availability of telecom services in rural areas may be limited if they are not able to connect to the trunk network. In Philippines, NTC has made it mandatory for all telecom providers to be interconnected. There are detailed guidelines specifying how the inter-connectivity issues are to be handled. Since this was a recent directive, its implementation and the associated problems have yet to be assessed.

JTM has yet to evolve formal mechanisms for monitoring quality of service. There are no formal criteria for measuring quality of service. In such a scenario, market forces would determine the players and the quality of services.

JTM must also articulate the rationale for provision of rural telecom by TM alone. Mechanisms to ensure that private bodies participate in this area need to be examined otherwise, the private operator just gets the more profitable areas of operation. In some countries such as Philippines, licenses to private operators

for provision of services is contingent upon their participation in the provision of rural telecommunication.

Overall Impact on Telecom Sector

Many studies in the past have claimed that privatization and deregulation work only when the initial network has reached a certain level of penetration. This was the environment in which countries such as USA, UK and Japan had implemented telecom reforms. Other studies have argued that it is not the initial level of penetration that determines the success or otherwise of the reforms, but the potential for growth [Mohammed, 1990]. In this context, Malaysia successfully introduced reforms at a stage when its telephone density was 10% and its growth rate of economy was 12% - 13% and telecom sector was growing at the rate of 15% - 18%.

An ITU Report [1989], suggested that the extent of benefits of the reform process depend on the sequencing of reforms. The report suggested that the fundamental underlying issue that must be addressed in telecom reform is effective separation of the basic function of policy making, operational management and regulation. The second level consideration is that of access to capital and human resources. The third level concern is introduction of competition for efficiency in the telecom sector. Competition is considered to be a more important factor than ownership in introducing efficiency. Further, the order in which structural adjustments take place will also determine their effectiveness [Melody, 1990]. It is also argued that before separation of policy, regulation and operations and introduction of competition, a firm regulatory regime must be in place.

Effective separation of policy, regulation and operations

Using the ITU framework to assess the Malaysian initiative, it may be argued that the government attempted to address the issue of separation of policy, regulation and operations, even though in some areas, the distinction between the different functions is not clearly outlined. For example, though in theory the Secretary General, Ministry of Energy, Post and Telecommunication, working as advisor to the Minister is supposed to formulate policy and implementation is left to JTM, in practice, the ministry has often granted licenses, bypassing JTM. As the highest decision making body in the country, the ministry must view its role only as that of a policy provider. The award of licenses should be the domain of the regulator. The current state of affairs is probably a heritage of the earlier telecom structure in which the ministry played both the role of regulator and policy provider and the department was the provider and partial regulator. Transforming from a system where patronage could be provided by the ministry by offering licenses to a transparent regime in which the ministry's role is limited to policy formulation will take time.

Most developing countries undertaking a reform process, to separate the policy, regulation and operations, face resistance to change. Lack of political will and a coherent action plan for the reform program creates bottlenecks giving rise to ad-hoc decisions. For example, Thailand, India, Philippines etc are examples of countries, which are facing problems in creating the required institutional framework for effecting the functional separation [Jain, 1992]. In India, a new organization called Telecom Commission was created in 1989 to formulate policy and regulate the monolithic Department of Telecommunications. Today, the Commission has effectively no role and the Department continues to be the policy-maker, regulator and operator. Similarly, in Thailand, the carving out of Telephone Organization of Thailand and Communication Authority of Thailand from the Department of Telecommunications effectively reduced the department's role to carrying out routine jobs and did not lead to the creation of a strong regulatory

body. In Philippines, the government is both the policy provider and regulator besides being a minor operator. Though the sector is regulated by a separate agency, National Telecommunications Commission (NTC), it is under the Department of Transport and Communications (DOTC). NTC gets its budget and staff support from the DOTC and is under the DOTC, the autonomy in decision-making is likely to be diluted. It is likely that regulatory guidelines flow from the government, rather than emerging out of the needs of the sector [Jain, 1994 (a) and (b)].

It appears that carving out a regulatory body from an existing department does not allow it to function in an effective manner as a regulatory body. The ministries and regulatory bodies need to build capabilities for policy analysis and implementation. In addition, regulatory bodies need to be provided with judicial or quasi-judicial powers and be manned by experts in policy, regulation, technology and legal matters etc.

