

INTERNATIONAL TELECOMMUNICATION UNION



**REGULATORY IMPLICATIONS OF BROADBAND
WORKSHOP**

Document 6
29 April 2001

GENEVA — ITU NEW INITIATIVES PROGRAMME — 2-4 MAY 2001

CASE STUDY: BROADBAND, THE CASE OF MALAYSIA

This case study was prepared by Dr Lucy Firth <Lucy.Firth@itu.int>, Project Manager for the Workshop on Regulatory Aspects of Broadband, International Telecommunication Union (ITU), with the support of Michael Minges and Vanessa Gray, and based on a research trip from 2-6 April 2001. "Broadband: The Case of Malaysia" forms part of a series of telecommunication case studies produced under the New Initiatives Programme of the Secretary-General of the International Telecommunication Union (ITU). The Telecommunication Case Studies Project is being carried out under the direction of Dr Ben A. Petrazzini <Ben.Petrazzini@itu.int>, Telecommunication Policy Adviser in the ITU Strategy and Policy Unit (SPU). Case studies on Broadband in Italy, Malaysia and South Africa may be found at the webpage <<http://www.itu.int/broadband>>. The views expressed in this paper are those of the author and do not necessarily reflect the opinions of the ITU, its Membership or the Government of Malaysia

CONTENTS

1	Introduction.....	4
2	Country Background.....	5
3	Communication Regulation framework.....	9
4	e-Projects to get things going.....	18
5	Current Broadband status.....	20
6	Broadband Infrastructure	25
7	Conclusion	26
	Annex.....	28

FIGURES

Figure 1.1: Malaysia.....	4
Figure 3.1: The roles of thy key players in the industry	10
Figure 3.4: Activities of companies with MSC status	17

TABLES

Table 1.1: Population indicators	4
Table 1.2: Human Development Index, Malaysia	7
Table 3.2: License requirements for various activities.	15
Table 4.1: NITC's desired end-states	20
Table A1: List of interviews	28

BOXES

Box 1: Smart schools, smarter buses	8
Box 2: Content a major focus	12
Box 3: Unbundling the local loop – will they, wont they and does it matter?.....	14
Box 4: When is cable TV not cable TV?	15
Box 5: MSC vision – dream or reality	18
Box 6: E-government: a vision of Reinventing Government	21
Box 7: Malaysian census leads world in broadband-relevant question	22
Box 9 In search of a business model.....	26

1 INTRODUCTION

Malaysia could be said to have a passion for ‘multimedia’. The term remains largely undefined but refers to networked information and communication technology (ICT) services, which are considered to offer a path to a prosperous, egalitarian and democratic society. Malaysia is thus making a concerted effort to bring about a broadband future that protects its society, and honours its heritage, while leapfrogging to developed nation status. The chosen path is a mixture of competitive freedom and government intervention that is much more relaxed than the control of the previous regulatory frameworks that separately governed telecommunications, broadcasting and data. A converged regulatory framework has been developed, and legacy regulations and programmes are being reviewed, and modified or abandoned, as appropriate. The change from the earlier regulatory controls to a freer self-regulated model has been planned to ensure that the new model has the flexibility to retain relevance in an unknown future.

While Malaysia has made an early move into high tech manufacturing, computer assembly and software design, it still needs wider access and connectivity across society. That is, if Malaysia is to move towards an information society with ubiquitous broadband connectivity, it must not only focus on high-profile multimedia projects to attract global companies, but also on the mundane business of ensuring that electricity and telephone services are generally available and the users of those services are literate. This is one of the great challenges for middle-income countries with limited resources but an attraction to state-of-the-art projects that they believe will both enhance national pride and identity and provide the building blocks for development.

Malaysia has on its side not only the fact that it made an early start, but also that it has made a new beginning with the converged regulator—the Malaysian Communication and Multimedia Commission (CMC). It is still early days (data collection for this case study began on the Monday after the first anniversary celebrations of the new

Table 1.1: Population indicators

Item	Year 2000
Total Population	23.26
Proportion of males (%)	51.2
Proportion of females (%)	48.8
Infant mortality (%)	0.79
Population Density (Per/ km ²)	70
Average life expectancy at birth (years)	
Male	70.2
Female	75
<u>Age Distribution:</u>	
Below 15 years (%)	34
15-65 years (%)	62
65 years and older (%)	4
Urban population (%)	62

Source: Department of Statistics, Malaysia, Key Statistics

Figure 1.1: Malaysia



Source: World Factbook.

regulator) but it is not too early to identify the major issues, and to assess Malaysia's approach to them. It is this that is the focus of this paper.

By way of definition, broadband service is taken to mean any service beyond the scope of the existing PSTN/ISDN network.

2 COUNTRY BACKGROUND

2.1 Overview

Malaysia, almost 330'000 square kilometres in size, is located in South East Asia and consists of two geographical regions, separated by the South China Sea. Peninsular Malaysia is located between Thailand in the north and Singapore in the south. On the eastern side of the South China Sea, the states of Sabah and Sarawak, are located on the northern part of the island of Borneo. Sabah and Sarawak are bordered by Indonesia to the south as well as by Brunei.

Both Peninsular Malaysia and Sabah and Sarawak have coastal plains and mountainous territory in the interior. The country's longest river is the Rejang River in Sarawak. The country is divided into 13 states plus the federal territories of Kuala Lumpur, Labuan Island and Putrajaya.

Malaysia's location along the Straits of Malacca and on the South China Sea gives it a strategic position in the heart of Southeast Asia.

2.2 Demography¹

Malaysia carried out its fourth post-independence census in July 2000. At that time, the Malaysian population was estimated at 23.3 million, with a population growth rate of 2.1 per cent per annum and a population density of about 70 inhabitants per square kilometer. The estimated population for 2025 is 37 million. The capital of Malaysia is Kuala Lumpur with an estimated population of 1.3 million (in 2000). The administrative capital is being transferred to Putrajaya. Other major administrative districts in Malaysia include Kinta, (0.8 million), Johore Bharu (1.1 million), Petaling (1.2 million), Klang (0.6 million), and Kuala Terengganu (0.3 million).² About 62 per cent of the population is urban. Life expectancy at birth for men is 70 years while that for women is 75 years. Infant mortality is 0.8 per cent.

Malaysia is a multi-ethnic and multi-religious country, consisting of Malays (47 per cent), Chinese (24 per cent), Indians (7 per cent), and several indigenous groups, such as the Iban in Sarawak, the Kadazan in Sabah and the Orang Asli on the Peninsula. The official religion is Islam and about 50 per cent of the population is Muslim. Another 29 per cent are Buddhist and Confucian, seven per cent Hindu and six per cent Christian. Other religions include Taoism, Sikhism, and the Baha'i faith. Malaysia's official language is Bahasa Melayu with Tamil, Chinese and indigenous languages used amongst their respective ethnic groups. English is widely spoken.

¹ Unless otherwise indicated, the information in this section is derived from the Malaysian Department of Statistics <www.statistics.gov.my/English/page2.html.html>

² Population and Housing Census of Malaysia, 2000 (Preliminary Report)

2.3 Economy³

Malaysia's economy has traditionally been one of the strongest in Asia. Its successful transformation from an economy primarily based on mining and agriculture in the 1970s to one based on manufacturing in the 1990s, allowed the country to attract foreign investment and to substantially increase its exports. Until 1997, the country had maintained over three decades of stable economic development and an average annual GDP growth rate of 7.6 per cent between 1989 and 1999.

Despite these successes and an initial resistance to the region's economic plight, Malaysia went into recession in 1998. Its currency depreciated by almost 40 per cent and the economy contracted for the first time since independence. The government's response was prompt. After establishing the National Economic Action Council (NEAC) in early 1998, it announced the National Economic Recovery Plan, a range of objectives to support economic recovery and stimulate the economy, such as stabilizing the currency and fostering domestic demand. Since 1999 Malaysia has experienced one of the strongest recoveries within the Asian region. A GDP growth rate of 5.8 percent was achieved in 1999 and estimates until 2003 lie above five per cent. Inflation dropped from 5.3 per cent in 1998 to 1.4 per cent in early 2000. The country's total external debt was reduced from US\$ 45.6 billion in 1997 to less than US\$ 41 billion at the beginning of 2000. Unemployment has remained relatively low (3 per cent at the beginning of 2000) and even during the crisis only rose to about 3.2 per cent. Income distribution, however, remains unequal, with highly paid urban jobs and low wages in rural areas, especially in the agricultural sector.

