Jurnal Komunikasi
Jilid 16, 2000
Pages: 1 - 32

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South East Asian Countries' Response to the Advent of Information Era: With Emphasis On Malaysia

Introduction

Countries in Southeast Asia are paying strong emphasis on Information Technology (IT) in spite of being badly affected by the economic crisis. It cannot be denied that the advent of Internet has spurred this effort. At least 60 per cent of IT market is concentrated in Southeast Asia with Malaysia leading in the paperless office concept (Berita Harian, Ekonomi, 5 November 1997). Malaysia spent RM5 billion (US$1.9 bil) on IT, and in 1999 Malaysia expects to spend a further RM5.24 billion (US$1.38 bil) IDC Asia-Pacific, 1998 cited in the Sun, Mar 17, 1999).

Countries in the region realised that IT is playing a very important role in the global transformation of economy. Countries in South East Asia are fully cognisant of the changing environment and are taking all the necessary measures to ensure that they will not be left behind. For example, Indonesia has come up with Nusantara 21, Malaysia with its Multimedia Super Corridor, Singapore with its SingaporeOne, and Thailand with its Software Park. These are but some of the responses from the countries in the region to the advent of information era. No doubt the other countries in the region do have their own programmes.

This paper will take a broad overview of what is happening in the region and will give particular attention to Malaysia to see how Malaysia is coping with the advent of information era.

Overview

Silicon Valley in California, is a leading technological concentration, not only in the United States but also in the world. It is here that Intel, Apple and many other IT firms started their projects on a very modest scale and now each of them are a huge concern.

Although Silicon Valley became known only by that name in 1971 when journalist Don Hoefler coined the term for his series of articles to describe about the semiconductor industry in the area, the IT history of the area actually started in 1906 when the first signal amplifier, a vacuum tube triode was invested by Lee de Forest (View from Internet Valley). There are other "Silicon Valleys" in the United States. Two other known parks, are Route 128 in Boston and Research Triangle Park in North Carolina, and in Austin Texas. In Asia, there is India's Bangalore Technology Park, and Taiwan's Science Industrial Parks. It is quite fashionable to describe places with high-tech firms with the name tag "Silicon Valley".

So when Malaysia announced its intention to develop the Multimedia Super Corridor (MSC) it was described by some as another Silicon Valley. So is with Singapore's One, Nusantara 21, and Thailandís software park. If that is so, then Penang in Malaysia should be more deserving to be called the first Silicon Valley in Malaysia. Penang started manufacturing semi-conductors some 25 years ago.

The technological breakthrough for the information era came about as a result of the convergence of technologies-telecommunications, broadcasting, and computer. When Internet came to Southeast Asia, the telecommunication infrastructure was more or less ready for it.

It will not be wrong to say that many countries are now working on some sort of IT programmes, the only difference is the extent and scope of the projects. In ASEAN, Malaysia, Singapore, the Philippines and Thailand have embarked on IT projects that will take the individual countries into the next millennium.

The Global Competitiveness Report 1997 Asia ranked low on a crude index on basic IT; the index was established by a Harvard University professor Edward Glaeser. According to the index, leading countries are United States and Sweden, in that order. The index is based on three fundamental items

- the availability of direct dial international service, the number of fax machines per capita and the computing power in the country in millions of instructions per second (MIPS) per capita (Asia ranks low on IT Index, AMIC Vol 27, No. 4, :4)

TABLE 1
Ranking of Countries in Terms of Information Technology

Ranking	Country	Index
1	USA	6.689
2	Sweden	5.537
3	Denmark	5.473
6	Hong Kong	5.373
15	Singapore	4.818
25	Malaysia	3.496
29	Thailand	3.255
37	Indonesia	2.986
38	Philippines	2.870
45	China	2.604

Source: World Competitiveness Report, 1997

Below are some of the activities taking place in some of the South East Asian countries.

Singapore

Being small and more advanced compared to the rest of the countries in Southeast Asia, the island-state will be fully wired by the year 2000. It can lay claim to be one the few intelligent states in the world.

Singapore One is a national high-capacity network platform that will deliver a potentially unlimited range of multimedia services to the workplace, the home and the school. It comprises two distinct but interrelated levels — an infrastructure level of networks and switches, and a level of applications and multimedia services. Initial steps have been taken to encourage development of applications for the broadband network, with emphasis in four areas — government, home, education and business.

Government - Singapore One will bring public services closer to the people and make it more convenient for them to carry out government transactions. Eg. of services — multi-function

kiosks for government transactions, and one-stop government centres with video conferencing facilities.

Home - High speed communication will open up a whole new channel for people to do many things from the home. Potential home applications include high speed Internet, entertainment on demand, electronic shopping, home banking, and electronic information services.

Education - Singapore One will enable easy access to high quality multimedia teaching and learning materials and open up new avenues for learning, It will support distance learning and multi-party collaboration by students at different locations.

Business - For businesses, a high speed multimedia network will mean better communication and co-ordination. An entire marketplace can also make use of new technologies for buying and selling. Potential business applications include, video conferencing, multimedia information services for corporations, telecommuting and electronic commerce.

Thailand

Thailand is counting on IT to bring about speedier economic recovery. Like the rest of its neighbours, Thailand with a population of 60 million, is moving towards an information-oriented society. Thailand has adopted a national IT policy, the IT-2000, resting on three pillars, namely a) investments for countryís national development, b) investment for the improvement and development of human resources, c) the government computerisation programme.

One of the major aspects taken by the government to promote IT within the country is to establish the National Information Technology Committee (NITC) in March 1992, with the mandate of planning, facilitating, monitoring the implementation of IT development plans. According to Thaweesak Koanantakool (IT Projects into the Future, June, 5, 1997) the IT-2000 has three agendas:

1. Build an equitable National Information Infrastructure

   - revising Thailandís Telecommunications Master Plan
   - development of high speed nation-wide optical fiber networks by several telecom operators
   - Three operational ThaiCom satellites, with the latest (ThaiCom III) having 39 transponders (compared to 24 previously), seven of which have global beam
   - Introducing electronic commerce law to facilitate electronic commerce in the country
   - Expansion of rural telephone project to cover 60,000 villagers in the whole of Thailand
   - Launching of Information Superhighway Project to explore and evaluate the feasibility of using high-speed network in Thailand. This national testbed project is a cooperation between NECTEC. CAT, TOT, universities and telecommunications vendors. The project looks into applications such as distance learning, multimedia networking and virtual reality.

