CHAPTER ONE

INTRODUCTION

1. At the dawn of a new millennium, Malaysia finds itself at the crossroads. While the export-led industrialisation strategy of the past fifteen years has been highly successful in bringing growth and prosperity, the need for fine-tuning the country’s economic strategy in light of new realities is also obvious. The battle for a shrinking pool of FDI world-wide is intensifying and Malaysia’s competitiveness and low labour cost are eroding fast.

2. Malaysia must address these challenges squarely. It must ensure that it remains one of the most dynamic, productive and fastest growing economies in the world. It can do this by undertaking a strategic initiative to quickly develop into a knowledge-based economy (K-based economy).

What is a K-based economy?

3. There are many definitions of a K-based economy, all revolving around the notion of an economy based on the production, distribution and utilisation of knowledge, which constitutes the primary engine of growth and wealth creation in the economy. For Malaysia’s purpose, it is proposed that a knowledge-based economy be defined as an economy in which knowledge, creativity and innovation play an ever-increasing and important role in generating and sustaining growth.

4. In a K-based economy, knowledge is the most critical factor of production. It generates more wealth than the other traditional factors of production, land, labour and capital. It is also a commodity in itself. This is in contrast to a production-based economy, where knowledge plays a less prominent role, and growth is driven largely by the accumulation of the traditional factors of production. In a K-based economy, educated and skilled human resources, or human capital, is the most valuable asset.

5. In a K-based economy, a high proportion of its GDP derives from knowledge-based and knowledge-enabling industries such as high- and medium-technology industries, financial and other business services, and the teaching profession. K-based economies are also characterised by high investment in R&D, high literacy, high tertiary education enrolments, good technology-related capacity and skills, strength in innovation, and high ICT penetration and Internet usage.
Why the K-based economy?

6. There are at least seven reasons why Malaysia should undertake the development of a K-based economy:

- Malaysia’s global competitiveness has seen some erosion.
- Foreign competition has increased.
- Globalisation and liberalisation are motivating Malaysia to prospect for new products and services that will be competitive in the global market.
- There is a need to seek higher value-added, partly to offset higher costs.
- There is a need to move into more profitable and wealth-generating stages of production.
- New sources of growth are required.
- There is a need to meet the challenge of enhancing total factor productivity.

**CHART 1-1: MALAYSIA’S RANKING IN THE WORLD COMPETITIVENESS SCOREBOARD (1994-2001)**

Source: The World Competitiveness Yearbook, various issues.
Executive Summary

7. There are therefore strong push and pull factors behind Malaysia’s initiative to become a knowledge-based economy. Ultimately, the transformation will enable Malaysia to regain and enhance its competitiveness in the global economy while simultaneously allowing it to sustain the rapid economic growth that has been the hallmark of its development since the Seventies.

Where is Malaysia situated with regard to the development of a K-based economy?

8. Besides an overall political, social, cultural and security environment that is conducive to the flourishing of a K-based economy, certain factors can be identified as critical to the development of a K-based economy and as indicative of the positioning as well as strengths and weaknesses of a country in that regard. These factors include:

- Quality of human resources - literacy; secondary enrolment; tertiary enrolment; enrolment in science and technology-related subjects; science graduates; technical graduates; expenditure on education; thinking and innovation skills; a learning culture; lifelong learning facilities; English language skills; receptivity to change.
- R&D - Public and private sector expenditure on R&D; personnel in R&D; scientists and engineers in R&D; patents filed.
- Infostructure - newspapers; radios; television; telephone mainlines; mobile telephones; costs of international telephone calls; freedom/availability of information.
- Infrastructure - investment in ICT infrastructure; electricity; personal computers; Internet hosts; Internet subscribers; Internet usage.
- Economy - knowledge workers; knowledge-based industries; knowledge-based services; tacit and codified knowledge; knowledge embodied in work processes and products; e-commerce; high-technology exports; venture capital; openness to foreign knowledge workers; entrepreneurship; risk-taking culture.

9. Malaysia’s journey towards becoming a K-based economy began when Vision 2020 was launched in February 1991. The Vision committed Malaysia, among others, to becoming a “scientific and progressive society”, “an economy that is fully able to adapt, innovate and invent, that is increasingly technology-intensive...”, and “an economy driven by brain power, skills and diligence, in possession of a wealth of information...”.

10. The National Information Technology Agenda (NITA) and the inception of the Multimedia Super Corridor (MSC) were the next big steps. NITA aimed to foster the development of IT as a strategic enabler of dynamic economic growth. The MSC was designed to be an engine of economic growth for the 21st century, and to become a “K-based economy within an economy”. Both projects aimed to bring Malaysia into the knowledge-intensive high technology era through a number of important demonstrator and flagship applications.

11. Malaysia has therefore already made some progress towards developing into a K-based economy. Nevertheless, the bulk of the journey still lies ahead. In terms of ranking for different K-based economy indicators for instance, the United States excels with regard to almost all indicators. In East Asia, Malaysia ranks behind Singapore, Japan, Taiwan and South Korea, but ahead of all other Southeast Asian countries.

12. With regard to the most critical asset for the K-based economy - human capital - Malaysia faces some important deficiencies compared to the developed economies and some others in the Asia Pacific region. In terms of tertiary enrolments in public and private institutions, and enrolments
in natural science, mathematics, computer science, engineering, science and technical fields, Malaysia compares unfavourably with Japan, Korea, New Zealand, Philippines, Taiwan and Thailand. Similarly, with regard to K-skilled workers, Malaysia lags behind its major competitors.

13. As Table 9.12 in the Master Plan indicates, in terms of ICT benchmark data for selected countries, Malaysia is ranked 7th, and is classified as being in the “medium” category. Malaysia is now better equipped in terms of institutional, legislative and regulatory framework following the establishment of the Ministry of Energy, Communications and Multimedia. The MSC also positions Malaysia as an aspiring global hub. Nevertheless, the K-based economy ICT Working Group report points to several weaknesses. Malaysia’s performance in the ICT sector is graded “emerging” (better than “rudimentary”, the lowest ranking, but lower than “advanced” and “world class”, the highest ranking). The ICT penetration rate, while better than Malaysia’s neighbors (other than Singapore), is only half that of Australia, New Zealand and Hong Kong. Malaysia is also comparatively behind with regard to Internet and e-commerce uptake, and content development and R&D. There is also strong inequity among states and between rural and urban areas.