Often when there is a single large dominant player, there are chances it also becomes the de-facto regulator. JTM must ensure that standards set by it are in the overall interest of the growth of the sector and are not unduly influenced by TM. Since telecom is a fast evolving field, JTM would need to ensure continuous staff development in this area.

It is clear that to strengthen the effectiveness of the reforms, besides the political will, the governments, (including Malaysia) need to identify how to introduce effective and responsive regulation.

Mobilization of resources

The government and subsequently STM and TM have been able to mobilize adequate financial resources both by privatization and improved financial operations. Over a period of time, STM has been able to pay-off the foreign loans and generate profits.

Introduction of Competition

In terms of the third level concern of introduction of competition, the government has allowed competition both in basic and value added services. Though clear guidelines for identifying the basis for competition have not emerged (as exemplified by exclusion of TM from certain segments), it is hoped that an independent regulatory body and pressure from the competitors will bring about these changes. Comparing this initiative with that of other developing countries such as India, the Malaysian initiative is better implemented. Indian telecom sector is still grappling with the issue of introduction of competition even in the value added segments. (No competition exists in the basic services segment). There continue to be legal battles regarding the process of award of licenses.

Sequencing of Reforms

The formation of JTM as a regulatory body and STM as an operator were simultaneous. This gave JTM little time for formulating guidelines for operations, even when STM was the sole operator. Competition was introduced even before issues such as interconnection and transfer pricing were clearly dealt with. It appears that the sequencing could have been better designed to avoid ad-hoc addressing of such issues in the future.

Conclusions

Malaysia has been able to relatively successfully implement a reforms program, initiated in an environment where telephone density was low compared to western standards. The regulatory mechanism needs to be strengthened, to ensure healthy competition and provide impetus for overall growth of the sector. Compared to many other ASEAN countries where the policy, regulation and operations are not clearly separated, scenario in Malaysia is better developed. There are certain areas which need improvement in terms of clearly identifying scope of role for each of the three actors (policy, regulation and service provider) and also having a well etched out regulatory policy.

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Exhibit 1 : Network Expansion and Modernization

	1987	1988	1989	1990	1991
Local Network					
1. Capacity (Mill Cable Pair)	2.67	2.92	2.97	3.22	3.40
2. Utilization	42%	43%	47%	49%	53%
Switching Network					
Capacity (Mill exch lines)	2.31	2.41	2.45	2.51	2.71
Digitalization	70%	74%	75%	76%	77.8%
Utilization	49%	52%	57%	65%	67%
Trunk & Junction Network					
Capacity (milcircuits)	0.65	0.72	0.82	0.85	0.97
Digitalization	25%	44%	48%	53.1%	55%
Capital Exp.	590	541	637	802	1400

Exhibit 2 : Availability of Telephones

Customers	
Telephone Access Lines	2,237,900
Mobile	86,000
IDD	777,000
Telephone Development	
National	12.4
Urban	28.0
Rural	2.8
Network Digitalization	
Switches	85%
Transmission	65%
Fibre	Long Dist. & International

Exhibit 3 : Growth of Telecom Services 1987-1991

	1987	1988	1989	1990	1991
Residential Phones('000)	789.7	884.1	990.3	1135.9	1298.7
Business Phones('000)	332.9	363.5	397.8	449.7	518
Atur 450 (mobile phones)	17411	27302	39419	54616	7097
Public Pay phone	19007	21456	22353	24591	2750
Telex	11228	9930	8821	8372	7981
Telefax	4674	13663	24864	40000	45000
Data Communication Services					
Leased Circuits	6724	8206	10953	15518	18782
Datel	1203	2687	4235	5592	6830
Maypac	530	763	909	1153	1655
Telita	-	299	467	530	634
Maycis	-	-	301	322	357
			93	236	334
			14	271	561
Total Access Lines (000)	1131.7	1247.6	1388.1	1585.7	1816.8