2. Invest in People

   - School informatization programmes initiated by many organisations including the Ministry of Education. One such programme is the IT project for schools in the rural areas, disabled/under-privileged people and some pilot computer-assisted instruction development.
   - The Kanchanapisek Network Project began its service since Dec 5, 1996. It is the largest BBS in terms of number of access lines and geographical coverage and free of charge. The major volume of this web site is the Junior Encyclopedia and being enlarged at the rate of one volume of encyclopedia per month.
   - Academic research Network (ThaiSarn) gained wider access to international link (2Mbps to USA and 2Mbps to Japan) and greater bandwith domestically.
   - SchoolNet Thailand Project, the inter-networking project for Thai schools was initiated by the National IT Committee. Some 74 schools have joined and 99 more in the process.

- IT Campus project launched in 1996 involving 15 campuses in ll provinces. By 1999 this project will cover 30 provinces.
- National Multimedia Institute (NAMMI) project is now being studied. The objective of this institute is to speed up the local creation of multimedia content producers.
- Electronic Industry Institute is being planned to enhance manpower in the industry to be more competitive, especially when the Information technology Agreement is becoming effective in the year 2000.

3. Enhance Government Services and Forge a Strong Information Industry

- EDI-Tradesiam, a government and private sector joint venture was set up to operate the nationís Electronic Data Interchange (EDI) for international trade. TradeSiam will shorten and eliminate cumbersome the paperwork process between importers/exporters and the customs.
- Government Computerization Programme. This was initiated in 1995 with a series of measures to ensure that Thai Government agencies and their staff are well developed to serve the people better. The initial measure was to make sure that each government agency will be equipped with sufficient amount of office automation and IT. Other additional measures include the compulsory computer appreciation programme for all government officials above the C-5 level, and the target for government inter-networking and EDI in 1998.
- Government Information Network (GINet) project is to empower Thai Government agencies to automate inter-office communication and information processing within the agencies. The GINet, planned as a government private network, will be running on high-speed optical fiber backbone capable of data transmission at 620 megabits per second across the country.

- Thailand Software Park project is to support the development of software industry in Thailand.

Thailand Software Park

Thailand is also setting up a Software Park as part of the efforts to promote IT activities of the Thailandís IT-2000. A study by NECTEC in 1995 found that software industry is one of the sunrise industries in Thailand. A software park will help develop software industry in Thailand. The park will be the centre for all types of necessary facilities, amenities, resources and training. It will be the centre for high-speed telecommunications, training, consultancy automation of offices as well as business cluster for software businesses.

The park expects to attract both local and international business related to software including software and hardware vendors, training companies, system integrators, multimedia products and content producers, etc. Software park will have both the physical facilities in cyberspace to help with training and technology transfer as well as being a marketplace for software producers and customers. The software park will operate as an incubator facility with a permanent office. In the long term, the software will operate more as an industrial park like other parks in many other countries. Software related firms to be located in the park will be selected by a review board of the park management.

Those located in the park will be given incentives such as:

i. Permission to bring in foreign technicians and experts to work in promoted projects;
ii. Exemptions of import duties on machinery and equipment;
iii. Exemption of corporate income tax and income tax on dividend for the first 8 years after the start of operation.

Government Information Network

Government Information network (GINet) is another major IT project by Thailand. It is a nation0wide high capacity network for government services that will provide for delivering

government electronic information within geographically dispersed ministry and for inter-ministry communication. The network to be set up will have 155-620 Mbps backbone to all provinces, with several Mbps links to every district. The basic network serviced is part of the plan to computerise Thai government with IT application on top of this network. The project is scheduled to start in October 1997. In the first six months, 10 major provinces will be connected with full connectivity to all 76 provinces in 18 months. Complete delivery to all 680 districts would be completed in the third year (Koanantakool, 1997).

The Phillipines

The Philippines, with more than 50 million people, is opening up the whole country to IT by having a large number of Internet Service Providers. Helping this push is the Philippine network Foundation (PHNET), Inc. a consortium of institutions which established and operates the Philippine-wide area computer network called PHNET. PHNET was created with the support of the Department of Science and technology (DOST) and the Industrial Research Foundation.

The PHNET became the main hub of all the leased line linking the various institutions forming the PHNET. It has more than 60 members now comprising among others government organisations, the academe, private corporation and non-government sectors. The network has covered 10 out of the 15 regions of the country. PHNET serves as an incubator and an integrator ñ an incubator because it nurtured and help other ISP to obtain their own international leased lines; and an integrator because it encouraged other ISP to interconnect with PHNET, thus saving bandwidth resources in the international lines. PHNET claims to be the fastest growing network within the region.

The Philippines will have its first fired or networked city at the Subic Bay Free Port (SBF) in Olongapo City. The cybercity project will connect government agencies, business organisations, educational institutions, and households inside the Subic Bay Metropolitan Authority (SMBA) and links all these with other global networks. It will have a technology institute for training and educational services to create highly skilled workforce and promote cultural acceptance of

technology in the community. (Metropolitan Computer Times Dec 2, 1996. Philippines' First Cybercity to Rise in Subic http://www/newsbytes.com.)

Indonesia

Indonesia has vast potential with a population of 200 million and a huge country. But the problems can be big too. Indonesia is one of the first countries in Southeast Asia to resort to telecommunication technology as early as 1976 when the domestic communication satellite PALAPA was launched. The PALAPA project was necessary to help bring about progress and prosperity to the whole of Indonesian people. This is also the underlying premise of Nusantara-21. Nusantara-21 is the vision and initiative of the government and the people of Indonesia with unlimited reach (Nusantara-21, 19097). Like its neighbours, Indonesia hopes its involvement in the IT will increase national economic competitiveness. Nusantara-21 will become an important infrastructure for Indonesia in the next century.