14. To develop into a thriving K-based economy, Malaysia will also have to tend to its low S&T base, poor R&D capacity, low venture capital and low innovative skills.

15. Malaysia however is not without its strengths, quantifiable as well as non-quantifiable. Among others, it possesses strong government support and commitment, capacity for sustained action and carry-through reform, an open economy, rich biodiversity, and a high proportion of high technology exports. The large proportion of trainable and adaptable young in its population will facilitate rapid development into a K-based economy. The country has also launched a decade-old comprehensive ICT drive, which aims to foster an e-community and develop ICT as both an industry as well as an enabler. In Southeast Asia, Malaysia is the best placed to make a successful transition to a K-based economy, next to Singapore.
CHAPTER TWO

THE ROAD TO THE K-BASED ECONOMY

I INTRODUCTION

1. In charting the road to the K-based economy, Malaysia must take cognisance of several fundamental factors. These include:

- The aspirations of its people, as reflected in the Federal and State Constitutions, the Rukunegara, and Vision 2020.
- The total strategic environment, domestic as well as external, that impinges upon the country. Among the important elements in this regard are the impact of globalisation and liberalisation, positive as well as negative, on the nation’s economy.
- The country’s present economic structure and trends.
- Existing capacity in the country and the potential resources at its disposal.

II THE VISION

2. Malaysia’s vision must be to build a strong and resilient, vibrant and competitive economy - growing by an annual average rate of growth of 7 per cent until the year 2020 - driven most strongly by a dramatic increase in the application of knowledge to production and the development of new knowledge-intensive industries.

3. To achieve this vision, Malaysia must aim to grow significantly faster than 7 per cent in the remaining years of the first decade of the millennium because growth is expected to moderate in the second decade as the economy becomes more developed. The recent financial crisis which enveloped the region emphasises the necessity to dramatically invigorate growth rates in the coming years.

4. If Malaysia is able to achieve this average annual growth rate of 7 per cent, it will have succeeded in accomplishing its generational income-doubling plan. Its GNP, having doubled every decade, would be eight times larger in 2020 than in 1990.

5. The growth plan envisaged in the K-based economy will be dependent to a significant extent on raising the growth rates of Total Factor Productivity (TFP). TFP is vital because it reflects the increasing importance of knowledge, human capital, innovation and investments in Information and Communications Technology (ICT) in the K-based economy. The growth path will be achievable with the comprehensive and sustained application of knowledge content into all economic activities and the knowledge industries as well as significant advances in human capital. The contribution of TFP to growth is expected to be high. In order to sustain the growth, it is imperative that capital deepening continues, especially for ICT, as well as the raising of the productivity of capital.
III THE CENTRAL MISSION

6. To accomplish the above vision, the K-based Economy Strategic Plan has proposed that the central mission of Malaysia’s K-based economy initiative be to make the paradigm shift from the P-based economy (P-economy) to the K-based economy.

7. In making this shift, Malaysia cannot afford to dismantle or neglect its presently dominant P-based sector, on which much of the nation’s wealth and well-being depends. Allowing the P-based sector to wither away before a robust K-based sector develops will be economically, socially and politically destructive. The approach, on the contrary, must be to revitalise viable P-based industries by infusing more wealth-generating knowledge into them even as concerted measures are taken to vigorously upgrade and expand the K-based sector.

8. More specifically therefore, Malaysia’s central mission should be to:

- First, ensure the optimal and ever-increasing application of knowledge in the production processes in all sectors of the economy, “old” as well as “new”.
- Second, ensure the vigorous development of viable knowledge empowering and enabling industries as well as profitable and high value-added knowledge intensive industries.

IV SEVEN STRATEGIC THRUSTS

9. The following seven strategic thrusts have been proposed in the K-based economy Strategic Plan to realise the vision, accomplish the central mission, and propel the transition to a K-based economy:

Strategic Thrust One: Cultivate and secure the necessary human resources.

Strategic Thrust Two: Establish the institutions necessary to champion, mobilise and drive the transition to a K-based economy.

Strategic Thrust Three: Ensure the incentives, infrastructure and infostructure necessary to prosper the optimal and ever-increasing application of knowledge in all sectors of the economy and to the flourishing of knowledge-enabling, knowledge-empowering and knowledge-intensive industries.

Strategic Thrust Four: Dramatically increase capacity for the acquisition and application of science and technology (including information and communications technology) in all areas.

Strategic Thrust Five: Ensure that the private sector is the vanguard of the K-based economy’s development.

Strategic Thrust Six: Develop the public sector into a K-based Civil Service.

Strategic Thrust Seven: Bridge the knowledge and digital divides.
10. Each strategic thrust complements the others. All are considered important and indispensable. But the most important of all is the need to secure and cultivate the most crucial asset in the K-based economy: human capital. And the most immediate, in terms of shepherding the transition to a K-based economy, is the establishment of the institutional drivers.

V SIX ESSENTIALS

11. There are six essentials for Malaysia's successful functioning as a K-based economy:

- A conducive external environment.
- A conducive domestic environment.
- Sustained competitiveness.
- Productive partnership between the public sector, the private sector and the community.
- Private sector as the vanguard.
- Good corporate governance.
CHAPTER THREE

DEVELOPING THE K-BASED HUMAN RESOURCES

1. INTRODUCTION

1. The quality of human resources will be the single most important factor that will determine the pace and success of the transition toward the K-based economy. There are three ways in which the quality of human resources can be improved. The first, which is long-term and sustaining, is to upgrade the quality of education at the primary, secondary and tertiary levels, and to foster a cultural and intellectual infrastructure to support lifelong learning. The second, which is medium-term and flexible, is to foster training and re-training for managers and workers. The objective here is to upgrade knowledge and skills to cope with the new demands of technology and markets. In the initial stages, much of such training is likely to focus on the broad organizational changes demanded by the K-based economy, but in later stages the main focus will be on imparting specific industry and job-related skills. The third approach is that of recruiting foreign talent. This is an effective, rapid-response approach, which is useful in meeting urgent shortages of manpower, but cannot be relied on as a long-term solution.

2. Education plays a crucial part in developing human capital and will play a critical role in shifting the economy towards a K-based economy. Education increases the skills and knowledge of individual workers, allowing them to accomplish particular tasks better and to adapt more easily to changing job requirements.