With GNP per capita in 1999 of US\$ 3'390, Malaysia is in a unique position midway between the high income Asian economies (e.g. Singapore \$24'210) and other East Asian and Pacific countries, with an average of US\$ 1'000. In 1999, GDP was US\$ 79 billion, consisting of 11 per cent agriculture, 46 per cent industry (of which 32 per cent manufacturing), and 43 per cent services. Malaysia is the world's largest exporter of semiconductors and electronic exports make up over 50 per cent of total exports. The country plans to attain the status of a developed nation by 2020 by implementing its *Vision 2020*, which aims at increasing "*the country's competitiveness in high value-added export-oriented manufacturing and services sectors, notably in information technology...*" As part of this plan the government, together with the private sector, has introduced a range of measures and established the Multimedia Super Corridor (MSC) to act as their catalyst. The MSC is a high-tech area to the south of Kuala Lumpur, designed to attract companies specializing in IT development and advanced IT research and design. While conceptually similar to Silicon Valley in the United States, the MSC has the distinction of being a planned environment.

2.4 Human Development⁴

According to the UNDP, Malaysia ranks 61 out of 174 countries in the Human Development Index (HDI), which places the country within the top quarter of the

³ Unless otherwise indicated, the information under 1.3 is taken from The World Bank, Countries, Malaysia, at <http://www.worldbank.org/html/extdr/regions.htm>

⁴ UNDP Human Development Report 2000, Human Development Index, at <http://www.undp.org/hdr2000/english/book/back1.pdf>

medium human development group. Table 1.2 shows that Malaysia ranks high compared to other countries in South/Southeast Asia on the key indicators of the HDI.

Table 1.2: Human Development Index, Malaysia

Key indicators (left table); Malaysia compared to other South/Southeast Asia countries (centre table) and Malaysia compared to countries with similar GDP per capita (right table)

Indicator	Value	Nation	HDI	Nation/GDP per capita (PPP US\$)	HDI
Life expectancy (years)	72.2 (1998)	Singapore	24	Chile/8'787	38
Adult literacy (%)	86.4 (1998)	Malaysia	61	Poland/7'619	44
Combined school gross enrolment ration (%)	65 (1998)	Thailand	76	Mexico/7'704	55
GNP per capita (US\$, PPP)	8.137 (1998)	Philippines	77	Malaysia/8'137	61
		Vietnam	108	Saudi Arabia/10'158	75
		Cambodia	136	Oman/9'960	86
		Nepal	144	South Africa/8'488	103
		Bangladesh	146		

Note: for HDI, the higher the number, the lower the level of development.

Source: UNDP Human Development Index, Human Development Report 2000.

Human resource development is one of the key platforms for Malaysia's program for a broadband future. With one third of the population currently schooling, the major approach has been to prepare schools and universities, as well as working with the current workforce. Projects currently underway include:

- Awareness training in industry;
- Providing schools with ICT connectivity (see section 5.2, and Box 1)
- Community ICT skills outreach programs (see Box 1)

Box 1: Smart schools, smarter buses

More than just a catchy label, the Smart Schools project demonstrates Malaysia's determination to prepare its society for the information era, from an early age. Like so many ICT-related initiatives, the Smart Schools project is closely linked to the MSC and the perceived need to form a knowledge-based and technologically literate generation of Malaysians. The 1997 pilot project, initiated by the Ministry of Education and the Multimedia Development Corporation, selected 90 schools from all over the country to 'go smart' by July 2002. Eventually, by the year 2010, all of Malaysia's primary and secondary schools are supposed to have transformed to Smart Schools. The Ministry of Education is also encouraging schools to 'go smart' on their own initiative. The Ministry provides the necessary know how and guidelines, the transition is financed by the government (Ministry of Education via funds allocated for the smart school project) and in other complementary projects by private companies or fund raising/community initiatives. The MDC, for example, has adopted several schools on their way to obtain the Smart School status.

The question is: what exactly makes a school a Smart School? A critical component is the introduction of information technology. While some Smart Schools will have a computer in every classroom, all smart schools will be equipped with at least one computer lab. Special IT classes and applications help students to become IT literate.

Smart schools need smart teacher. In order to adapt to the new developments, teachers must continuously attend training programmes, inclusive of a 14-week long session, organised by the ministry of Education, and sometimes by private organisations.

The project is not about technology per se - it is about 'reinventing the education system', mainly by changing teaching and learning methods and by using technology as a tool for acquiring knowledge - to help children acquire analytical skills and become independent thinkers. In order to access international data, an international language (usually English) is offered. Children also participate in various global programmes to enhance cultural diversity, utilising the Internet and multimedia tools as enablers.

Some schools that are not on the Smart School program have access to ICT via the Mobile Internet Unit (MIU) referred to as 'smart buses, that visit rural areas, which is an initiative of the National IT Council with the Malaysian Institute of Microelectronic Systems (MIMOS) as one of the sponsors together with APDIP (UNDP) and others. The poorest 12-13 year old students at the poorest schools are given 8 lessons, after which they must perform a research project or develop a website. In April 2001, the program was extended to act as a community outreach program - smart-families - again targeting the least wealthy in under-serviced areas. These buses are equipped with PC's, and where possible they are connected to the Internet. The PCs have cached Internet sites for when they are at locations without telephone connections. The slowness of PSTN connectivity and the inadequacy of relying on cached sites will be remedied soon with the installation of satellite receivers. For locations without electricity, the bus is equipped with a generator, which is used as infrequently as possible because of the heat and fumes.

The MIU service will shortly be expanded to Sabah and Sarawak where smart boats will ply the coast and major rivers.

Source: Information has been taken from the Smart Schools Project Web Site, at <<http://202.190.218.3/smartschool/index.html>> and the Telekom Smart School Sdn Bhd, at <<http://www.tss.com.my/index.html>> and <www.miu.nitc.org.my>

2.5 Political

After the Federation of Malaya (today's Peninsular Malaysia) gained independence from the British in 1957, it united with Sarawak, Sabah and Singapore to become Malaysia in 1963. Singapore left the union two years later. The multi-ethnic and multi-religious country has generally enjoyed a politically stable environment.

Malaysia has a constitutional monarchy system with His Majesty the Yang di-Pertuan Agong, who is appointed by rotation every five years from amongst the nine sultans from Peninsular Malaysia, nominally the head of country. The Barisan Nasional (National

Coalition), which comprises a coalition of different political parties representing the diverse races in Malaysia, has been governing the country since independence in 1957. Today's Prime Minister, Dr. Mahathir Mohamed, won his fifth term in 1999 and has been in office since 1981.⁵

3 COMMUNICATION REGULATION FRAMEWORK

The government in Malaysia has long had a powerful influence in all aspects of communication. Recent radical changes to the regulatory framework have streamlined and sharpened the focus of that influence while encouraging private investment and competition. This is consistent with a philosophical approach to communication as a public good and a means to social ends as much as a tool for relaying messages.

3.1 Philosophical approach to communication

Malaysia's aspiration to become a fully developed country by 2020 is documented in the Vision 2020 programme⁶. While the manufacturing sector was initially expected to spearhead the drive to the vision, the role of multimedia communications has come to the fore. In fact, Malaysia has made information technology and Internet central to its socio-economic development without sacrificing its cultural traditions or suffering social degradation. Malaysia is mindful of the effects the Internet may have on the country's political and social harmony since its population is a tapestry of various ethnic, religious and cultural origins⁷. The challenges on which national strategies are more social engineering than economic or technical, include:

- Establish a united Malaysian nation, one Malaysian race;
- Fostering and developing a mature democratic society;
- Establishing fully moral and ethical society;
- Establish a scientific and progressive society;
- Establish a prosperous society with an economy that is fully competitive, dynamic, robust and resilient.

According to the recently published 8th Malaysia Plan, RM5 billion is allocated to ICT development over the next five-year period, out of a total budget of over RM110 billion⁸. The expenditure indicates the high priority given to the development of ICT⁹.