Physical development of Nusantara-21 involves three major projects:

- Archipelago Super-Lane. This will connect 27 capitals of provinces in Indonesia with various backbone transmissions and bandwidth needs. This will also be included in regional growth areas ñ SIJORI , BIMP-EAGA, IMT-GT, and Australian growth area. NUSANTARA-21 will use "ring of rings" structure because Indonesia because of the nature of the country.
- Multimedia Cities. Multimedia cities will be developed throughout Indonesia which will be provided with fiber optics connection. Multimedia cities represent the centre of economic activities which possess information highway in the city. Among services available in multimedia cities are telecommuting, entertainment information and consumption information.
- Nusantara Multimedia Community Access Centres. Community access concept covers broadband payphone, broadband business centres, network

e-library, and multimedia community kiosks. Telkom Indonesia and Pos Indo will play a major role in providing community access to Nusantara-21.

Nusantara-21 is being harnessed to achieve efficiency, effectiveness and growth of development of Indonesia through government sector (government machinery, education, health services, research and cultural sector); private sector (banking, mining, manufacturing, tourism, general trading and retail); development of local industry.

Brunei

Brunei, with a population of more than 275,000 people, is also busy working on the Brunei Information Infrastructure (BII) to ensure the country is not left behind. Telecommunication network is fully digitised and ready to respond to national, regional and global demand for new information technologies and services. The BII can offer customers access to information from a variety of sources and for the purposes of business, such as telebanking and teleshopping, health (telemedicine), education (distance learning) and social obligations.

To ensure the successful implementation of BII, there will be strategic partnership between government and private sectors. The government, through its telecoms department will build the infrastructure such as laying of fibre-optic cables while the private sector will develop the content, provide value added service and deliver the services to the users.

Brunei is also working on a national vision of making Brunei as the Service Hub for Trade and Tourism by the year 2003 called ShuTT2003 by investing heavily on information infrastructure.

Brunei, with a fully digitised telecommunications network enables high quality telecommunication and multimedia services to be provided to the people.

Malaysia

Letís take a brief look at Malaysia today. Malaysia has been set back by a decade in terms of per capita income [US$3238 or RM12,305 (1999) as against US$5,000] as a result of the recent financial crisis. Fortunately, Malaysiaís infrastructures are

still intact and much better than a decade ago. However, in 2000, Malaysia per capita income rebounded to RM12,883.00, with a further rise in 2001 at RM13,708 (Economic Report 2000/2001).

Malaysiaís current state of development was achieved under the leadership of Prime Minister Dr Mahathir Mohamad. The great shift in Government policy took place when he instituted the Malaysia Incorporated concept and the Privatisation policy, both in 1983. The Malaysia Inc. concept is a new way of approaching the task of national development. It is a concept of close cooperation and mutual understanding between the public and private sectors, where the two behaves and operates as a huge "corporation"to mould the nation into an advanced, affluent industrial society. (Malaysia Today towards the new Millennium, 1997). The Privatisation policy was introduced to transfer the activities and functions government departments to the private sector to bring positive changes in management and performance of the public enterprises. To date a total of 360 projects has been privatised. (Malaysia Today, 1997). The implementation of the policy was carried out using the Privatisation Master Plan and privatisation Action Plan.

One major project is the North South Expressway (NSE) which was awarded the concession to United Engineers Malaysia Berhad (UEM) to complete the construction of the expressway, to carry out maintenance and as well collection of toll during the concession period. Another was the setting up of TV3, a first private commercial TV station in Malaysia. Telekom Malaysia was also corporatised and later privatised, likewise Tenaga Nasional (the electricity utility company). Petronas (National Petroleum Company) was set up earlier as a government company. The completion of the NSE opened up the country to new settlements and industrial areas. The privatisation of Telekom Malaysia helped to speed up the development in the telecommunications industry.

IT – New Engine for Malaysia's Development

Malaysia has chosen IT to drive its economic and social development, moving from its current agricultural and manufacturing-based economy. The timing could not have been better. Through the country's Malaysia Incorporated and

privatisation policies, the government carried out deregulation and liberalisation of policies involving telecommunication and broadcasting industries. By late 1980's Malaysia has privatised its telecommunication industry, and the broadcasting industry, sectors that would help greatly in the IT pursuit. Another very important development is the setting up Microelectronic Systems of Malaysia (MIMOS) which played a key role in the Government policies regarding IT.

Malaysia has launched a multi-pronged strategy to achieve the programmes set out in the IT Agenda for the country. To ensure acceptance by the people, the Government recently launched a campaign to make IT a way of life for the country. The National Information technology Agenda (NITA) is central to the National Awareness campaign with the theme *IT As A Culture*. In a further effort to promote IT literacy and its use at all levels, NITC has formed a high-powered committee to map out a plan of action to establish a strong IT-mindset in the country (New Straits Times, Mar 23, 1999, p 1). The committee called the NITC Strategic Thrust Implementation Committee, is chaired by the Deputy Prime Minister, Abdullah Ahmad Badawi. The SITC was formed to help build the capabilities, in terms of knowledge and skills of individual Malaysians, to live and work in the electronic world. It is also aimed at developing and strengthening the capacity of organisations and institutions so that they function efficiently and effectively in the emerging networked global society.

Malaysia has set for itself to be a fully developed country by the year 2020. In order to achieve it, Malaysia per capita GDP will have to be over US$9,000 and a growth rate of 7 per cent per annum. Malaysia will have a brighter prospect of achieving the target using the IT approach with the per capita GDP expected to be over US$15,000 (Computimes, NST). However, this prospect is somewhat dim because of the economic crisis, Malaysiaís economy contracted in 1998 and while growth for 1999 is expected to be in the region of 1 to 3%.

Malaysia has set up a National Information Technology Council under the Chairmanship of the Prime Minister Datuk Seri Dr Mahathir Mohamad. Malaysia National IT agenda is underscored by catch-phrase of turning ripples into tidal waves. It talks in terms of high tides and low tides and of the

IT waves, initiating the ripples and turning these ripples into tidal waves. Malaysia needs to recognise and understand and proactively respond to the third wave of information revolution. Among Malaysia's response towards this technology evolution is the setting up of Multimedia Super Corridor and other initiatives throughout the nation.