3. For several decades, education in Malaysia was marked by tremendous efforts to meet quantitative targets. Given these quantitative achievements, Malaysian education must now focus on achieving qualitative improvements at the primary, secondary, and the tertiary levels. Information and Communication Technology (ICT) is a principal driver and enabler of the K-based economy, and must be given more emphasis in teaching and learning at school level. Placing priority on science and technical education is also necessary.

4. In addition to a long-term plan to upgrade and promote education, a medium-term strategy should be drawn up to upgrade human resource development (HRD) via skills training and retraining. Knowledge-intensive and creative industries demand a shift in human resource development strategy, one which emphasises continuous training and retraining, both within and outside organisations, on and off the job.

5. Lifelong learning is another area which requires greater attention in a K-based economy. Lifelong learning can provide the organising principle which integrates economic development, social justice, cultural, political and scientific-technological literacy, national unity and cohesion as well as capacity-building for international competitiveness.

6. Another key factor is foreign talent. Recourse to foreign talent is necessary to supplement the supply of domestic talent. New technologies and global economic competitiveness have made high level talent critical and urgent in determining Malaysia’s ability to move towards a K-based economy.
II CURRENT STATUS

Education

7. Malaysia has scope for improvement as regards indicators such as literacy rates, enrolment rates from primary to tertiary levels, investment in education, access to and participation in tertiary education, teachers’ salaries, qualifications and work conditions, and students’ ICT and Internet access.

8. Malaysian literacy rates were lower than the rates of all of the more developed economies in the high human development ranking, but are comparable to the rates of Philippines and Thailand.

9. At the primary level, Malaysia’s achievement is already on par with those of the developed economies. With the exception of a few countries including Singapore, enrolment rates at the secondary level in all the high human development countries in 1997 were already at a universal level. In 1997, Malaysia spent 4.4 per cent of its GDP on education. This was higher than the Philippines (3 per cent) and about the same as Thailand (4.5 per cent). Teachers’ salaries in Malaysia are relatively low. While comparisons should take into account cost-of-living differences between countries, teachers’ salaries in Malaysia are nevertheless four to five times less than those in OECD countries.

Skills Training and Retraining

10. Though Malaysia has almost universal primary school enrolment, secondary school enrolment was 80 per cent in 2000, lower than in South Korea. Young workers who do not have a secondary education are less likely to be trainable and adaptable in the K-based economy.

11. The Labour Force Survey Report 1999 indicates that almost 5 per cent of workers do not possess any formal education (never attended school), while almost 24 per cent only attended primary school. Though about 56 per cent have had secondary education, and 15 per cent tertiary education, almost a third of the current work-force still lacks the minimum literacy, learning ability and skills required for a K-based economy.

12. Almost 60 per cent of school-leavers enter the world of work without any form of post-school training. This stifles their job and occupational mobility and wage earning capacity while also depriving their employers and the economy of higher productivity. In addition, the majority of Malaysian firms do not provide formal training for their workers.

Global Talent

13. Despite the need for high level manpower, there is a lack of sufficiently trained Malaysians. Less than 30 per cent of Malaysians of the relevant age cohort receive a tertiary education, compared to over 50 per cent for industrialised nations. In addition, out-migration drains the limited talent pool.
14. There appears to be a shortage not only in numbers but also in quality. In the recent World Competitiveness Survey 2000, Malaysia ranked low not only in terms of educated talent but also in the international-level competence of its managers. While perceptions and rankings are relative, they are nevertheless critical to international investors who have a choice of competing locations for businesses.

15. The sustainable long run strategy for Malaysia to improve its competitiveness would be: educational reform to increase talent supply and quality, the upgrading of English competency, and retraining of existing workers. The short-term solution is foreign talent. But even this option can be problematic given the worldwide shortage of talent, particularly for IT workers.

III ISSUES AND CHALLENGES

Education

16. At the school level, key concerns are related to the teaching profession, the curriculum, the grading of schools, curriculum content, classroom size, expertise and courseware development.

17. ICT programmes at school level are still heavily centred on infrastructure or procurement of hardware. Software and people development needs in the ICT programmes are more urgent. There is also a lack of coordination among the various agencies in their supporting activities for the ICT programmes, while most teachers have not had sufficient training to maximise the use of computers to enhance teaching and learning. Student contact hours also need to be increased if students are to get more exposure and familiarisation with computer use. At the tertiary level, concerns centre mainly on the issues of research, resources, staff qualifications, and the quality of output.

Skills Training and Retraining

18. Malaysia still lacks an adequate pool of knowledge workers, a sufficiently high enrolment in the sciences at tertiary levels, and broad base of workers with the minimum literacy, learning ability and skills. Educational reform takes time while the recruitment of foreign talent is merely a temporary measure. An effective short-term response would be to train managers and workers to cope with the new demands of the K-based economy. Private and public sector managers need to be trained to re-engineer their organizations into ‘learning organisations’ which can attract, retain and develop K-workers to make their organisations more competitive, service-oriented and efficient.

19. In addition to providing basic education for all, in a K-based economy it is essential to stress lifelong learning and education to help citizens cope with expanding knowledge and rapid change.

Global Talent

20. A world shortage of high level manpower is likely to increase the brain drain from Malaysia.
While the high growth East Asian economies compete for Malaysian talent, particularly in IT, the more serious long term competitors are the advanced K-based economies of the US and Europe which suffer serious shortages of IT personnel.

IV POLICIES AND STRATEGIC DIRECTION

Goals and Targets

21. At the school level, the key aim should be to improve the quality, pay, work conditions, and promotion prospects of school teachers. In addition, there is a need to upgrade and strengthen ICT resources in schools so that teachers may be better able to impart ICT skills to students. At the tertiary level, the goal should be to prepare universities for a ratings system, provide academics more incentives for research, and improve salaries of junior lecturers.

22. To boost training and re-training, efforts should be made to set up a Working Group on Knowledge Workers, improve labour market information, establish an on-line directory of training institutions, organise workshops to train managers in establishing ‘learning organisations’, promote ICT and ‘net communities’, and move from supply- to demand-driven public training systems. A national policy and programme for lifelong learning and education both in and outside the workplace, need to be drawn up.

23. To attract global talent, Malaysia should grant automatic work permits for defined categories of high-level talent in all fields, promote the country as a creative centre, invite world-class talent to local creative institutions, and establish an internet-based network with overseas Malaysians.

Measures

24. In conjunction with these strategies, the following measures may be considered in each of the four core areas of human resources development (HRD), namely education, training and retraining, lifelong learning and securing global talent:-

A Education

Recommendation 1: Upgrade entrance qualifications for teaching positions.