3.2 History of a radical change to regulation

Until corporatisation in 1987, telecommunications was under the auspices of a government department. It was privatised in 1990 with the Government retaining a majority stake in the corporation. Partial competition in the form of licenses for 5 other operators was introduced in the early to mid 1990s. Meanwhile, Broadcasting came under the Ministry of Information. Television broadcasting was a government-operated monopoly until 1984 when the first private TV license was issued¹⁰. The main focus of

⁵ Malaysia's Ministry of Foreign Affairs, at: <<http://www.kln.gov.my/english/content/idx-aboutmy.htm>>

⁶ See also <<http://www.mida.gov.my/profit/vision.html>>

⁷ CMC, Dr Syed Mohamed, Public Action: Regulation or Economic Incitement, address to the World Summit of Regulators on the Internet and the New Services, Nov-Dec 1999.

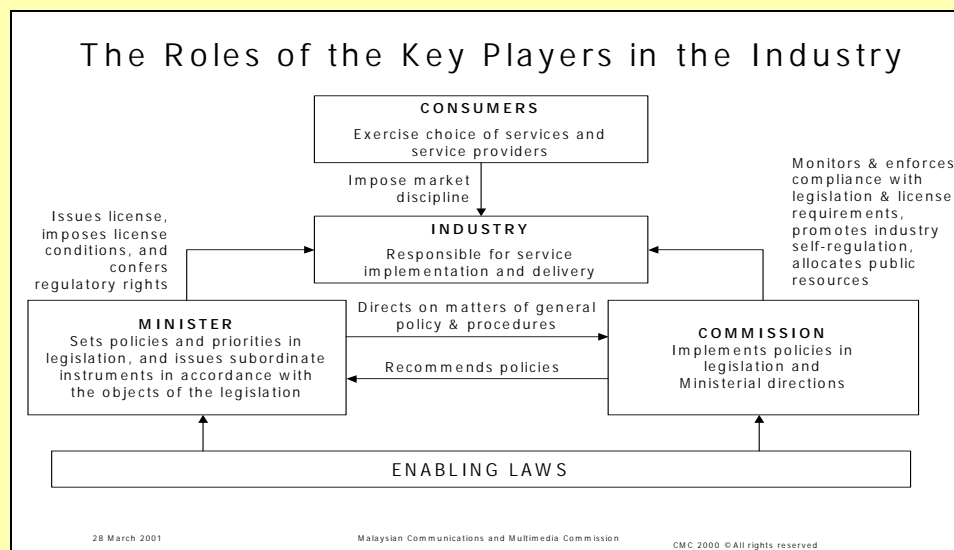
⁸ The Malaysian Ringgit is pegged to the American Dollar at the exchange rate of approximately USD1=RM3.80

⁹ 8th Malaysia Plan summary at <www.epu.jpm.my>

¹⁰ CMC, Dr Syed Hussein Mohamed, Public Action: Regulation or Economic Incitement, address to the World Summit of Regulators on the Internet and the New Services, Nov-Dec 1999.

the Ministry of Information was content control. There are now in operation, 4 private television broadcasters with more than 30 channels. The Internet is fully competitive. In 1994, consultants were engaged to advise the Prime Minister's Department as to what extra was needed to ensure that Malaysia achieved its Vision 2020. The response was that communications regulations needed to be overhauled. The Government formed the National Information and Technology Council (NITC), headed by the Prime Minister - a think tank and advisory group to enhance the development and use of ICT as a strategic technology for national development. After more than a year of concept development the framework of a converged regulator supported by legislation that was flexible enough to apply to an unknown future, and robust enough to stand the test of time was accepted by the NITC. The outcome is that the Ministry of Energy Communications and Multimedia has responsibility for policy, while the Malaysian Communications and Multimedia Commission has developmental and regulatory responsibility under the Communications and Multimedia Act 1998. The powers and functions of the stakeholders are summarised in Figure 3.1.

Figure 3.1: The roles of the key players in the industry



Source: Communication from the CMC.

3.3 Communication and Multimedia Act

The Communications and Multimedia Act 1998¹¹ established a regulatory framework in support of national policy objectives for the communications and multimedia industry. The Act governs the policies and regulations of networks and networked services as well as the management of spectrum. The activities and services regulated under the Act include traditional broadcasting, telecommunications, networks and network services, and content carried over those networks. The Act seeks to provide a generic set of regulatory provisions based on generic definitions of market and services activities and services. It is therefore well suited to the converged broadband environment.

¹¹ <http://www.cmc.gov.my/akta589/eng/legis_cma1998_pg3.htm>

In an innovative approach to legislation, the CMA contains national policy objectives. This means that the Act is, in fact, an educational tool that places the act in a context that complements the traditional 'thou shall/shall not' of legislation with a statement of 'why'. The ten national objectives are¹²:

1. To establish Malaysia as a major global centre and hub for communications and multimedia information and content services;
2. To promote a civil society where information-based services will provide the basis of continuing enhancements to quality of work and life;
3. To grow and nurture local information resources and cultural representation that facilitate the national identity and global diversity;
4. To regulate for the long-term benefit of the end-user;
5. To promote a high level of consumer confidence in service delivery from the industry;
6. To ensure provision of affordable services over ubiquitous national infrastructure;
7. To create a robust applications environment for end users;
8. To facilitate the efficient allocation of resources such as skilled labour, capital, knowledge and national assets;
9. To promote the development capabilities and skills within Malaysia's convergence industries;
10. To ensure information security and network reliability and integrity.

The three underpinnings of the CMA are that it is **pro-competition** (it is the first Malaysian Act to directly address competition), it is **technologically-neutral** and it aims to achieve **universal service** on ubiquitous national infrastructure. These set the conditional structure by which the policy, regulatory and other institutional components of government seek to achieve the Vision 2020. Within that structure, the CMA aspires to flexibility. Not only is it technologically neutral, it contains few definitions and few proscriptions. It therefore enables ongoing reform without changes to the legislation as the implications of a converged broadband environment emerge and evolve.

3.4 The Malaysian Competition and Multimedia Commission (CMC): a converged regulator

The CMC was established in November 1998 under the framework of the Malaysian Communications and Multimedia Commission Act 1998 to be independent of the incumbent operator, and independent of the Ministry, with 5 members all appointed by the Minister. A spokesman for the CMC explained that there are sufficient checks and balances in place to ensure transparency and fairness, and therefore independence, is assured.

With a strong focus on social issues, the CMC is more a promoter of the communications and multimedia industry than a regulator in the traditional sense. As the industry matures and self-regulation is proven to be effective, the plan is that the role of the CMC as promoter, developer and facilitator will become more dominant¹³. In the transition period, the focus of the CMC is on education in order to change the mind-set of industry and the

¹² <<http://www.mida.gov.my/profit/vision.html>> and <www.nitc.org.my>

¹³ CMC, Dr Syed Hussein Mohamed, Public Action: Regulation or Economic Incitement, address to the World Summit of Regulators on the Internet and the New Services, Nov-Dec 1999.

community as well as other agencies. Punitive pursuance of legal avenues, is likely in the interim to be a less favoured option. This relaxed approach is designed to give all parties the time to come to terms with the change, not least of all the CMC, which has to prepare regulatory processes and procedures that will be respected by all stakeholders.

Box 2: Content a major focus

One of the main impetuses for multimedia regulation in Malaysia is to influence content in two ways - to make sure that the content is not offensive, and to make sure that there is sufficient local content.

In terms of preventing offensive content, the new regulatory framework provides for self-regulation of content after decades of control by the Ministry of Information. Self-regulation of content is to be determined by industry forums comprising voluntary members from the public as well as from corporations. At this stage, the Content Forum has been formed and has already been designated to be an industry forum pursuant to the Act, and they intend to embark on a program of promotion and education targeted at industry, advertisers, advertising agencies, civic groups, and other key players. The CMA defines as illegal 'the provision of content which is indecent, obscene, false, menacing, or offensive in character with intent to annoy, abuse, threaten or harass any person'. The role of the forums is amongst others, to interpret those words in the Act.

The CMC is taking the role of advising the forums on ways to set standards and to ensure compliance, rather than pushing standards and practices on the industry; the objective being to provide a platform for interested parties to get together and work co-operatively towards achieving what the country wants rather than what the regulator wants. If self-regulation fails to establish an acceptable set of standards – in that there is public outcry against content of media covered by the Act, the CMC has the power to establish mandatory standards with the authority to enforce those standards.

