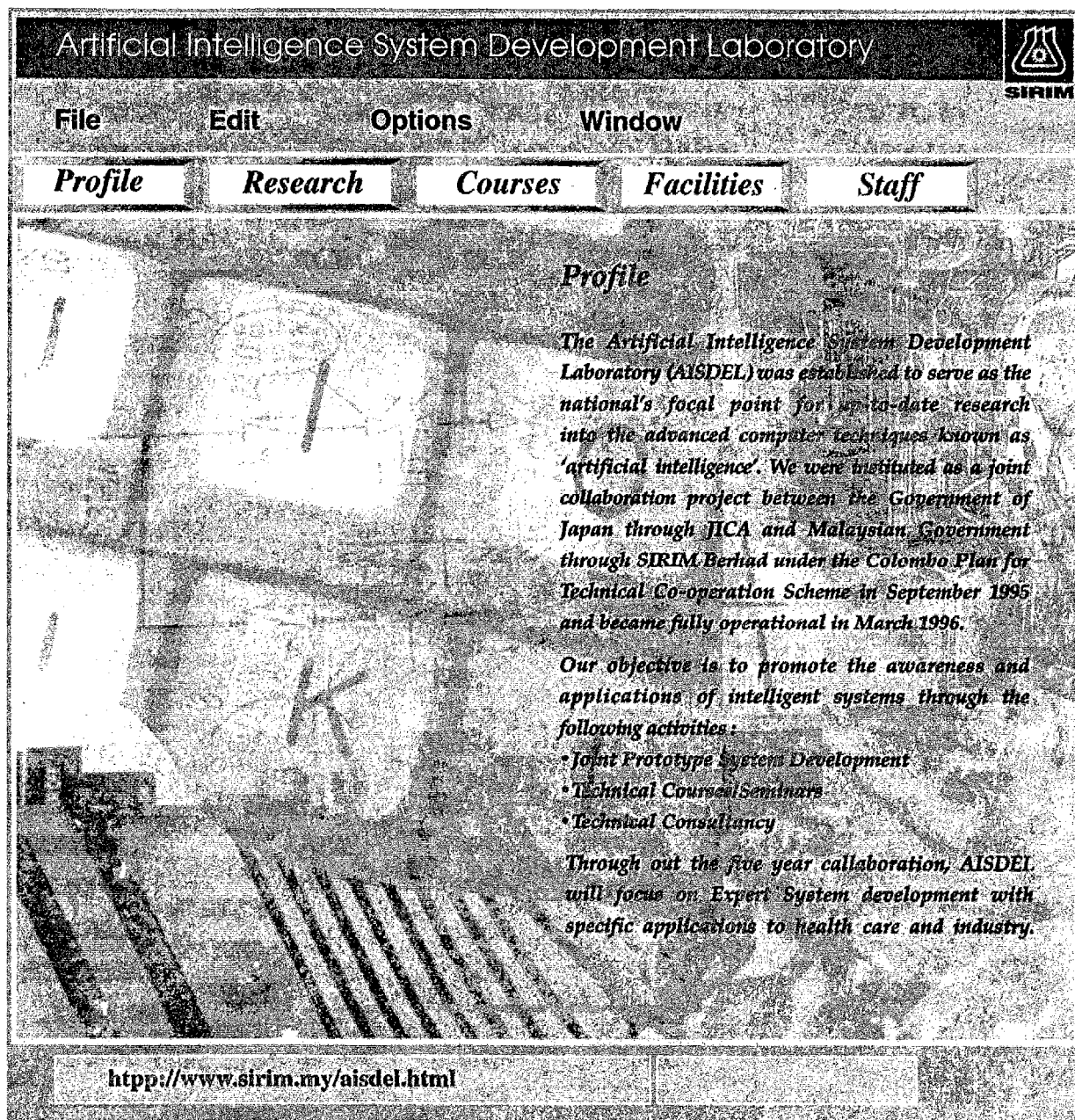


SIRIM Berhad



Artificial Intelligence System Development Laboratory

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Profile Research Courses Facilities Staff

Profile

The Artificial Intelligence System Development Laboratory (AISDEL) was established to serve as the national's focal point for up-to-date research into the advanced computer techniques known as 'artificial intelligence'. We were instituted as a joint collaboration project between the Government of Japan through JICA and Malaysian Government through SIRIM Berhad under the Colombo Plan for Technical Co-operation Scheme in September 1995 and became fully operational in March 1996.

Our objective is to promote the awareness and applications of intelligent systems through the following activities:

- Joint Prototype Systems Development
- Technical Courses/Seminars
- Technical Consultancy

Through out the five year collaboration, AISDEL will focus on Expert System development with specific applications to health care and industry.