Recommendation 2: Create a separate performance appraisal system for teachers.

Recommendation 3: Restructure the teacher promotion exercise from one which is largely based on seniority to one which is based on performance.

Recommendation 4: Review and restructure the salary scales of teachers.

Recommendation 5: Expand career paths for the teaching profession.

Recommendation 6: Introduce a policy that only teachers with proper training and qualifications will teach subjects such as physical education or become counsellors.
Recommendation 7: Increase administrative staff in every school to a satisfactory number by 2002.

Recommendation 8: Review teacher training programmes to ensure that teachers will be able to teach with the aid of ICT.

Recommendation 9: Integrate ICT in the teaching and learning processes in primary schools.

Recommendation 10: Develop software solutions to coincide with the curriculum review.

Recommendation 11: Outsource the technical component of developing the courseware for critical subjects.

Recommendation 12: Further encourage award schemes for schools with good performance.

Recommendation 13: Identify priority areas for MDC and MIMOS to contribute to the ICT programmes.

Recommendation 14: Provide allocations for schools to maintain ICT centres.

Recommendation 15: Teach entrepreneurial studies in secondary schools.

Recommendation 16: Put in place, by 2005, the e-education enabling environment for the entire education system.

Recommendation 17: Assess and rate quality indicators for large colleges and private universities.

Recommendation 18: Strengthen the effectiveness of the Private Education Department and the National Accreditation Board.

Recommendation 19: Reframe the criteria of the Private Education Department and National Accreditation Board for assessing private educational institutions.

Recommendation 20: Set a target date for the enforcement of the accreditation of courses in all private universities and large colleges.

Recommendation 21: Promote and encourage the merger of the relatively small-and medium-sized private colleges into consortia specialising in different areas.

Recommendation 22: Consider upgrading the merged colleges into universities.

Recommendation 23: Give greater priority to applications for the establishment of institutions that place emphasis on science and technology.

Recommendation 24: Encourage private conglomerates or the public sector to foster ties with private institutions.

Recommendation 25: Set up a repository holding a collection of teaching and learning blueprints or materials (electronic and printed) for various courses from both the public and private sectors.

Recommendation 26: Conduct a study on the impact of collaborative programmes.

Recommendation 28: Offer IT courses in more polytechnics.

Recommendation 29: Further maximise the facilities at polytechnics by increasing the Time Sector Privatisation (TSP) initiatives.

Recommendation 30: Increase significantly the number of community colleges beginning 2002.


Recommendation 32: Improve methods of assessment and provide more incentives to encourage high quality research among academicians.

Recommendation 33: Introduce an incentive to encourage research publications in international journals.

Recommendation 34: Step up measures to recruit those with Ph.D qualifications into universities and set a target that by 2010 all academicians in all public universities will have a Ph.D qualification.

Recommendation 35: Review the salary of junior lecturers.

Recommendation 36: Introduce pedagogical skills training for academicians to enhance their teaching capabilities.

B Skills Training and Retraining

Recommendation 37: Conduct a strategic review of skills training.

Recommendation 38: Improve labour market information.

Recommendation 39: Set up an on-line directory of public and private sector training institutions.

Recommendation 40: Promote ICT training for working adults and non-specialists.

Recommendation 41: Impart key enabling skills to all students and workers.

Recommendation 42: Move from supply- to demand-driven public training systems.

Recommendation 43: Corporatise public training institutes.

Recommendation 44: Increase training/retraining opportunities for the marginalised through ‘bridging courses.’

Recommendation 45: Foster ICT training and the establishment of ‘net communities’ for those with special needs and interests.
C  Lifelong Learning

Recommendation 46: Formulate and adopt a National Policy on Lifelong Learning and Education within the context of Vision 2020 and the K-based economy.

Recommendation 47: Embed lifelong learning education and philosophy in all major government policies.

Recommendation 48: Forge partnerships between government, business, and education and training providers.

Recommendation 49: Formulate policies to encourage the use of schools, community colleges, mosques, civic halls and other public and private buildings for lifelong learning programmes.

Recommendation 50: Launch a National Lifelong Learning Helpline Dedicated Centre that could be located at the Ministry of Human Resources.

Recommendation 51: Develop a fair pricing framework for different types of courses and learning opportunities offered by various modes.

Recommendation 52: Utilise retired citizens to enrich the intellectual capital and the talent pool of the nation.

Recommendation 53: Re-examine functions of key ministries in the provision of learning opportunities.

Recommendation 54: Review and enhance the roles and contributions of museums, libraries and think-tanks in lifelong learning.

Recommendation 55: Promote research and development in the areas of adult education and lifelong learning by strengthening existing research and development centres of lifelong learning.

Recommendation 56: Create learning-friendly environments throughout the nation.

Recommendation 57: Develop Malaysia as a centre of excellence in education and training.

Recommendation 58: Foster the development of scientific and technological literacy through lifelong learning and education.

Recommendation 59: Promote trade union involvement in lifelong learning.

Recommendation 60: Provide incentives to individuals and organisations that support learning and re-skilling.

D  Brain Gain/Global Talent

Recommendation 61: Grant automatic work permits and right of abode to top-level foreign talents.

Recommendation 62: Grant right of abode to Asian/world-class talents in all creative fields.

Recommendation 63: Invite world-class talents to visit local universities, research institutes and creative centres under Distinguished Visitor Programmes.

Recommendation 64: Develop a data-base and Internet-based network with Malaysians overseas.
CHAPTER FOUR

SETTING UP THE INSTITUTIONS TO DRIVE THE K-BASED ECONOMY

I INTRODUCTION

1. Efforts must be made to establish new institutions, change and strengthen existing ones to support the development towards a K-based economy. Existing and new institutions will need to respond to the forces of change. Because of the difficulties of anticipating changes, there is a need for the institutions to build in the necessary flexibility to cope with the demands of a K-based economy and respond to uncertainties.

II CURRENT STATUS

2. The economy has become more industrialised and the manufacturing sector occupies a key part of the economy. The present institutions were set up and maintained when globalisation and its attendant concerns were less intense. At the same time, the importance of creativity and innovation in a K-based economy raises the profile of institutions which are responsible for encouraging the growth of creativity and innovation.

3. Working arrangements, processes and the mechanisms of the institutions must also be reviewed and adjusted to suit the demands for rapid decision-making. At the same time, organisational changes will need to be introduced, and processes and work mechanisms will have to be improved and strengthened to cope with increasing competition. Increasing competition will also call for improved co-ordination between institutions. Two types of institutional changes need to be made. First, there is the need to establish new institutions. Second, there are the changes that must be made to the way existing institutions function and work.