In terms of encouraging local content Malaysia is well positioned to exploit its multilingual base to produce exportable content in Bahasa Melayu (for Indonesia and Singapore), and several Chinese and Indian dialects. The licensing framework pursuant to the Act introduces a rebate system that is intended to augment and complement the previous approach of Government directly funding particular projects. The rebate system acknowledges that the industry knows the industry best, and can best make investment in content development.

The two issues of content production and content control come together at Astro's studios where some content is produced for satellite television, and where imported content is edited to ensure compliance with Government guidelines and standards for local distribution. ASTRO employs over 100 local staff to carry out content control based on Government guidelines.

Source: Interviews with CMC staff, <www.cmc.gov.my> and NITC staff, <www.nitc.org.my>

Within the overall approach of self-regulation, the CMA is establishing an industry forum (comprised of members derived from industry, consumers and other affected parties) for each of the identified regulatory areas, *viz*:

- Content regulation (see Box 2);
- Economic regulation;
- Technical regulation;
- Consumer protection.

Consistent with the three underpinnings of the CMA, the approach taken by the CMC is pro-competition, technologically neutral and aims to achieve universal service.

3.4.1 Pro-competition

Although the CMA provides for competition rules with guidelines on conduct substantially lessening competition, the CMC has moved beyond the competition-at-all-

costs mantra that guided regulation around the world in the 1980s and 1990s, as the following statement from the former Chairman indicates:

A major contribution factor to the difficulties faced by telecommunications and broadcasting companies has been the severe competition resulting from too many operators and service providers and absence of clear policies, rules and guidelines. There have also been excessive investments resulting in under utilisation and over duplication of networks and assets..... One of the major policies is rapid transition to full competition or full liberalisation. This is an important turning point, coming as it does at a time when the industry is still grappling with technology, services, investments, market share and globalisation. Liberalisation is intended to achieve the national objectives, particularly of establishing Malaysia as a major communications and multimedia centre and hub. The measure of success of this policy shall not be in the sheer number of industry players but rather in the increase in benefits it will bring to the consumer and Malaysian society¹⁴.

With as many as five core networks in some areas of Malaysia, the CMC has indicated that it is seeking a more rational approach before it considers allocating 3G spectrum¹⁵. One of the reasons that there are duplicate backbones is that each operator was required to build out its own networks and there are difficulties in unbundling the local loop — as is common around the world. The CMC has recently issued a determination on an ‘access list’, which sets the list of facilities and services available to an access seeker. The access list is not intended to be a closed matter, but will be modified from time to time to add or remove services and/or facilities.

Competition between telecommunications companies and subscription television companies is limited by legacy joint provision and cross sector competition restrictions that prevents telecommunications companies from providing subscription television services, and subscription television companies from providing telephony services¹⁶. One subscription television company in search of a new business model, for example, has applied for a network facilities license and a network services license to complement its content application services license. Such licensing issues associated with the legacy regulation should be addressed in the near future - the CMC states that it is there to listen to industry and to bring about the changes that will help industry provide the services to the people.

With the local loop not yet unbundled and new entrants unwilling to invest in a local loop, and with legacy cross-sector competition and joint provision regulation, companies could face a constrained path to a broadband future. Four of the major ICT players are at least partly state owned (TMB, Mimos, Fiberail), which limits their ability to compete for customers and for funds, see Box 9. Moreover, with legacy monopolies holding sway in some aspects of the market, the operations of private players could be somewhat curtailed. The impression from the interviews is that each company seeks to find a niche in which it can operate without being unduly constrained by any of these barriers. While these barriers potentially hamper companies’ ability to pursue a profitable growth path, it also potentially has a great impact on the national capacity to provide competitive services. This is nowhere clearer than in the case of Cableview Service Sdn Bhd (Mega TV) (see Box 4).

¹⁴ New Regulatory Framework for communications and multimedia sector: subsidiary legislation, Dr Syed Mohamed

¹⁵ CMC, Concepts and Proposed Principles on the Implication of IMT-2000 Mobile Cellular Service in Malaysia, December 2000.

¹⁶ ITU Telecommunication regulatory survey 2000, at www.itu.int/osg/sec/spu/ni/broadband/survey/Survey20003.pdf

Box 3: Unbundling the local loop – will they, wont they and does it matter?

As Malaysia embraces a broadband, converged, multimedia future, one of the main challenges faced by the CMC is changing the mind-set of the industry, including their own. Nevertheless, in the face of the almost global *mantra de jour* of ‘competition is good, more competition is better’ the CMC has come out with an argument that one of the problems is “too much” competition, resulting in unwarranted duplication of infrastructure.

While there are several backbone infrastructure networks (Fiberail, DIGI, TMB, MIMOS, Time), only one company has an extensive local loop - the incumbent, TMB. Malaysia is in the process of reviewing the local loop arrangement and notes that the lack of access to the incumbent’s local loop could potentially stifle broadband access.

Like incumbents in other countries, TMB is reluctant to share its proprietary network with competitive companies that did not contribute to the cost of establishing that infrastructure. Rival companies claim that they cannot compete against TMB’s first mover advantage unless they have access to the local loop.

Taking a long-term purview, Malaysia may have an advantage over countries that have rushed to unbundled the local loop. While unbundling the local loop may result in a rash of broadband activity, in the long-term it may dampen investment in a higher-bandwidth local loop, such as fibre optic in the case of Japan (see <www.itu.int/broadband/briefing>). In fact, whilst the issues relating to the local loop are being tackled, Malaysian companies are experimenting with wireless solutions rather than laying a duplicate twisted pair local loop.

Until there is a breakthrough in technology, more spectrum is made available, or the local loop is effectively unbundled a broadband future could thus be denied to all but TMB’s customers and to those in high-rise developments where alternative local loop infrastructure is viable.

Though the old strategy of ‘no unbundling, forever’ is at odds with a broadband future, TMB states that change can only occur when tariffs are rebalanced. TMB believes that new comers are targeting existing customers rather than creating their own market. This is likely to continue while local loop rental charges are regulated at below cost.

Source: Interviews with various telcos, ISPs and ASPs.

3.4.2 Technology neutral service focus

In order to achieve technological neutrality that focuses on the service and not the technology, the CMC has replaced the previous complicated license system of specific services with four types of licenses¹⁷:

- Network facilities – facilities such as satellite earth stations, broadband optic fibre cables, switching equipment, broadcast equipment and mobile communication base stations;
- Network services – basic connectivity and bandwidth to support application services, and connect different networks;
- Application services – particular functions such as voice, data, content and electronic commerce services;
- Content application services – special subset of application services including traditional broadcast services and Internet content services.

The beauty of this licensing framework is that it not only separates the network from the service, but it also places the emphasis on the activity rather than on the technology. It is expected that this division of activities will be robust into the future as all activities can be unambiguously identified as one or the other. A company that wants to transmit

¹⁷ New Regulatory Framework for communications and multimedia sector: subsidiary legislation, Dr Syed Mohamed.

content on its own network, for example, might need four licenses. Special 3G licenses, for instance, are not required.

Moreover, the CMC has introduced two categories of licenses – individual and class. ‘Individual’ licences are granted to a particular person when the highest degree of regulatory control is required. The intention is to limit the number of individual licensees. A ‘class’ license is lighter and sets out rights and obligations that apply generally to persons who engage in those activities to which the license applies. Persons seeking a class licence register with the Commission but are not granted a license as such. The object is not to limit the number of licenses, it is not a case of the fewer the better but of the more the merrier¹⁸. The type of licence required for various activities is set out in Table 3.2.

Box 4: When is cable TV not cable TV?

Answer: When it is provided by Cableview Service SBD BHD (Mega TV). In 1994 Mega was granted a cable TV license. However, in order to fast track and achieve a critical mass of subscribers they elected to use a Multi-channel Multi-point Distribution System (MMDS) via microwave terrestrial transmission. Reception was restricted to the urbanised areas around Kuala Lumpur, north to Pulau Pinang and south towards Singapore. Although the spectrum allocated (2.5-2.7GHz) is not robust against tropical weather, and the technology requires line of sight, they quickly built a subscriber base of 160’000 in 1998. By 2000 this had fallen to only 10’000.