IT Agenda of Malaysia

National IT agenda is rooted in Vision 2020 which envisages the creation of a civil society as the ultimate goal. In the civil society all Malaysians will have access to information and learning through infostructure for personal, organisational and national advancement. Information and knowledge application will provide the basis to further enhance Quality of work and life.

The IT agenda calls for providing a top-down leadership, orchestrate bottom-up technology push and generate outsideñin demand pull. There is also a need for a dedicated and determined IT initiative. The answer is the MSC, which will be used as the national test-bed for multimedia capability development and indigenous participation. There is also need for involvement of all Malaysians in IT revolution. This will be done through democratising the policy formulation process, to engage key players/stakeholders in national agenda building. Finally, transforming opportunities into tidal waves of national, regional and global changes. This will involve positioning MSC as the International Centre of Excellence for Multimedia and leverage on the MSC to transform the entire country.

The National IT Agenda identifies three key elements ñ people development, infostructure development and application development. The three elements of NITA are interdependent by interlinking objectives, according to MIMOS Berhad President Datuk Dr Tengku Azzman Sharifadeen (Rozana Sani, Computimes, Oct. 16, 1997).

People Development

There are three strategies under the people development element, namely education, skills development, and acculturation system. Among programmes to be carried under the education strategy with the target date of 2005, are smart

schools for the whole of Malaysia, schools connected to Internet, Multimedia university, basic computer literacy programme for all and electronic distance education.

While programmes under the skill development are learning culture in all sectors, intelligent performance support and decision support systems, business re-engineering knowledge and tools and knowledge intensification skills programmes.

Programmes under the acculturation system are acculturation through the comprehensive education system, On-line information services, Networked electronic communities, IT appreciation through media and Strengthening traditional values.

Infostructure Development

Under the infostructure development element strategies identified are network, appliances and legislation.

Some of the programmes identified under the network strategy to be ready by the year 2000 are, Broadband network technology, Mobile computing technology, Every new house/ premise must be linked to network, Every new road/building must have conduit ready, and Global coverage.

Programmes under the appliances strategy, expected to be ready by the year 2005 are, intelligent low cost access appliances, Malaysian brand names for products and services, and culture compatibles user interface.

Some of the programmes under the legislation strategy are Asean cyberlaw Institute, Multimedia Convergence Act, International cybercourt of justice, and Multimedia Funds Haven.

Applications Development

Under the applications development element, three strategies have been identified, namely the indigenous content development, interactivity, and infotainment, educatainment and infocommunication.

Under the Indigenous content development strategy, seven flagship applications have been identified, and culture compatible content. Target date for these projects the year 2005.

Under interactivity development, some of the programmes identified are electronic communities, electronic

libraries, electronic newspapers/contents, and teleshopping. Target date for these projects is year 2005.

Some of the programmes under the infotainment, edutainment and infocommunication are teleconferencing: multimedia, multimedia electronic mail, focus on infotainment and edutainment content in media, on-demand educational services. These programmes are expected to be ready by the year 2005.

Multimedia Super Corridor

Multimedia Super Corridor (MSC) is a 15 km by 50 km corridor running south of the Kuala Lumpur City Centre (KLCC) to the Kuala Lumpur International Airport (KLIA) in Sepang. The new Federal Administrative capital of Putrajaya is in the MSC, and east of Putrajaya is Cyberjaya, the first cybercity in Malaysia. MSC is not another Silicon Valley because the Government objective is not the attract international and local companies to manufacture or assemble computer products in the area (Quantum Leap into Cyber Space, Investors Digest, March 1997). In fact, three of the applications for MSC status companies were rejected recently because of this reason.

On the other hand, information technology (IT) and multimedia companies would be induced to locate there to engage in remote manufacturing and to introduce high value added IT goods and services to enable Malaysia to become a regional IT hub. IT and multimedia companies are required to undertake their content development, software development, develop technologies for the network, develop Internet products, conduct electronic commerce, among other things. In short, MSC is going into value added products where it should have competitive advantage. The bottom-line of the whole initiative is to transform the country into one which is a knowledge-based society and one where the industry is IT and information driven. There are three objectives of the MSC:

1. To enable the country to reach the target of Vision 2020 through productivity-driven growth. Malaysia is getting competition from countries with lower labour cost. The objective is to enable Malaysia to reach the target of quadrupling its per capita output by the year 2020.

2. To speedily transform the country to become the leader in synergising foreign and Malaysian companies to become global players in IT and multimedia in the next 10 to 20 years.
3. To form smart communities, to interlink with other intelligent cities around the world like Singapore, Japan and Bangalore in India where there are good software activities. Prior to that MSC will be linked to other parts of the country as such as Penang, Selangor, Johor, Sabah and Sarawak so the whole of Malaysia will be a supercorridor between the year 2000 and 2010. (Quantum Leap into Cyber Space, Investors Digest, March 1997).

The MSC project is targetted to attract investments from the worldís top information technology companies and Malaysiaís 20 million people into the next millennium to rank it among industrialised nations by the year 2020. Three mega project within the MSC will be major consumers of multimedia products and services: 1) Putrajaya, the intelligent city with a paperless administration, 2) The Kuala Lumpur International Airport and the Kuala Lumpur City Centre, featuring the Twin Towers, the worldís tallest building at 452 meters.

The Government will also spend US$2 billion building a new city called Cyberjaya that will support 100,000 residents and attractive enough to lure some of the worldís leading IT specialists.

An international advisory panel comprising top brass of information technology companies mainly from the United States, Japan and Europe have been set up, including Microsoft Chairman Bill Gates. Miscrosoft itself is considering engaging in some peripheral research operations.

While MSC can be considered to start from scratch, Malaysia already has about 20 yearsí experience with foreign companies establishing their semi-conductor operations, going from mere assembly to sophisticated testing. In fact, exports of electronic and electrical products accounted for 64% of all exports valued at RM89.7 billion (US$23.6 billion at US$1 = RM3.8) in 1998.