III ISSUES AND CHALLENGES

4. Decision-making will need to be speeded up because of the rapid changes in the market place. The growth of new economic activities, especially in manufacturing, services and technology will require a new institutional regime. Institutions will have to support and encourage the creation, utilisation and diffusion of knowledge. Institutions will need to support private entrepreneurship.

IV POLICIES AND STRATEGIC DIRECTION

5. The following are the measures recommended to strengthen the institutional infrastructure of the economy.

Measures

Recommendation 1: Establish a National K-based Economy Development Council (NKDC).

Recommendation 2: Establish in each state a State K-based Economy Development Committee (SKDC).

Recommendation 3: Strengthen the Economic Planning Unit (EPU) in development planning for the K-based economy.

Recommendation 4: Make EPU the Secretariat to the National K-based Economy Development Council (NKDC).
CHAPTER FIVE

ENSURING THE INCENTIVES AND INFOSTRUCTURE FOR THE K-BASED ECONOMY

I INTRODUCTION

1. The National K-based Economy Strategic Plan has identified “ensuring the incentives, infostructure and the infrastructure for the K-based economy “as one of the seven Strategic Thrusts of Malaysia’s plan to develop into a K-based economy. As the nation embarks on a transition to the K-based economy, significant funds for investment in the required infostructure and infrastructure have to emanate from both public and private sources. Building infostructure is vital, and it complements the traditional roles of infrastructure investments that have characterised the production-based economy.

2. The development to a K-based economy demands financing for new high growth activities that cover K-based industries and services, technology-intensive industries and emerging technologies. The banking sector will continue as the primary source of financing for the domestic economy, in particular for the traditional P-economy activities, while more innovative forms of financing are demanded by the new high growth activities. A system of incentives for the K-based economy will augment the present tax regimes, and focus on accelerating the growth of human capital and infostructure, especially for ICT investments.

II CURRENT STATUS

3. According to the International Institute for Management (IMD) World Competitiveness Yearbook, 2000, Malaysia was ranked 26th in the year 2000 out of a total of 47 countries. It was ranked 5th for investment in telecommunications; 20th for new information technology; 30th for innovation; 35th for protection of intellectual property rights; 59th for research collaboration; 25th for pervasiveness of cluster; and 7th for transfer of technology. It was ranked 4th for implementing a tax system to encourage investments. In terms of financing, Malaysia was ranked 29th for access to credit.

III ISSUES AND CHALLENGES

4. The successful advancement to the K-based economy must ensure the development of the right form of low-cost but high-quality infostructure; favourable incentives to influence resource allocation for K-based and economic activities; and a well-diversified and competitive financial system. Greater efforts are needed to direct finances from non-bank sources to the new growth activities, including nurturing the venture capital industry.

IV POLICIES AND STRATEGIC DIRECTION

5. Among the goals and targets are the following:

- All Malaysians must have access to information in an equitable manner.
• Increase quality and cost-effective investments in infostructure that will be the enablers for development of the K-based economy.
• Raise the level of PC penetration rates, access to Internet and connectivity as well as the number of mobile phone users.
• Raise the quality of the telecommunications services system to facilitate more Internet users in the country by moving towards world standard telecommunications networks.
• Targets for the venture capital industry have been set by the Financial Sector Master Plan (FSMP). In this regard, several measures to facilitate the development of the VC industry have been recommended in the FSMP, in the Chapter on Alternative Modes of Financing, and the Capital Market Master Plan (CMP) in the Chapter on Equity.
• Raise the share of VC investments to GDP from the present level to about 0.10 per cent of GDP, comparable to the achievements of the OECD economies, by year 2010 (Canada, United States, and the Netherlands achieved about 0.15 per cent of venture capital investment to GDP in 1999, and Finland 0.10 per cent).
• Strive for world class quality of support by VC firms to innovators. Another significant goal is to target a higher percentage of external financing by VC compared to public financing, comparable with other K-based economies.

Measures

A Infostructure

Recommendation 1: Build the infostructure for technology absorption capability.
Recommendation 2: Strengthen the science and technology infostructure.
Recommendation 3: Build the infostructure for innovation and technology diffusion.
Recommendation 4: Strengthen the institutional and research infostructure.
Recommendation 5: Establish the infostructure for emerging technologies/K-based industries.
Recommendation 6: Establish the infostructure for intellectual capital.
Recommendation 7: Build the infostructure for human resources.
Recommendation 8: Build the infostructure for knowledge creation and diffusion.
Recommendation 9: Build the infostructure for knowledge management.
Recommendation 10: Build the infostructure for telecommunications.
Recommendation 11: Build the infostructure for ICT.
Recommendation 12: Set up the infostructure for networking.
Recommendation 13: Build the infostructure for data dissemination.
B  Fiscal Incentives

Recommendation 14: Grant tax exemptions to corporations given Strategic K-based Economy Status.

Recommendation 15: Grant incentives for drafting of Corporate K-based Economy Master Plans.

Recommendation 16: Grant incentives for lifelong learning package.

Recommendation 17: Grant accelerated depreciation allowance.

Recommendation 18: Provide incentives for innovation and technology diffusion.

Recommendation 19: Provide incentives for ICT.

Recommendation 20: Provide more incentives for intellectual capital.

C  Financial Support

Recommendation 21: Provide incentives for knowledge management.


Recommendation 23: Adopt a holistic approach in developing the venture capital sector.

Recommendation 24: Enhance financing facilities through financial grants.

Recommendation 25: Enhance the role of the Malaysian Exchange of Securities Dealing and Automated Quotation (MESDAQ).

Recommendation 26: Establish a National Financing System for K-based industries and economic activities.

Recommendation 27: Consider other financing strategies.
CHAPTER SIX

BUILDING THE SCIENCE AND TECHNOLOGY CAPACITY FOR THE K-BASED ECONOMY

I  INTRODUCTION

1. The creation, utilisation and diffusion of knowledge will require a strong foundation in science and technology. High priority will need to be accorded to building the capacity for science and technology (S&T) which can then be harnessed to enhance wealth creation and competitiveness.