Two things happened to destroy their subscriber base, the first was the licensing of a competitor, Astro, in 1996, and the second was the financial crisis of 1998. The financial crisis is now behind them, but Astro remains. Unable to compete against the quality of service and marketing expertise of Astro, Mega seeks a new business model. Although legacy cross-competition regulation prevents them providing telecommunications services, they have applied for network services and network facilities licenses, and have begun trials offering 28 Mbit/s up stream and 18 Mbit/s downstream (less than this shared) point to point and point to many point. Mega TV hopes to become involved in projects to minimise the digital divide by using MMDS spectrum for last mile solutions pending approval of their licence.

With a low subscriber rate and now facing Astro they are unlikely ever to get funds to lay cable and become, as they initially planned, a cable TV company. The decision to take the short cut and not lay cable has not only denied the company a secure future, but has also denied the country the capacity to use cable modems for Internet access.

Measat Broadcast Network Systems Sdn Bhd (MBNS), is licensed by the government to provide Direct-To-Home (DTH) Satellite Pay-Television services under the ASTRO brand. MBNS has a 25-year license with 20-year exclusivity on DTH broadcasting. MBNS leases the Ku-band transponders on the MEASAT satellites from an affiliated company, Binariang Satellite Systems Sdn Bhd (BSS). ASTRO is awaiting the launch of another MEASAT satellite in late 2002 in order to grow their value-added broadband services. At present their value-added services are restricted to non-bandwidth-hungry Internet-based applications, not only because of their limited capacity but because they are subject to restrictions on cross-sector policies.

The terms of ASTRO’s license tie up a lot of spectrum and prevents competition in a way that is hard to understand in a pro-competitive regime. However, ASTRO’s compliance with social policy on content, and the universal accessibility of their transmission across Malaysia may have weighed in favour of the license.

Table 3.2: License requirements for various activities.

Individual license	Class licence	Exempt/unlicensed
--------------------	---------------	-------------------

¹⁸ New Regulatory Framework for communications and multimedia sector: subsidiary legislation, Dr Syed Mohamed.

Earth stations	Niche or limited purpose network facility	Broadcasting and production studios
Fixed links and cables	Telex facility and service	Incidental network facilities
Public payphone facilities	Niche customer access	Internet cross connect equipment
Radiocommunications transmitters and links	Niche connection service	Private network facilities
Satellite hubs	Internet access services	Incidental network services
PSTN telephony	Messaging services	LAN services
Public cellular mobile services	Directory services	Private network service
Public IP telephony	Private payphones	Router Internetworking
Public switched data services (e.g. ISDN)	Audiotext hosting services	Electronic transaction services
Public payphone services	Telegram services	Interactive transaction services
Satellite broadcasting		Web hosting/client servers
Subscription broadcasting		Networked advertising boards and cineplexes
Terrestrial free to air tv		
Terrestrial radio broadcasting		

Source: Abridged from the Communications and Multimedia (Licensing) Regulations 2000

3.4.3 Universal service obligations

Universal service is an important goal in developing countries such as Malaysia that seek to promote social objectives as much as economic. In order to move from the current dichotomy of state-of-the-art technology in modern centres around Kuala Lumpur and the lack of facilities in rural areas (see section 5), it is necessary to promote a dynamic rollout, and programs of access and equity. Until January 1999, TMB was the sole provider of universal service without contributions from other industry operators. As from January 1999, regulation provides for contributions by all facilities-based operators with TMB being designated as the sole USO provider for the purpose of implementing universal service. Contribution is based on the revenue of the contributing company weighted by the margins achieved on revenues from specific services. The formula reflects the lack of profit on local services, and the high margin on long distance and international calls. An underlying premise is that universal service provision is unlikely to be achieved by industry on its own without regulatory intervention. Although this implies the diversion of funds away from economically efficient uses, the goal of equity and access has been given a high profile.

In line with the overall self regulatory style of the new regulator, licensees are invited to bid to provide services in under-served areas in which there already is network infrastructure and two or more service providers, and in areas in which there is neither infrastructure nor service providers. The CMC has the power to nominate a company if there is no bidder (www.cmc.gov.my/determination). In under-served areas in which there is infrastructure but only one service provider, that provider is requested to extend the service to the under-served.

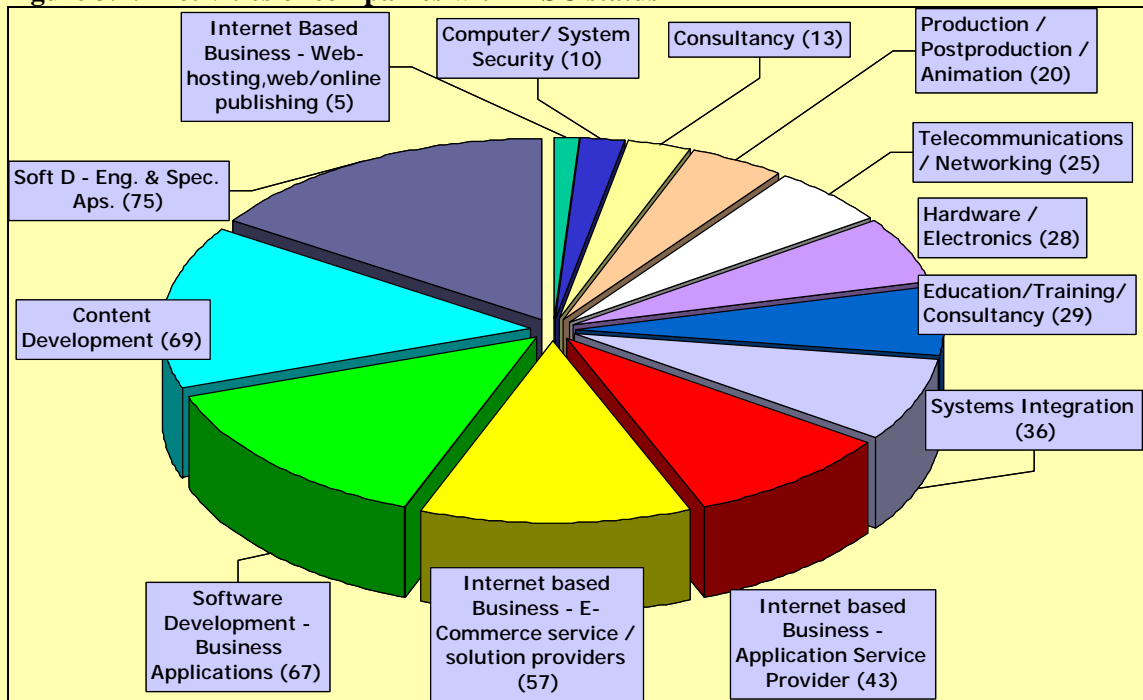
Malaysia's universal service obligation covers:

- Provision of collective access to basic telephony and public payphones;

- Provision of individual access to basic telephony;
- Provision of collective access to Internet access;
- Provision of individual access to Internet access.

The focus of universal service obligations is currently on voice telephony. This may change in the near future - a consultation paper on universal service prepared by the CMC acknowledges that basic telephony should have the capability to support Internet services. The paper also states: *“the government takes the view that all licensees in the communications and multimedia sector have a responsibility to support the objective of ensuring the equitable provision of affordable services over ubiquitous national infrastructure..... This responsibility exists even if it is not explicitly expressed as part of an operator’s license condition.”* While the USO may be extended to cover data services in much the same way as in Australia, it is unlikely in the immediate term to formally require broadband connectivity.

Figure 3.4: Activities of companies with MSC status



Source: MSC

Box 5: MSC vision – dream or reality

Appearance-wise the MSC has beautiful architecture in a manicured garden setting. With plenty of land available, guaranteed broadband connectivity, smart homes and costs carefully controlled, the phrase ‘technological dream in a tropical paradise’ does not seem too romantic.