Exhibit 4 : Financial Performance of JTM 1982-86

(in \$ million)		
	1982	1986
Revenues	772	1559
Profits	264	160
Fixed Assets (Mostly from foreign loans)	3239	6492
Value of foreign loans	1667	4595
Stock	141	597

Exhibit 5 : Financial Highlights 1987-1991

Item	1987 (\$M)	1988 (\$M)	1989 (\$M)	1990 (\$M)	1991 (\$M)
Operating Income	1644	1882	2141	2574	3004
Profit Before Tax	5	180	366	564	1079
Total Shareholders Funds	2158	2331	2698	5539	6466
Total Assets	7986	7843	7613	8295	9422
Total Debts	4862	4645	4111	1674	1333

Growth Rates Over Previous Years

Operating Income	-	14.5%	13.8%	20.2%	16.7%
Profit before tax	-	35.0%	103.3%	54.2%	91.3%
Total Shareholders Funds	-	8.0%	15.7%	105.3%	16.7%
Total Assets	-	1.8%	2.9%	9.0%	13.6%
Total Debts	-	4.5%	11.5%	59.4%	20.4%

Ratios

Return of Share holders Funds	0.20%	7.7%	13.6%	10.9%	16.7%
Return on Total assets	0.1%	2.3%	4.8%	6.8%	11.5%
Debt/Equity Ratio	2.3	2.0%	1.5	0.3	0.2
Dividend rate	-	-	-	5.0	12.5%
Earning/Share	0.3 Sen	12Sen	24 Sen	36 Sen	55 Sen

Exhibit 6 : Expected Business Volumes Growth For CASS

Item	1990	1995
Subscriber	1.6 million	3.5 million
Orders	100,000/month	150,000/month
Toll Messages	1.5 million/day	3.0 million

Exhibit 7 : Financial and Operational Benefits of CASS**Financial Benefits****1. Increase in Current Charges**

Current Charges in Million M\$	Non-CASS	CASS	Percentage Benefit
Target Area 1	17.48	22.30	27.57
Target Area 2	16.20	21.93	35.37
Target Area 3	17.40	22.63	30.06
Target Area 4	11.45	15.45	34.93
Target Area 5	10.94	15.03	37.93
Target Area 6	10.44	14.33	37.27
Target Area 7	11.33	15.43	36.13

Exhibit 7 Contd...**2. Payments**

Payments in Million M\$	Non-CASS	CASS	Percentage Benefits
Target Area 1	16.43	20.58	25.26
Target Area 2	16.56	20.24	30.08
Target Area 3	16.69	20.47	23.25
Target Area 4	10.70	14.20	32.71
Target Area 5	10.32	14.50	40.50
Target Area 6	9.92	13.31	34.17
Target Area 7	11.04	14.10	27.17

3. Outstanding Unpaid

Outstanding Unpaid in Million M\$	Non-CASS	CASS	Percentage Benefits
Target Area 1	18.30	17.52	4.30
Target Area 2	24.91	16.65	33.16
Target Area 3	28.45	24.00	15.91
Target Area 4	17.38	15.42	11.28
Target Area 5	18.04	17.23	5.29
Target Area 6	17.79	14.70	17.39
Target Area 7	15.48	13.30	14.08

Source : Internal TM documents

Exhibit 7 Contd...**Operational Benefits****Non CASS**

1. Processing Applications : 2-5 hours
2. A number of forms to be filled
3. Often a survey of assignment of cable pairs
4. Subscriber gets service after 2 weeks
5. Application to be submitted at designated outlets only

CASS

Same process : 10 minutes.
 No more needed
 Automatic assignment
 Immediate availability
 Application may be submitted in any specified location.

Exhibit 8 : Quality of Service

Item	1987	1988	1989	1990	1991
Total faults/line	1.12	0.93	0.79	0.76	0.78
Total complaints/line	0.11	0.09	0.06	0.04	0.03
Telephone fault restoration within 24 hrs (%)	84.5	89.4	92.2	92.4	93.3

Exhibit 9 : Operating Revenue 1991 by Service

Business Telephone	57.2%
Residential Telephone	28.4%
Mobile Service	5.9%
Telex	1.7%
Leased Service	3.6%
Data Service	0.4%
Other Services	2.8%

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