II  CURRENT STATUS

Services and K-based Industries

2. Malaysia is still in the P-economy stage as evidenced by the low services component of GDP coupled with low technology capability, be it in the manufacturing or services areas. The indices of the developed countries (represented by Europe-7, USA and Japan), ASEAN (represented by Malaysia, Singapore, Thailand, Indonesia and Philippines) and East Asia (represented by China, Korea, Taiwan and Hong Kong) show the dominance of computing and electronics in global trade. Malaysia’s exports are mostly medium technology exports as evidenced by the relatively low value-added, low information and knowledge inputs/outputs, as well as low numbers of K-skilled workers involved. These ‘hi-tech’ exports accounted for about 60 per cent of total manufactured exports in 1998.

3. The K-based services mainly comprise a broad category of technology-related areas, such as royalties, contracts and professional services, and construction and engineering. The category of other private services in the national accounts shows strong evidence of a shift to K-intensive trade in services.

Infostructure

4. The use of the Internet, to measure access to information and knowledge is a useful indication of the scale of development. Access to information and knowledge in Malaysia is an important issue. There are still sizeable gaps in this area when Malaysia is compared with other countries.

Technology Capacity and Capability

5. R&D performance in Malaysia is low as evidenced by the simple measure of R&D expenditure which is 0.39 per cent of GDP per year. Other countries have R&D expenditure ranging between 2 - 3.5 per cent of GDP. The R&D expenditure for South Korea, Taiwan and Singapore is about 2.0 per cent of GDP. South Korea proposes to increase its R&D spending to 5 per cent of GDP by 2003.
Human Capital for Science and Technology

6. In order for Malaysia to build up its technological capacity, technical graduates are needed. During the period 1993-1998, only about 10 per cent of the total number of graduates were technical graduates. During the same period, the percentage of S&T graduates was about 27 per cent. After 12 years of the S&T policy, the output is still skewed to the arts and social sciences. In contrast, the majority of the Finnish people have technical training rather than academic university education. The hallmark of the German economic system has been the apprenticeship tradition. High standards are key to their system. The number of research scientists and engineers in Malaysia is very low compared to that in the advanced countries.

III ISSUES AND CHALLENGES

7. The key issues and challenges that face the country in the area of science and technology have been addressed by the Study on National Science and Technology Policy II: 2000 - 2010. These issues and challenges include the gaps in S&T achievements, lack of indigenous technology and innovation, critical needs for scientific and technical human capital and financing of R&D.

IV POLICIES AND STRATEGIC DIRECTION

Measures

8. In drawing up the K-based Economy Master Plan, consideration was given to the Report on the Science and Technology Policy II. Seven strategic thrusts were defined in the Report on the Science and Technology Policy II:

- First, a mechanism to ensure strategic coordination and alignment between S&T policies and other broader economic development policies. The proposed target is a National Innovation System - a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts that define new technologies.
- Second, strategic K-based industries would need to be supported by appropriate packages of incentives, government-industry risk sharing, and the establishment of smart partnerships.
- Third, in order to exploit the potential of the K-based economy, enabling and platform technologies should be developed, K-contents intensified in all sectors, and K-based industries developed.
- Fourth, R&D investment would need to be intensified, with the private sector taking the lead in a smart partnership mode. The public sector R&D institutions would need to be more market-driven.
- Fifth, the enhancement of the development, acquisition and commercialisation of technology can be brought about through science-based R&D done at universities, research institutions and incubation centres, through the generation of local technology, reverse engineering of known technologies, or through technology importation.
Sixth, human resource development would need to emphasise demand-driven human capital that is mobile.

Seventh, the establishment of a national fund for R&D.

9. The MSC will continue to assume an important role in these strategic thrusts. Currently, there are 502 MSC-status companies. This broad strategic thrust should leverage on the learning experience of the MSC and it should be considered an integral part of the programme of the K-based Economy Master Plan.

Recommendation 1: Exploit opportunities to intensify the K-content in various economic activities.

Recommendation 2: Give high priority to the promotion and financing of R&D.

Recommendation 3: Develop a strategic technology map.

Recommendation 4: Align national ICT policy with K-based economy strategy.

Recommendation 5: Review strategic co-ordinating mechanism for ICT.
CHAPTER SEVEN

PRIVATE SECTOR SPEARHEADING THE K-BASED ECONOMY

I INTRODUCTION

1. In the development towards a K-based economy it is vital to appreciate that the private sector will assume a more critical role. Private entrepreneurship and involvement in trade and investment has long remained sizeable and will continue to remain sizeable. The key questions that need to be addressed are: How much reliance should be put on private enterprise to transform the economy towards a K-based economy? What are the reasons for relying more on the private sector and the market for developing towards a K-based economy?

II CURRENT STATUS

2. Substantial capital will be required for investment in the creation of knowledge, increasing K-content in economic activities, and for investment in new knowledge-based industries. It would appear, however, that capital formation by the private sector has not been increasing and the evidence suggests a decline in the share of private capital formation to total capital formation. The impact of the East Asian financial crisis and the counter-cyclical measures introduced by the government have contributed to this outcome.

3. Malaysia has been receiving substantial inflows of foreign direct investment (FDI) compared to other countries. In recent years FDI have been attracted to other economies. Private investment in manufacturing, according to Bank Negara estimates, accounted for about 36.9 per cent of total private investment. Recent official data from MIDA show an uptrend in private investments in manufacturing, especially foreign direct investments (FDI). In 2000, applications received amounted to a total proposed investment of RM45.9 billion compared to RM14 billion in 1999. FDI amounted to RM16.2 billion in 2000 compared to RM4.9 billion in 1999. The share of foreign investments, therefore, has increased from 41.9 per cent in 1996 to 64.7 per cent in 2000.

4. Research and Development (R&D) is a major source for the creation of new knowledge. Resources devoted to R&D, however, have not been very sizeable. According to the Malaysian Science and Technology Centre (MASTIC) 1998 National Survey of Research and Development, the Gross Domestic Expenditure (GERD) on R&D of RM1,127 billion as a proportion of GDP has increased from 0.22 per cent in 1996 to 0.39 per cent in 1998. The private sector, since 1992, has provided the largest share of financial support for R&D. According to the MASTIC Survey, in 1998, the private sector spent RM746.1 million for R&D activities, about twice the amount spent in 1996. Although its share has declined, it accounted for about two thirds (66.2 per cent) of the total Gross Expenditure on R&D (GERD) in 1998.