On a more practical level, the MSC is well on target to reach its vision. There are seen to be three phases in the MSC project. The MSC has achieved, in large part, the key elements of the first phase — dates are indicative:

- 1996-2003 Establish the corridor, attract 50 world-class companies, launch flagship e-projects, develop cyberlaws, have Cyberjaya recognised as a world-class intelligent city;
- 2003-2010 link the MSC to other cities in Malaysia and world wide, attract 250 world class companies, harmonize global framework of cyberlaws, establish other intelligent cities in Malaysia;
- 2010-2020 Transform Malaysia to a knowledge society, attract 500 world-class companies, have Malaysia recognized as a test-bed for multimedia applications, locate the International Cybercourt of Justice in MSC, have a total of 12 intelligent cities linked globally via the information super highway.

In the mean time, the allocation of funds and attention on the MSC begs the question – are they ‘beggar my neighbour’, are they absorbing funds and resources needed in the rest of the nation? Certainly they are, but is the trickled down effect strong enough and soon enough to warrant this on-going kick-start to the information society?

There are criticisms of the MSC, one of which is that it is not fully functioning as a test bed for innovative and exciting projects and that the critical mass needed has not yet been attained. But these are issues that are being looked at. Perhaps, incentives and encouragements need to be reviewed to accommodate the changing market conditions and business models of hi-tech companies, which are ever changing.

In this respect, as a complementary activity to the MSC, the NITC has established experimental programmes in locations outside of the MSC. It is in line with its focus on programmes that provide ICT acculturation opportunities for varied communities. Without any particular focus on broadband, the NITC Secretariat administers a seed fund to encourage communities to use ICT based solutions to meet their needs. The fund, the Demonstrator Application Grant Scheme (DAGS) funds pilots projects and requires that “smart partnerships” between the community drivers, technology companies and sometimes, a public agency be an integral part of their business model; which may not involve profit e.g., Cybercare. All must plan for sustainability beyond the 12 months under the DAGS and seven have graduated (end 2000). As at December 2000, 38 Demonstrator Applications have been funded or approved. Under the Eight Malaysia Plan a further RM100 million has been allocated to seed more pilot projects.

Subang Jaya 2005 (SJ2005) is a pilot programme to transform a moderately wealthy urban area into a broadband community by 2005. Developing policies for managing the impact of ICT acculturation on the ground meant that a brownfield site was necessary, a strategy quite different from the Greenfield approach taken in the MSC. It is hoped that by 2005, the lessons learned will allow for more focussed policy recommendations for Malaysia’s migration to the K-Society.

Source: Interviews with MSC staff, see <www.mdc.com.my> and with NITC staff, see www.nitc.org.my

4 E-PROJECTS TO GET THINGS GOING

Malaysia’s push for a broadband future has not stopped at establishing a regulatory framework. It has also initiated a range of projects to kick-start the multimedia/information society and to inspire the population to become involved. Of the myriad of projects and agencies involved in the ramp-up, two key ones are discussed here. They are the Multimedia Super Corridor (MSC) and the ongoing work of the NITC.

4.1 The MSC – a vision of multimedia

The MSC is designed to act as a catalyst for IT-related industries and products by attracting and nurturing hi-tech companies. The MSC is located on a dedicated compound of 15 km by 50 km immediately south of down-town Kuala Lumpur. It extends from the Petronas Towers in the north to the Kuala Lumpur International Airport (KLIA) in the south. The MSC is well served by highway connection to Kuala Lumpur and to Singapore, a fibre optic backbone and broadband connectivity to homes and offices, smart homes and the world's first multimedia university.

Public efforts in support of the MSC include fiscal incentives for setting up IT and multimedia companies, building the infrastructure, developing the intelligent cities of Putrajaya and Cyberjaya and the establishment of the Malaysian Exchange of Securities Dealing and Automated Quotation (MESDAQ) to promote equity finance for technology companies. Moreover, steps have been taken to ensure that the costs of doing business in the MSC remain attractive by ensuring telecommunications tariffs and property prices remain competitive. Incentives to establish multimedia industry in the MSC include the Bill of Guarantees, which provides privileges including:

- Exemption from local ownership requirements (usually 70 per cent);
- Unrestricted employment of foreign knowledge workers;

Companies can also apply for MSC status if they are heavy users or providers of multimedia products, employ a substantial number of knowledge workers, and are able to transfer technology to Malaysia. Companies with MSC status are also allowed to operate tax free for up to 10 years or are granted a 100 per cent investment tax allowance, and are exempt from the selective exchange control measures introduced in September 1998. Plus companies with MSC status and with at least 51 per cent Malaysian ownership can apply under the MSC Research and Development Grants Scheme for funds equal to half the R&D costs of a project over a two-year period¹⁹.

As at March 2001, there were 473 approved MSC companies, involved in a variety of sectors as shown in Figure 4.1. Of the target 50 world-class companies, 40 have a presence in the MSC as at March 2001, see Box 5.

4.2 The NITC's projects

The work of the NITC mentioned in Box 5, is part of a series of programs to achieve 'desired end-states' by exploiting the Internet to develop pioneering projects such as 'e-learning', 'e-community', and 'e-public services'. The objective is to bring together private, public and community organisations in a way that will effect major changes in social and cultural paradigms. The desired end-states towards which NITC is working are set out in Table 4.1²⁰:

Elements of each of these end-states have been combined in various projects each under the auspices of particular government agencies. The e-government project, for example combines large doses of e-public service, e-sovereignty, and e-economy with smaller

¹⁹ Mid-term review of the 7th Malaysia Plan, see <www.epu.jpm.gov.my>

²⁰ CMC, Dr Syed Mohamed, Public Action: Regulation or Economic Incitement, address to the World Summit of Regulators on the Internet and the New Services, Nov-Dec 1999.

doses of e-learning and e-community, under the auspices of the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), see Box 6.

Table 4.1: NITC's desired end-states

Thrust	Vision	Key-Focus
E-Economy	All sectors of the Malaysian economy creating value and wealth through successful participation in the emerging knowledge-driven global economy.	Knowledge-driven economy
E-Public Services	The public, private and community sectors providing people-oriented, customer-focused services electronically.	Delivery mode of public goods and services
E-Community	Networks of communities dynamically participating in the process of governance to enhance the quality of life of Malaysians.	Participating governance for quality of life
E-Learning	Formal and informal networks providing the opportunity and cultivating an ethos of life-long learning for individual, organizational institutional and societal advancement.	A life-long learning culture
E-Sovereignty	Citizens and institutions focussed on enhancing national identity, integrity and societal stability in the face of borderless challenges to our sovereignty.	Resilient national identity.

Source: Infosoc Malaysia 2000, Discussion paper on "Access and equity: benchmarking for progress".

5 CURRENT BROADBAND STATUS

Malaysia, like many developing countries, lacks detailed data on ICT access. This is about to change, as Malaysia included in its June 2000 Census questions that directly ask for penetration rates on a range of ICT services and applications, see Box 7. Because, the figures from that census will not be available until late 2001, the data presented here are preliminary results of the June 2000 Census.

5.1 Fixed telecommunications

At the end of 2000 there were 4.7 million fixed telephone lines in use in Malaysia, representing a teledensity of 20 telephone lines per 100 inhabitants. Of these lines, about 3.4 million were residential making a household penetration rate of 69.3. There has been rapid diffusion of household penetration since 1990, for instance, when the penetration rate was 31.7. However, the fixed line household rate has been stable since 1998, probably due to the economic crisis as well as the growing substitution of mobile for fixed lines. These figures, being national averages, disguise disparate penetration rates between the largely rural and more metropolitan states. For example, the heavily industrialised district of Petaling has a teledensity of 37, which is about four times that of the state of Sabah.

Box 6: E-government: a vision of Reinventing Government

The vision of e-government is of: 'a multimedia networked paperless administration linking government agencies, citizens, and business to facilitate a collaborative government, an efficient administrative environment and enhanced delivery of Government services'. Being a pilot project and with no benchmarking available globally, the achievement of this vision has encountered implementation difficulties.

The pilot stage covers six projects, the first three of which involve the government interfacing with citizens and/or industry, the last three are internal to the public service:

- e-services to the public including bill payment, driver and vehicle registration and summons payment ;
- e-procurement of requisites by government departments, initially from large e-capable companies;
- e-labour exchange as a national employment agency bringing workers and employers (including the government) together;
- e-office to establish a generic, public service, office environment;
- e-human resources to establish a common HR management system within the public service;
- e-project management to establish a common project management system within the public service;

Some of the 6 pilot projects are delayed, largely due to outsourcing problems and because the learning curve is longer and steeper than anticipated by the planning consultants when developing the initial time-lines. To date, two of the projects have gone live, namely e-procurement (Oct. 2000) and e-project management (Nov. 2000) and is currently being rolled nationwide to 889 sites. Two more projects will go live in May 2001, namely e-services and e-office.