Seven Flagship Applications

Seven applications which will utilise the technology have been identified to spearhead the MSC. Each application will have a lead agency to ensure the success of the applications. The applications represented key multimedia usage to spearhead the creation of a multimedia industry in the country. The applications are jointly developed by the Government and the private sector. There will be an industry advisory panel which will provide consultation in planning the concept, marketing and implementation of each application. The applications will not be limited to seven. In the future it will be increased as and when necessary. The seven applications are:

1. **National Multipurpose Card**
   Lead Agency: Bank Negara
   The MSC will be a test-bed for a world first national multi-purpose card that will be issued to all Malaysian citizens. According to MDC, this smart card can serve as a national identity card, and "electronic" purse for purchasing small-ticket items, a credit card, telephone card, club membership and will ultimately be used in all electronic transactions with the government.
   It is due to be commercially released before the year 2000. There have been suggestions that instead of one card, it should be two cards. It is too risky to have one card with all the personal information and financial information in that one card.

2. **Electronic Government**
   Lead Agency: The Malaysia Administrative Modernisation and Management Planning Unit (Mampu)
   Putrajaya, the new seat of the national Government, now under construction in the MSC, will pioneer the paperless administration in the government sector by using the multimedia technologies. The prime ministerís office will be the first to become paperless by the year 2000.

3. **Worldwide Manufacturing Web**
Lead Agency: Ministry of International Trade and Industry (MITI)
Compaies can use the MSC to establish regional hubs to control, monitor, and deliver operational support to their regional networks of design, manufacturing, and distribution centres. Using MSCís low-cost, high-performance information and logistic networks, regional operation can be linked with operation across the globe 24 hours a day, 365 days a year. The telecommunication links will enable companies to have real-time operational control of product development and customisation, manufacturing operation around the world from a central MSC operation.

4. **Borderless Marketing Centre**
Lead Agency: Multimedia Development Corporation
The MSC will serve as an excellent platform for companiesí customer service operation, such as telemarketing, technical support, background data processing, and local customisation of marketing materials. MSC laws, policies and infrastructure will help MSC companies serve their customers in the Asia-Pacific market.

5. **Smart Schools**
Lead Agency: Ministry of Education
Malaysia is committed to ensure that its school children will be information technology literate. Model ìsmart schoolsî will be develop within the MSC and rolled out to the rest of Malaysian schools. MSC-status companies will have the opportunity the shape the smart school concept by developing software application curriculum, courseware, teacher and staff training on information technology.
The Education Ministry has chosen 90 schools to launch the smart school concept on January 1, 1999.

6. **Telemedicine**
Lead Agency: Heatlh Ministry
Through the multimedia flagship application, the multimedia techniques will be incorporated into

Malaysiaís healthcare system. The key elements of telemedicine include distance learning, remote consultation, diagnosis and treatment virtual patients records and a national medical network. Malaysiaís first flagship hospital will be in the city of Selayang. The pilot hospital will lead the move towards using multimedia systems in Malaysian hospitals.

7. **R&D Cluster**

Lead Agency: Science, Technology and Environment Ministry

Malaysia plans to be at the forefront of R&D next generation multimedia technologies by developing collaborative R&D centre between corporations and universities. Multimedia University, to be located in the MSC, will be the catalyst in creating a research community which will utilise MSCís unique environment to test new multimedia and IT applications.

To boost R&D in the MSC, a grant scheme with an initial allocation of RM100 million, was launched on Oct 29, 1997. Malaysian majority-owned companies which have obtained MSC status can now apply for funds for their research and development activities under the scheme (New Straits Times, Oct. 30, 1997, p.3). Companies with at least 51% Malaysian-owned are eligible to apply. The objective of the scheme is to help local companies or joint ventures to develop relevant multimedia technologies and applications that would contribute to overall development of the MSC. This a matching grant scheme which would provide funding up to 50 per cent of the project cost. No repayment is required if the project is successful.

MSC Guarantees and Incentives

All companies that create, distribute, integrate, or use multimedia products and services can apply for MSC Status. Companies awarded MSC Status will enjoy the Malaysia Governmentís Bill of Guarantee and other compelling incentives, including:

- Substantial financial incentives such as zero percent income tax for up to 10 years, a 100 percent investment tax allowance, and no duties on multimedia equipment.
- The right to tender for key implementation contracts for Flagship Applications. Only companies with MSC Status will be able to apply for these contracts.
- Support from the MDCís one-stop centre that will expedite visas and other licenses and permits.
- Direct access to Malaysiaís top leadership through membership of MSCís International Advisory Panel, chaired by the Malaysia prime minister, and the Foundersí Council, chaired by the deputy prime minister. First movers to the MSC will be invited to sit on these high-level councils.

Ten Bills of Guarantees

The Malaysia Government commits the following to companies with MSC Status:

1. Provide a world-class physical and information infrastructure
2. Allow unrestricted employment of local and foreign knowledge workers
3. Ensure freedom of ownership by exempting companies with MSC Status from local ownership requirements
4. Give the freedom to source capital globally for MSC infrastructure, and the right to borrow funds globally
5. Provide competitive financial incentives
6. Become a regional leader in intellectual property and cyberlaws
7. Ensure that there is no Internet censorship
8. Provide globally competitive telecoms tariffs
9. Tender key MSC infrastructure contracts to leading companies willing to use the MSC as their regional hub
10. Provide a high-powered implementation agency to act as an effective one-stop super shop

MSC - New Innovations and Ideas

MSC is for new innovations and new ideas and not direct manufacturing. Up to March 12, 1999, of the 275 companies applied, 203 companies have been granted MSC-status, companies that are approved to set up business in the MSC. .The rest are still being evaluated. Table 2 shows the number of application up to March 1999, number approved, and number of world class companies as at March 12, 1999.

TABLE 2. MSC-Status Companies -Number of Applications and Approvals

Indicators	May 1998	Oct 1998	Mar 1999
Total MSC Applications	205	251	275
Number of MSC-status companies approved	129	179	203
Number of World class companies	20	27	29

Source: New Straits Times, March 17, p. 4

TABLE 3. MSC Companies in Operation March 12, 1999

Key Indicators	1997	1998	1999
* Companies in operation	94	134	139
* Investment (RM mil)	1097	1190	1193
* Revenue (RM mil)	1065	2922	4002
* Profit (RM mil)	-283	52	600
Knowledge workers			
* Local	2705	7626	9168
* Foreign	288	710	748

Source: The Sun, Business March 17, 1999. P. B40

TABLE 4. What The Companies Do

What They Do	%
Developing software	37
Content Development	19
Systems Integration	15
Telecoms and Networking Services	10
Others	19
Total	100

The Sun, Business, . March 17, 1999, B40.