5. Large corporations were responsible for about 70 per cent of the total private sector expenditure on R&D. About 29 per cent of the R&D expenditure of RM746.1 million in 1998 was channelled to the electronic equipment and components industry and 14.7 per cent to other manufacturing industries. Malaysian-owned and controlled companies accounted for about 62.2 per cent of the total R&D expenditure of the surveyed firms. A substantial proportion of the R&D expenditure was channelled towards the Applied Sciences and Technologies. In sourcing
funds for financing R&D expenditure, the private sector relied mostly on their own funds. Various factors have limited R&D activities of the private sector.

III ISSUES AND CHALLENGES

6. Changes in products and services are becoming more and more rapid. The life cycles of products and processes are becoming shorter. The key reason for relying more on private enterprise and the market is because the speed of changes in products and services is becoming more rapid. Products and processes are becoming obsolete much quicker than before and are replaced by new products while with the advent of new technologies, new processes replace old processes. The private sector must be aware of the importance and growth of e-commerce and also as a means of raising their competitiveness. The private sector must also anticipate how e-commerce will affect the nature of business.

7. The growth of e-commerce will have a far reaching impact on how markets are organised. More direct links between consumers and suppliers will adversely affect traditional intermediaries and brokers. New intermediaries will emerge. The B2B (business-to-business) trade which accounts for the bulk (more than 80 per cent of e-commerce) will be transformed so that more complex structures e.g. based on contracting out and joint venturing, will supersede the conventional vertical integration business structure. Private corporations will need to respond to the challenge of re-engineering their organisations and their value chain as a result of the impact of ICT, the Internet and e-commerce. Hierarchies will need to become flatter thus reducing costs through the shortening of management chains. Firms will be the central focus of the learning economy. The creation, absorption and diffusion of knowledge can be constrained, or encouraged, by the character and culture of organisations.

IV POLICIES AND STRATEGIC DIRECTION

Measures

Recommendation 1: Hold dialogues, seminars and workshops to raise the levels of understanding and commitment to the K-based economy.

Recommendation 2: Re-examine and revise accounting standards of the private sector.

Recommendation 3: Set up separate sector associations/groups for the multimedia industries, non-financial services, the software industry and for information and communications technology.

Recommendation 4: Establish private sector organisations for research and development.

Recommendation 5: Establish an organisation to represent knowledge workers in the private sector.

Recommendation 6: Assess the extent of knowledge content of Malaysian-owned and foreign-owned enterprises in selected key sectors, especially in manufacturing and services.

Recommendation 7: Assess and prepare a programme/plan for increasing K-content in Malaysian-owned small-and medium-scale enterprises and in K-based industries.

Recommendation 8: Restructure organisation of firms to meet the needs of a K-based economy.
CHAPTER EIGHT

FAST-FORWARDING THE PUBLIC SECTOR INTO THE K-BASED CIVIL SERVICE

I INTRODUCTION

1. Fast-forwarding the public sector into a more knowledge-based public sector is necessary on account of the need to have a more skilled, efficient and responsive civil service that can function effectively in a K-environment to catalyse, facilitate, and support a K-based economy. A K-based civil service will also be the absolute minimum which a more informed and discerning citizenry will demand as the nation develops. Fostering a K-based civil service in effect also means developing the knowledge-based capabilities of about 911,600 people, or 9.48 per cent of Malaysia’s 9.616 million-strong labour force. This in itself will go a significant way towards creating a knowledge-empowered Malaysian population.

2. The public sector has two primary functions to perform in the development of a K-based economy: first, to facilitate the development of the economy, and second, to develop into a more knowledge-based civil service.

II CURRENT STATUS

3. The public sector was among the early adopters of ICT in its administration and services. The effort to fully exploit the benefits of ICT to raise quality and productivity was accelerated further with the launching of the National Information Technology Agenda (NITA). The most significant initiative under this agenda was the E-Government initiative.

4. Computerisation measures also included the launching of a revamped Malaysian Civil Service Link (MCSL) as a gateway to the home pages of government agencies. In all, the government invested RM2.6 billion in ICT systems and computerisation for the public sector, during the Seventh Malaysia Plan period.

5. Other concerted measures were also introduced during the Seventh Malaysia Plan period to improve the public sector, with regard to quality of services, management integrity and work ethics, and organizational structure. These measures included programmes under the Total Quality Management (TQM) system, rightsizing the public service, and enhancement of training programmes.

6. The public sector intends to build upon these measures and adapt itself to a more knowledge-based environment under the Eighth Malaysia Plan. Effort will be focused, among others, on further enhancing management quality and integrity; extending ICT infrastructure and applications; increasing computerisation; and improving organisational structure, management of human resources and collaboration with the private sector and non-government organisations.

7. Substantial progress has therefore been achieved and further work is in progress. The following areas however, merit attention:
Executive Summary

- Initiatives so far have been focused mainly on the ICT domain. Enhancing knowledge in the civil service has not been given special emphasis beyond the on-going training and development programmes.
- ICT applications and potentials have not been fully exploited and utilised in the public service due to financial, hardware, software and skills constraints.
- Despite recent improvements, the civil service as in many other countries generally remains structured, opaque and procedure-bound, affecting the quality, productivity, efficiency and speed of its services.

III ISSUES AND CHALLENGES

8. Developing the public sector into a more knowledge-based civil service poses various major issues and challenges. Some of the more important ones are the following:

- The civil service is a big organisation and implementing changes to it is a major challenge even for the developed countries with their greater capabilities.
- The civil service scene in Malaysia is further complicated by the fact that there are seven civil services: a federal civil service and six state civil services (Kedah, Kelantan, Terengganu, Johor, Sabah and Sarawak). This Master Plan applies essentially to the federal civil service. Efforts however, will be made by the relevant states to adopt and apply the basic principles contained in this Plan.
- The absorption and application of ICT in the public sector will automatically necessitate changes to organisational structure and management practices so as to achieve optimal outcomes.
- Transforming a work culture, fostered and crystallised over many decades, will require massive unlearning, re-learning, and reform of organisational structure and processes.
- A concerted attempt will have to be made to promote fruitful public sector, private sector and community partnerships and collaboration to accomplish the transition to a K-based economy.
- The public sector must equip itself to satisfy a more demanding clientele that expects the best possible standards and service in the shortest possible time.
- Developing a skilled and knowledge-based public sector actually begins with quality education and training in institutions of learning.