With the projects going live, the Government faces the reality that implementation will be challenging and numerous issues will need to be addressed. Not the least of the problems is due to the size of the project aiming to network Government, industry and the populous. On the Government side of things, there are 24 Federal Ministries, 126 Federal Departments, 78 Federal Statutory Bodies, 245 State Departments, 109 State Statutory Bodies, and 144 Local Governments with a total work force of 670'000 people. In industry there are approximately 400'000 corporations and 1'600'000 proprietorships/partnerships. The 23 million residents are a disparate group of urban and rural dwellers. coming from the full range of socio-economic backgrounds.

Among the challenges being address are the buy-in issue to increase the level of awareness of the potential benefits of these projects The issue of the digital divide also remains a concern for the Government as the skills both among the citizens, and within small and medium enterprises may not be adequate. The main push of MAMPU – the agency with responsibility for e-government - is to ensure the smooth, timely and holistic implementation of these projects focusing on the development of state-of-the-art applications and at the same time addressing the human resource and change management issues. Although the implementation of this ambitious vision has had its difficulties, a CMC spokesperson says that Malaysia is confident that through its planned and concerted effort, it can surmount these potential difficulties.

Box 7: Malaysian census leads world in broadband-relevant question

Malaysia's love affair with multimedia has translated into the inclusion of a question in their 2000 census that directly asks for various ICT penetration rates. The question was suggested by The Census Technical Committee comprised of main users of census data, and has been subjected to rigorous testing and culling of unsuccessful components.

The question puts Malaysia ahead of the world in getting hard data on this important issue. It is reproduced here in full, and should inspire other statistics authorities.

Are the following items available for use by the members of this household:

Motorcar

Motorcycle

Bicycle

Others

Air-Conditioner

Washing Machine

Refrigerator

Microwave

Radio/Hi-fi

Television

Video/VCD/DVD

Fixed Telephone Line

Mobile phone

Personal Computer (PC)

Internet Subscription

None of these items mentioned above

The results will allow ICT penetration rates to be compared across income, ethnic and geographical criteria.

That data from the census will be released towards the end of July 2001 at www.statistics.gov.my/English/page2.html

Source: Interview with staff at Malaysian Department of Statistics

5.2 Mobile telecommunications

Mobile cellular communications commenced in Malaysia in 1985 when Telekom Malaysia launched its analogue NMT-based ATUR service. Competition was introduced in September 1989, when Celcom launched its ETACS-based ART900 network. Competition intensified following the licensing of GSM networks in 1995. Today, Malaysia has 8 cellular networks operated by 5 companies. The number of mobile telephone subscribers passed fixed lines in 2000, ending the year at almost 5 million for a penetration rate of 22.3.

All operators offer Short Message Service (SMS) and Wireless Application Protocol (WAP) services over the GSM networks. There are indications that SMS use is growing with one operator claiming 8 million SMS messages are sent a month over its network. There are around 150'000 WAP users in the country. Like elsewhere, WAP has been plagued by slow speeds, lack of content and handset shortages. Operators have also been trialling faster GPRS. These trials have been affected by a lack of handsets and slower than expected speeds. Regarding 3G, the CMC has recently posted a discussion paper²¹.

²¹ CMC, 2000, Concepts and Proposed Principles on the Implementation of IMT-2000 Mobile Cellular Service in Malaysia, at: www.cmc.gov.my

5.3 PC and Internet

According to the Association of Computer and Multimedia Industry of Malaysia (PIKOM), there were 2.2 million personal computers (PCs) in Malaysia at the end of 2000 for a penetration rate of 9.1 per 100 inhabitants. It is estimated that less than 10 per cent of Malaysian homes have a PC, a major barrier to wider Internet penetration. One constraint is affordability with one study estimating that the price of PC would amount to around a third of average Malaysian disposable income.²² In an effort to boost PC penetration, the government has launched a scheme whereby Malaysians can withdraw money from their social security savings to purchase a PC.

The Malaysian Institute of Microelectronic Systems (MIMOS) launched Jaring, the nation's first ISP. TMNet, the ISP of the incumbent Telekom Malaysia was launched in November 1996. Five other licenses had been issued by the end of 1998 by the previous regulator. The lion's share of subscribers are with TMNet and Jaring. There were 1.7 million Internet subscribers at end 2000. It is generally accepted that on average, three persons share an account, so an estimated 5.0million Malaysians used the Internet at the end of 2000, or 21.5% of the population.

Table 5.1: Malaysian ICT Indicators

Year ending December 2000, ('000s)

Population	22'203
Households	4'911
Main telephone lines	4'754
Per 100 inhabitants	22.00
Per 100 households	63.20
Mobile cellular subscribers	5'122
Per 100 inhabitants	22.34
Personal computers	2'200
Per 100 inhabitants	9.91
Internet subscribers	1'700
Per 100 inhabitants	7.10
Estimated Internet users	5'000
Per 100 inhabitants	21.5
Estimated television households	4'000
% Households with TV	81%
Cable TV households	100
As % of TV households	0.3%
Satellite Dishes	525
As % of TV households	13%

Source: ITU, Malaysia Department of Statistics, telecom operators, PIKOM, ASTRO, Cableview.

One barrier to PC and Internet penetration is a lack of electricity connection. Not every house in Malaysia is connected to a grid electricity supply. While the national average is 93 per cent, this ranges from almost 100 per cent of households in Peninsular Malaysia to only 75 per cent in the state of Sabah. The cost of buying and connecting a computer to the Internet is another barrier. According to the NITC the total cost of buying a computer on hire purchase, rent on a telephone line, and Internet fees represents 43 per cent of the average disposable household income in urban Malaysia, and 88 per cent for rural Malaysia. They estimate that 60 per cent of urban and 83 per cent of rural households could not afford a computer²³.

5.3.1 PC and Internet in schools

With one third of its population currently in school, PC and Internet access to the schools is an essential component of ICT awareness and training. However, not every school had a computer in and even fewer had Internet access. Of the 9'018 schools (1'713 secondary, 7'305 primary)

marking for Progress". Paper presented at InfoSoc Malaysia

2000. 7-10 June 2000. Available at <<http://www.nitc.org.my/resources/AccessEquity.pdf>>

²³ <<http://www.nitc.org.my/events/infosoc.html>>

2'192 do not have a telephone. By the end of 2001, the Economic Planning Unit projects that 2'400 schools will have PC labs. The Ministry of Education has a project where by 2001 it intends to provide connectivity to 230 rural schools – 120 with ISDN, 100 via PSTN, and 10 (in Sabah and Sarawak) via VSAT, see also Box 1.

5.4 Television

There are an estimated four million households in Malaysia with a television set (around 81 per cent of all households). While household TV penetration is close to 100 in Peninsular Malaysia, the figure is far lower in Sabah and Sarawak. There are four free-to-air channels in the country.

5.4.1 Cable TV

Malaysia has no cable TV, see Box 4. Because there is no cable TV, there is probably no prospect of cable-modem technology taking off in Malaysia. This denies Malaysia one potential broadband access technology that would avoid TMB's stranglehold on the local loop, see Box 3.

5.4.2 Satellite TV

Satellite TV is provided by MEASAT Broadcast Network Systems. Their ASTRO service is a direct-to-home platform that provides up to 24 television and 13 digital radio channels. ASTRO's service is delivered via the Malaysia East Asia Satellite (MEASAT), which covers Malaysia and other South East Asian countries. ASTRO had some 525'000 subscribers at the end of 2000, or 13 per cent of all TV households.

5.5 Summary of determinants of communication service access²⁴

Approximately 4.4 per cent of Malaysians have no formal education and so are marginalized in the use of ICT. The 14.3 per cent of the population with only primary education will need exposure to be able to use e-public services, or otherwise to participate in a broadband information society. Almost 15 per cent of the population (3.3 million) are aged 15-64 but are outside the labour force and are not currently schooling, so they have minimal access to ICT facilities. Of these, 3.3 million 70 per cent are female, half of whom have secondary or tertiary education. That makes 1 million with the potential to work with ICT (e.g., teleworking) if they have adequate bandwidth connectivity. Almost 70 per cent of the primary schools and 46 per cent of secondary schools did not have PC facilities in 1999, 90 percent of primary schools and 66 per cent of secondary schools did not have Internet access.