TABLE 5. World Class Companies with MSC Status Holding Local or Regional Offices in (March 12, 1999)

	Local	Regional
1	Nokia (M)	Fujitsu (M)
2	SITA	Bloomberg
3	Sap Regional Enterprise Centre	Intel Malaysia Design Centre
4	Siemens Multimedia	Reuters
5	Motorola Multimedia	Fujitsu Telecommunications
6	Newbridge Networks	Pernec-NEC Multimedia R&D Centre
7	Lotus Development	BT Multimedia
8	Lucent Technologies	Sun Microsystem
9	Oracle MSC	NTT (MSC)
10	Ericsson Support Malaysia	EDS
11	Ericsson Academy	Compaq@MSC
12	Ericsson Data	Microsof Knowledge Centre
13	Ericsson-Hewlette-Packard	
14	Asia Pacific Information Services (DHL)	
15	Baan Education Asia Pacific	
16	Shell Services International	
17	BAT-Asia Pacific IT Development Centre	

The Sun, Business, 17 Mar 1999, p. B40.

Telekom Malaysia

Telekom Malaysia is the sole provider of the basic telecommunications infrastructure in the corridor. The company will be spending about RM5 billion over the next 10 years to set up state of the art telecommunications linkages in the MSC. With the completion of the MSC infrastructure, Malaysia would be on target to meet the challenges of the multimedia era and a full participant in the information and technology. The company's extensive infrastructure development plans include fibre-optic networks to houses, broadband services and diversity packages.

On November 10, 1997 Malaysia takes a ìquantum leapî into Multimedia networking solutions with the launching of Corporate Information Superhighway (COINS) by Telekom Malaysia. COINS is Malaysiaís first multimedia networking solution basedon Asynchronous Transfer Mode (ATM) technology. It is a fast, open, nationwide and globally

connected, broadband multimedia network with a huge capacity of up to 10 Gigabits per second. COINS is meeting the demands of regionalisation and globalisation of business, remote manufacturing, borderless marketing, electronic commerce, distance learning, etc.

COINS will be the networking platform that will manage the transmission of information within and outside the MSC. The seven flagship applications of the MSC will all require the massive bandwidth, reliability and security of COINS to run successfully.

Some of the strategic applications of COINS are banking, transport services, government, brokerage and securities, manufacturing, retail and trading, Internet and Intranet.

ATM Testbed

An experimental Asynchronous Transfer Mode (ATM) network will be launched comprising five Malaysian universities, two companies and a government department. The partners are MIMOS Berhad, Cellular Communications Network (M) Sdn Berhad (Celcom), Telecommunications Department, Universiti Putra Malaysia (UPM), Universiti Sains Malaysia (USM), Universiti Malaya (UM) and Universiti Telekom (Unitele). The experimental network called Testbed Environment for Malaysian Multimedia Applications (Teman), will connect its member organisations, and will be used as a testbed for new and existing ideas, applications and services in ATM technology, before being implemented on real networks.

It will also provides a platform for testing the conformance of networking hardware and ATM standards implementations. *Teman* will also be used to test the Public Enterprise ATM Gigabit Optical Network (Pentagon) being developed by Celcom's research and development department.

Over 100 researchers are expected to be involved in the project when the network, which has a bandwidth of 115 Mbps, is completed early next year. This number is expected to increase as more members join the project. *Teman* will be the first end to end ATM network in Malaysia.

The *Teman* partners will invest an estimated RM27 million over three years on the project, with MIMOS contributing RM7 million from the Intensification of Research

in Priority Areas Programmes (IRPA). Mimos will provide Internet access and will serve as a hub between member organisations. The cost of local connectivity will be borne by individual organisations, while Celcom will sponsor the wide area links.

Teman network will also be connected to other experimental; networks. These include Asia Pacific Information and Infrastructure Testbed in Japan, the Asia Multimedia Forums (AMF) ATM network and the Canadian Networks for the Advancement of Research Industry and Education (Canariel). *Teman* will also be linked to the Asia Pacific Advanced Network (APAN), the Berlin testbed operated by GMD-Fokus in Germany, and by satellite to the Asian Internet Initiative Interconnection (AIII) (ATM testbed to be launched, The Star In-Tech, 30 Sept 1997. P. 2).

MESDAQ

Malaysia has set up a third securities market, the Malaysian Exchange of Securities Dealing and Automated Quotation, to boost the development of MSC. It is designed to provide technology-related companies with an avenue to raise funds to start up, upgrade or to expand. Mesdaq is expected to be functioning by the end of the year. Mesdaq is a stategic capital market support for the national plan to develop the MSC.

It is hoped that the new market will attract not only small and high-tech good growth companies from within ASEAN region, but also Asian companies already trading on Nasdaq (National Association of Securities Dealers Automated Quotation) in the United States. Or other North American exchanges to seek a secondary liisting.

Mesdaq's preferred listing sectors include telecommunications, IT and software engineering, electronics and advanced electronics, biotechnology including pharmaceuticals and food supplements, environmental technology including alternative energy sources, advanced materials, aerospace technology and lastly, education/training services for technology companies.

Companies to be listed on Mesdaq need not have track of profitability but they may hold hi-tech promise. (Market for New Engines of Growth, Investors Digest, March 1997, p. 17). After putting off launching a few times, MESDAQ is expected

to began trading on April 30, 1999 with the debut of Supercomal Technologies (The Sun, Business B40, 17 Mar 1999). MESDAQ has also approved three other companies for listing and is considering applications from two others, and also monitoring 30 other companies.

For a MESDAQ listing, a company must have RM2 million in paid-up capital, give full disclosure of its business and plans and have a sponsor for the first five years.