9. A quality education system is therefore among the prerequisites for a quality civil service.

IV POLICIES AND STRATEGIC DIRECTION

Goal and Targets

10. The goal should be to develop a world-class knowledge-based civil service by 2010.

Strategy

11. The strategy should be to focus on four main areas: human resources; organisation and structure; work processes; and ICT.
Measures

A Developing Human Resources

Recommendation 1: Develop management of human resources based on competency.

Recommendation 2: Attract some of the best brains into the public sector.

Recommendation 3: Improve training policy and strengthen training programmes.

Recommendation 4: Strengthen support infrastructure for training.

Recommendation 5: Inculcate stronger thinking skills and a culture of innovation by 2005.

Recommendation 6: Develop a knowledge management system.

Recommendation 7: Enhance transparency.

Recommendation 8: Strengthen capacity for policy analysis and R&D.

Recommendation 9: Improve English language capabilities.

B Reform of Structure and Organisation

Recommendation 10: Introduce flexible, flatter, non-hierarchical structures.

Recommendation 11: Reorganise the public sector.

C Reform of Work Processes

Recommendation 12: Introduce more efficient work processes.

D Absorption and Application of ICT

Recommendation 13: Address ICT shortfalls and introduce improvements.
CHAPTER NINE

BRIDGING THE KNOWLEDGE AND DIGITAL DIVIDES

I INTRODUCTION

1. Growth with equity has been fundamental to the development philosophy adopted by Malaysia. It should continue to be the central consideration in the transition towards a K-based economy. In this regard, the private and community sectors shall be called upon to play a more vigorous role in partnership with government to bridge the information, knowledge and digital divides in Malaysian society, as it undertakes the journey towards becoming a K-based economy.

2. ICT in particular is a potentially powerful tool to empower marginalised groups, and Malaysia should fully exploit its potential. The experience in other countries however, is that the transition to a K-based economy exacerbates prevailing socio-economic inequities while creating new ones. The same will happen in Malaysia unless effective countervailing measures are taken.

3. The quest for social justice is a fundamental tenet of the Rukunegara. Serious socio-economic disparities are morally untenable and should not be tolerated. They also undermine political and social stability. Given the unique political, ethnic and geographic dimension to equity issues in the country, widening gaps will eventually threaten public order, peace and security.

4. In Malaysia, the knowledge and digital divides exist not only between ethnic communities, but also between states, rural and urban areas, men and women, the educated and the illiterate, rich and poor, high and low income groups, young and old, and the able-bodied and the handicapped. The plan to close the knowledge and digital divides must attempt to address all these dimensions as far as feasible. Malaysia’s K-based economy drive will strive to enrich all and marginalise none.

II CURRENT STATUS

The Knowledge and Digital Divides: The Income and Geography Dimensions

5. In Malaysia as in other countries there is a distinct correlation between income levels, and computer ownership and Internet access, due to affordability problems. Besides affordability problems, the poorer groups in rural and distant areas also experience access problems due to inadequate ICT infrastructure.

6. The income factor also impinges on the knowledge divide. Poor and low-income groups are less able to afford tuition, and low-wage workers are also at a disadvantage when they seek to enhance their skills or partake in lifelong learning.

7. The government will continue to give great emphasis to programmes to reduce poverty and close income gaps under the Eighth Malaysia Plan.
The Knowledge and Digital Divides: The Ethnic Dimension

8. The ethnic dimension to the knowledge and digital divides derives from the income gaps among ethnic groups. While poverty and low incomes cut across ethnic divides, the majority of those who are poor are Bumiputeras. The government’s distributional programmes under the Eighth Plan period will continue to narrow gaps between ethnic groups, but the ethnic dimension to the knowledge and digital divides will persist until income gaps are closed.

The Knowledge and Digital Divides: The Gender Dimension

9. Gaps are particularly evident with respect to enrolment in technology-related courses, representation in the administrative and managerial sector, presence in the professional and technical workforce, adult illiteracy and comparative income.

The Digital Divide

10. As at March 2000, only 7 per cent of Malaysians were Internet subscribers. ICT illiteracy is also assessed to be significant given factors such as low proportion of PC ownership, relatively low Internet subscription, and the high percentage of schools still without access to PC facilities. Marginalised groups also include those without formal education, the older generation, and women outside the labour force.

III ISSUES AND CHALLENGES

11. The issues and challenges that Malaysia confronts in its initiative to close the knowledge and digital divides are enormous. The more important ones may be summarised as follows:

- The tension and occasional contradiction between the imperative for fostering rapid economic growth, on the one hand, and the necessity to redress inequities with limited resources, on the other.
- The multi-dimensional nature of the challenge confronting Malaysia.
- Affirmative action to redress inequities and enhance social justice is a moral and ethical imperative, but it can cause dissatisfaction as well when poorly administered.
- Since the “old” economy will co-exist alongside the emerging “new” economy in the foreseeable future, affirmative action attuned to the needs of both the “old” and “new” economies will have to be simultaneously implemented.
- Knowledge is the most critical wealth-creating asset in a knowledge-based economy, yet it is less easily apportioned through distributional strategies, unlike land, labour and capital.
- Tradition and culture can pose significant complications to efforts to redress inequities.

IV POLICIES AND STRATEGIC DIRECTION

Goal and Targets

12. The goal should be to eliminate the knowledge and digital divides significantly by 2010, and in the process, eliminate poverty and significantly reduce income disparities.
Strategy

13. The following strategies have been identified:

- Refine and improve existing affirmative action approaches, and adapt them to a knowledge-based economy environment.
- Give emphasis to distributional measures relating to the provision of access to affordable infostructure, ICT infrastructure and education.
- Forge a trisectoral partnership among the public, private and community interest sectors.
- Develop local content.

Measures

Recommendation 1: Put in place a better data collection and feedback mechanism.

Recommendation 2: Fully investigate the gender divide.

Recommendation 3: Instil passion for knowledge and learning.

Recommendation 4: Harness the power of Islam.

Recommendation 5: Provide educational assistance for the disadvantaged and the needy.

Recommendation 6: Dramatically increase the number of residential schools for the disadvantaged and the needy amongst Malaysian students.

Recommendation 7: Enhance affordability: Reduce Internet access costs.

Recommendation 8: Enhance access: Wire and electrify every nook and corner of Malaysia.

Recommendation 9: Enhance access: Ensure all schools have PC and Internet access.

Recommendation 10: Enhance access: Establish community telecentres throughout the nation.


Recommendation 12: Enhance access: Launch programmes for senior citizens and the disabled.


Recommendation 14: Implement gender-dedicated programmes.

Recommendation 15: Develop local content.