More than one hundred thousand Malaysians fall below the poverty line and cannot afford a TV or a radio, let alone a computer and connectivity. Approximately 25 per cent of Sabah and 20 per cent of Sarawak households have no access to grid electricity. In the states of Kedah, Kelantan, Terengganu, Pahang, Sabah and Sarawak the telephone subscriber rate is below 20 per cent. Approximately 50 per cent of the subscribers are in Kuala Lumpur and Selangor. Approximately 60 per cent of urban households and 83 per cent of rural households may face financial constraints on purchasing PCs.

²⁴ Data sourced from NITC Secretariat : Discussion Paper on "Access and Equity: Benchmarking for Progress". Paper presented at InfoSoc Malaysia 2000. 7-10 June 2000. Available at <<http://www.nitc.org.my/resources/AccessEquity.pdf>>

Based on 1997 figures, approximately 70 per cent of newspaper readership is non-English in Malaysia as a whole with the exception being Pulau Pinang and Kuala Lumpur suggests a need to increase English literacy levels and also a need to develop Bahasa Melayu and other local language Internet content.

These figures are indicative of the long path that Malaysia has embarked upon. In the long-run Malaysia's success in reaching its Vision 2020 via a multimedia highway may depend as much on how it addresses these issues as by how well it attracts global hi-tech companies.

6 BROADBAND INFRASTRUCTURE

Infrastructure has historically been provided by the Government and continues to be so through the partly government owned TMB, and other government owned companies. However, private companies have established extensive backbones and satellite terrestrial networks. In Peninsular Malaysia, at least, the backbones and terrestrial networks are well established and probably do not pose a barrier to broadband activity. As discussed throughout this case study, it is the local loop bottle-neck that holds the key to competitive access to broadband services.

6.1 Broadband media

6.1.1 Fibre optic

Malaysia is well served by several fibre optic backbones. The most extensive of which is TMB's at 172,100 km²⁵. The MSC is especially well served. However, even the states in East Malaysia are well linked to the main land via submarine fibre optic cable. With TMB's backbone entirely fibre optic, the potential for broadband connectivity is great and almost universal throughout the country.

6.1.2 Satellite

One company, Binariang Satellite Systems Sdn Bhd (BSS), which owns the MEASAT 1 and 2 satellites, leases out transponder capacity. Several companies use satellite back-up for their fibre optic submarine connections to Sabah and Sarawak.

6.1.3 Terrestrial

Other than the subscriber television service transmitted over Multi-channel Multi-point Distribution System and cellular telephone services, Malaysia currently has no commercial terrestrial services although it is used as a back up for fibre optic networks by several of the operators. While the infrastructure is in place to serve the most developed urban areas, the prospect of using this technology for broadband services is constrained by technical and spectrum issues.

6.1.4 International

Malaysia is well served by international fibre optic submarine links. Plus, a 2.56 Tbit/s fibre optic loop, which is being laid from Japan to Hongkong and Malaysia, is expected to be lit in September 2001. Five companies currently provide international broadband connectivity either via these links or via Teleglobe and Stix satellite services.

²⁵ <www.telekom.com.my/news/290800.htm>

Box 9: In search of a business model

The diversity of business models developed by communication companies in Malaysia is extraordinary. In fact, it does not seem to be an exaggeration to say that no two companies are competing for exactly the same niche. While that may simply be a legacy of the strong and ubiquitous monopoly position held by TMB, it impacts on the futures that companies can see for themselves, and so may impact negatively on their investments. One company that is in such a situation is Fiberrail.

Fiberrail is a joint venture between Telekom Malaysia (TMB) and the Keretapi Tanah Melayu Berhad (KTMB-Malayan Railways), of which KTMB is fully state-owned and TMB partially state-owned. The business model is simple. With 140 employees, Fiberrail wholesales fibre optic network capacity to telcos. In fact, TMB is their largest customer. Using contractors, it lays a fibre optic backbone along the railway lines of peninsular Malaysia (Sabah and Sarawak has only one short rail line). Laying fibre along rail lines is easier than along a highway because rail lines are straighter, less busy and have lower gradients than roads. They are also private property accessed only by KTMB and Fiberrail workers, they are therefore less subject to disruption from other projects. Fiberrail thus leverages off KTMB's right of ways.

The backbone of 1'600 km of 2.5Gbit/s bandwidth is now in place. The roll out is finished. The dark fibre is 75 per cent utilised and the bandwidth is 10 per cent utilised. So what of the future?

Fiberrail could be vulnerable to the global reduction in bandwidth prices. It is possible that their old business model of long-term lease of capacity on an indefeasible right of use (IRU) basis is no longer acceptable to most customers who are operating under uncertainty in the communications market. It is possible that the current business model would be more successful if the local loop was unbundled because more competition could mean more customers. Ideally, Fiberrail probably would like to have an expanded license to provide end-to-end connectivity to its customers rather than stopping at the station as their present license allows, but this remains to be seen.

6.2 Broadband services²⁶

6.2.1 ISDN

ISDN penetration in Malaysia is only low. As at December 2000, only three companies provided ISDN services, a fourth has begun in 2001. The three companies had just over 40'000 subscribers in December 2000. Of these 40'000 less than 2'000 subscribers have primary rate, the rest have only basic rate ISDN.

6.2.2 Leased lines

As at December 2000, three companies provided leased line services, a fourth has started in 2001. The three companies had just over 2'000 subscribers in December 2000.

6.2.3 ADSL

Only one company provided ADSL services in December 2000, and another has started conducting trials of the service in 2001. As of December 2000, there were only 30 ADSL customers.

6.2.4 Modems

The six companies that reported modem subscriber numbers had a total of 85'000 between them as at December 2000.

7 CONCLUSION

²⁶ The figures in this section have not been confirmed. They are indicative of the levels of service.

Malaysia is a very interesting case of a middle-income country dealing with the broadband issue in two ways. Firstly, its converged regulator is preparing for a future in which all broadband services and networks are regulated in a technologically neutral way. This approach is founded on an as-yet-incomplete new licensing regime. While completion of the licensing regime will add certainty to the application process, it is just as important that the CMC remains true to its overall goals in doing so.

Secondly, its program of encouraging ICT activities as a way to leapfrog into developed nation status has a dual focus on the MSC and the wider community. While the public works programs associated with the MSC in rebuilding national confidence in the wake of the 1998 crisis, it is not clear what tangible benefits can be attributed to that investment so far. Still, as indicated in the introduction, it is early days.

The main issues with which Malaysia has to come to grips if its efforts are to be successful include:

- Whether to unbundle the local loop and achieve a short term gain in broadband access or to continue to protect investment in the local loop for the long run gain of a higher capacity local loop;
- How to attract private investment to sustain the multimedia passion and the broadband vision.
- How to meet the market's immediate need for broadband access without compelling the incumbent to provide, for example, ADSL — given that there is no cable TV infrastructure to facilitate cable modem alternatives.
- What role can the government take in developing higher bandwidth access alternatives — e.g., microwave?
- In fact, what role should the Government in Malaysia, or elsewhere, take in growing a particular industry, a particular network, a particular media?

ANNEX

Table A1: List of interviews

Organisation
CMC – Regulatory Overview
CMC - Licensing
CMC - Competition and Access
CMC - Content
CMC – Technical Regulation
Telekom Malaysia (Including TMNet and TM MSC Operations)
Maxis (including Maxis.net)
Pikom
Ministry of Energy, Communications and Multimedia
Ministry of Education
DiGi
Celcom (& celcom.net)
MegaTV
MEASAT Broadcasting (Astro)
Department of Statistics, Malaysia
Economic Planning Unit
Multimedia Development Corporation
Ministry of Information
Ministry of Health
MIMOS – Jaring & Mobile Internet Unit
MAMPU and smart school
Fiberail
TtdotCom (& TimeNet)
CMC – Industry Research & Analysis