Malaysia's Preparation

Malaysia acknowledges that IT will play an important role in the future not only of the country but also the world. To meet the challenges of future Malaysia has carried out reformation in many areas including education system and the government administration. The government wants Malaysian from all walks of life to be involved in IT.

Manpower

Manpower development is an important key to successful implementation of IT projects in the country including the Multimedia Super Corridor. Some 18,000 workers knowledgeable in computers and computer related skills will be required in the MSC alone in the first five years of its existence. However, some 35,000 skilled workers will be required in other parts of the country. Initially, Malaysia's skilled workers will come from three major sources.

1. Foreign companies in MSC can bring in any number of foreign workers they need.
2. Malaysian expatriates now residing in other countries like Singapore, Australia and the United States of America and elsewhere.
3. Malaysians educated and trained in IT.

As can be seen in Table 2, there are now about 10,000 knowledge workers (both local and foreign) engaged in the MSC. Since more knowledge workers are needed in and out of MSC, steps are being taken to educate and train potential workers. The Ministry of Education is in the process of converting all vocational schools in the country by the year to

2,000 to cater to the increased need in the science and technical manpower. The conversion began in 1993 where there were six technical schools against 69 vocational schools; in 1997, there were 31 technical schools and 47 vocational schools. It is expected that by the year 2,000 intake in the technical schools will increase to 89,440 students from 5,493 student in 1993 (Economic Report 1998/1999, 1999). Most of these students are expected to join the universities to pursue engineering and IT related programmes. At lower levels, other agencies are involved in producing certificates and diploma graduands related to multimedia.

Bringing Back Malaysian Expatriates

In an effort to further boost the number of knowledge workers for the MSC, the Ministry of Science, Technology and the Environment (MOSTE) has launched a programme to bring back Malaysians now working overseas, especially in the United States, Australia and Singapore. It is estimated that there are about 1,000 Malaysians now involved the information technology sector in those countries. Countries like Taiwan have benefited from the returnees, and Malaysia expects the same. It is considering two models, Japan and Korea, on best to court these Malaysians. (Return of the natives, The Star Section 2, p 2-5, Oct, 6, 1997).

Finance Minister, Tun Daim Zainuddin, announced in his 2001 Budget Speech, that foreign spouse of returning Malaysians and their children who are not Malaysian would be given permanent residence status within six months of their return and all personal effects including two cars would be given tax exemption. Furthermore, their income remitted to Malaysia within two years be exempted from income tax (New Straits Times, Oct. 28, 2000, p. 14).

The 2001 Budget-Developing the Information and Communication Technology Industry

The 2001 budget could be described as the cornerstone for Malaysia preparation towards K-economy. Tun Daim Zainuddin, said that there Malaysians have no other alternative but to accept the realities of the K-economy. The new economy will lead to increased productivity, higher

incomes as well as a better quality of life. Measures taken to achieve this include intensifying investment in ICT, eduation ansd the retraining of workers.

Emphasis on ICT will be continued as ICT-based applications are necessary to enhance the nationís productivity and competitiveness. The development of infrastructure in MSC marked the beginning of these initiatives.

As a further effort the Government has set up another Venture Capital Fund totalling RM500 million for capital financing of ICT companies. Listing requirements on MESDAQ will also be liberalised including reducing the requirement that 70% of the listing proceeds be used in Malaysia. This is to facilitate the access of venture capital companies to the capital market.

Earlier, in the 1998 Budget, the Malaysian Government announced the formulation of a National Information Technology Agenda (NITA) which became an important strategy for national development. Other measures taken in the 1998 Budget were:

- In line with the development of MSC, the Government has allocated a sum of RM400 million in 1998 to enable agencies to develop information technology and Electronic Government. This involves the implementation of fine pilot projects for selected departments and computerisation programme at various levels of technology in Government departments.
- A sum of RM119 million is allocated to implement the Smart Schools in 90 selected schools.
- The Government will also install kiosks which are computer terminals that will facilitate the public in their transaction for various services.
- The Government is providing a tax rebate of RM400 for the purchase a personal computer for each family, for a period of five years.
- Tax incentives given to MSC companies are extended multimedia faculties of the institutions of higher learning that provide courses in information technology, telecommunications, graphics and imaging.

Education

In the long run manpower for the IT will have to come from within the country itself. Realising the importance of science and technology, Malaysia has given more emphasis to S&T making it a policy to produce more S&T as opposed to Arts in the ratio of 60:40. In line with its corporatization policy the government is in the process of corporatization of Malaysian universities and establishing new private sector universities. Education is no longer merely a social service. It is now considered an industry whereby Malaysia is being developed into an excellent centre for education in the region.

There are ten universities in Malaysia, all set up by the government, namely Universiti Malaysia, Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, Universiti Sains Malaysia, Universiti Teknologi Malaysia, Universiti Utara Malaysia, Universit Malaysia Sarawak, and Universiti Malaysia Sabah, and Institut Teknologi Mara and International Islamic University of Malaysia (IIUM).

In order to boost the number of graduates in S&T and also management, and to encourage students from other countries to study in Malaysia, the government has given the green-light to a number of public sector companies and privatised corporations to set up universities. Under this scheme Telekom Malaysia has set up Universiti Telekom Malaysia (Unitele), Tenaga Nasional has set up Universiti Tenaga, Petronas, Universiti Petronas. Other private sector universities are Universiti Multimedia (joint-venture between Telekom Malaysia and Nippon Telephone and telegraph), Malaysian University of Science and Technology (MUST), International and Commonwealth University, and Universiti Pendidikan (University of Education). Several other private universities are also in the pipeline including Renong and group of companies.

Prior to the setting up of these private sector universities, many private colleges have set up twinning programmes with other universities from all over the world mainly with universities in United States of America, United Kingdom, and Australia. Under twinning programmes, the first part of the graduating programme is taught in Malaysia. Ten of these colleges have been awarded certificates to run 3+0 programmes, meaning they could offer full foreign university degrees at their campuses.

The Government has also started the computer literacy programme for students and Smart Schools Programme comprising 90 pioneer schools. The pioneer project which began in early 2000, is expected to be completed by next year. The Government is also implementing the computer laboratory programme nationwide, whereby each school will have between 12 to 45 computers and equipped with multimedia and Internet facilities. As a start, Tun Daim announced in the Budget 2001 that work has commenced to construct 2,200 computer laboratories through out the nation. By the year 2001, all schools with electricity supply and telephones are expected to be equipped with computers and software through this programme (New Straits Times, Oct. 28, 2000, p. 14).

Regional Cooperation

There is still no regional co-operation in existence. The only effort at this co-operation is only seen at the ASEAN Ministerial Meeting in Kuala Lumpur in June 1997. The meeting has not spelt out in concrete terms what sort of co-operation will be done between ASEAN countries.

But there exists co-operation between telecommunication companies of one ASEAN country and another, eg. Telekom Malaysia investing in a telecommunications company of Thailand.

There are areas that Asean should co-operate to benefit each other. The are advantages in doing global business through strategic alliances or coalitions (Michael Porter of Harvard Business School , The Competitive Advantage of Nations)

Inter-regional Level

There is also no inter-regional level co-operation to talk about. However, telecommunication company of a non-ASEAN country has set up a regional company that can be participated by other countries, including ASEAN countries. eg, Nippon Telecom and Telegraph (NTT), Malaysia, Thailand and Singapore are expected to take part in this joint-venture.

Nippon Telegraph and Telephone (NTT) is forming a joint venture company with major telecommunications firms in

other Asian countries to provide regional Internet services. NTT is to take a 15 per cent stake in Asia Internet Holding, a Tokyo-based company operating Net circuits connecting Japan and seven other Asian economies, according to Nihon Keizai Shimbun, reports AFP (NTT joins other Asian telecoms carriers in Internet venture, Sunday Mail, 24 Aug. 1997: 15). NTT will put up 240 million yen (about RM5.8 million) to obtain the stake by October, with carriers in Malaysia, Thailand and Taiwan also making capital participations. Telekom Malaysia Berhad will put up 50 million yen. The Japanese telecoms giant will also call on Singaporean and Hong Kong carriers to invest. Asia Internet will increase capital in October, opening new circuits linking Vietnam, the Philippines and others by the end of the year.

Conclusion

By and large, countries in the region will have to contend with at least three major developments in their pursuit for the information era, ie information infrastructure, people, and applications development. To what extent each of the countries will be able to develop will depend on the economy of the country. With the recent financial turmoil in Southeast Asia, a few of the countries may be affected and will probably take a longer time to achieve the set target.

This is true in the case of Malaysia. While MSC will go on, the Putrajaya project is now approved for phase one only. Putrajaya is the new administrative centre of the Federal Government. This is where Malaysia will begin with the concept for electronic government.

One of the challenges of carrying out projects related to information technology, such as MSC, is the acute shortage of manpower in the IT. This shortage is not confine to Malaysia and Southeast Asian countries only. This shortage happens to be everywhere in the world, since all countries are starting out almost at the same time. In the case of Malaysia it is doing the following:

i. Policy emphasis for science education against the arts, in the ratio of 60:40.
ii. The setting up several new universities with science and technology based.

iii. Upgrading of vocational schools to technical schools and polytechnic
iv. Bringing back Malaysian expatriates now working in USA and elsewhere to work in Malaysia, such as was done in Taiwan.

However, there may be other factors that Malaysia will have to contend with. Competition is stiff. If Silicon Valleyís experience is any indication, competition is going to be very stiff. It is a winner takes all situation. There are many stories concerning this in Silicon Valley.

Malaysia can provide all the necessary infrastructure. In the end the success or failure of this project will depend very much on how the investors, foreign and local, perceive their role against the bottom-line. If they can make a success in Silicon Valley or anywhere else, why should they be here in Malaysia. As someone said: Bangalore can be successful in 10 Ö20 years. Malaysia is not expecting a miracle, something that can happen overnight. In fact, it plans MSC for the long haul.

One aspect that should be considered is regional co-operation. The countries in the region should find areas to co-operate so that the whole region will benefit.

With the world moving towards K-economy, it can be seen that Malaysiaís plunge into ICT is most timely and bringing tremendous benefit to the country.

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References

ATM test bed to be launched, The Star In-Tech, 30 Sept 1997. P. 2.

Berita Harian, Ekonomi, 5 November 1997.

Bulletin Telekom– ucapan, http:///.brunet.bn/telekom/jbt/ucapan/htm http:///.brunet.bn/telekom/jbt/ucapan/htm

Jabatan Telekom Brunei, http://www.brunei.bn/telekom/jbt/mission/htm http://www .brunei.bn/telekom/jbt/mission/htm

Mackun, Paul. Silicon Valley and Route 128: Two faces of the American Technopolis http://www.geog.buffalo.edu/Geo777.mackun.batty4b.html) http://www.geog.buffalo.edu/Geo777.mackun.batty4b.html).

Malaysia Today towards the new Millennium, 1997, Asean Academic Press, London, Asian Strategy and leadership Institute.

Malaysia. 1999. Economic Report 1999/2000. Kuala Lumpur. Ministry of Finance.

Malaysia. 2000. Economic Report 2000/2001. Kuala Lumpur. Ministry of Finance.

Market for New Engines of Growth, Investors Digest, March 1997, p. 17.

Metropolitan Computer Times Dec 2, 1996. Philippines' First Cybercity to Rise in Subic http://www/newsbytes.com http://www/newsbytes.com.

New Straits Times, 17 Oct. 1997. The 1998 Budget by the Finance Minister, Datuk Seri Anwar Ibrahim. Pp 14-18.

New Straits Times. 23 Mar. 1999. Promoting IT literacy and its use. P. 1.

New Straits Times. 28 October, 2000. More focussed strategies, measures, p 12, 14-17.

NTT joins other Asian telecoms carriers in Internet venture, Sunday Mail, 24 Aug. 1997: 15).

Return of the natives, The Star Section 2, p 2-5, Oct, 6, 1997

Singapore One- One Network for Everyone. http://www.ncb.gov.sg/sone/asp http://www .ncb.gov.sg/sone/asp.

The Star business p. 5, 112 firms want to be part of the MSC. 3 Sept 1997.

The Sun, Business. Three More firms get MESDAQ approval. 17 March 1999.