<http://www.sirim.my/aisdel.html>

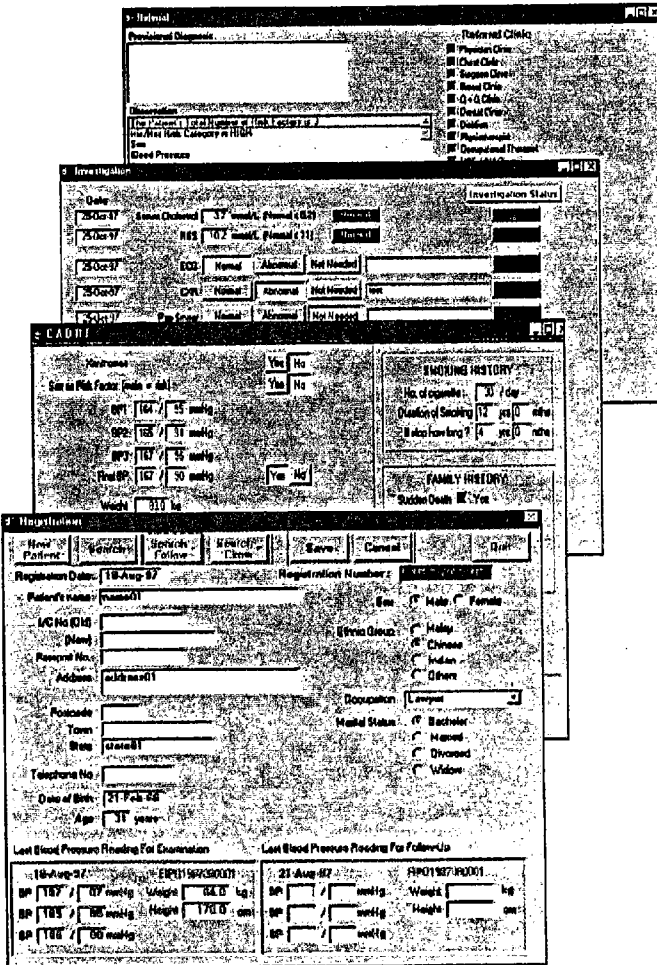
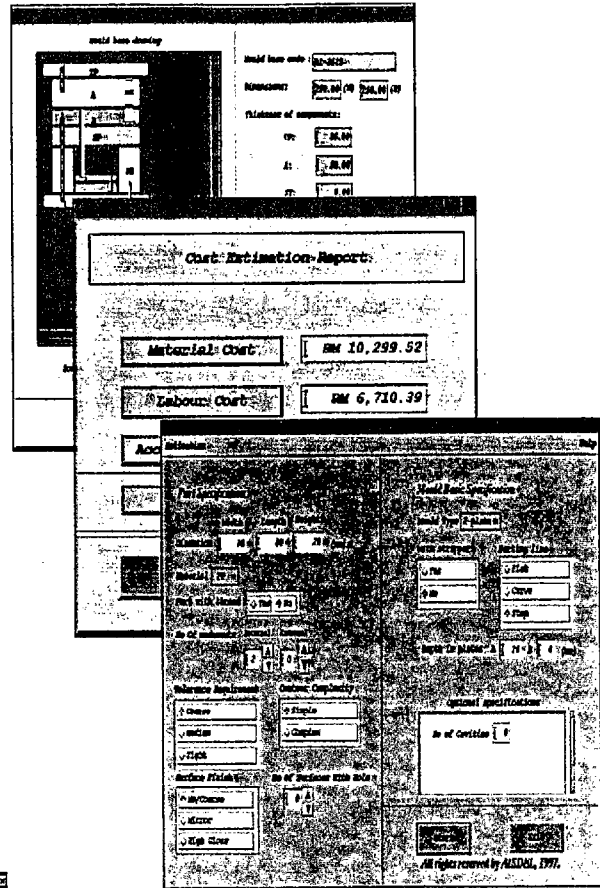
CURRENT RESEARCH AND DEVELOPMENT
Industry Project

One of the prototype systems which has been developed for industry is *Mould Cost Estimation System*.

Mould Cost Estimation System.

The complexity issue in manufacturing, affects many aspects of every manufacturing stage. One goal of AI-based system is to manipulate manufacturing information, which will be used to determine and weight the possible decisions and made suggestions at computerised speed, before the wrong choice has a chance to be made.

Our researchers have developed an expert system prototype that can calculate the price of a mould based on its plastic part requirements. By using the expertise of the mould designers and mould estimators, their knowledge is translated into the expert system and as a result, has enable non-expert on mould to perform the tricky business of estimating the price of mould. The input consists of requirements for the target part specification. The system will then determine important factors for mould design such as the number of cavities required, mould base size and code, thickness of plates and so on. When the features of the plastic part are input, the system will generate an estimated cost of the injection mould required to produce the part. The system can provide an almost accurate estimated cost of the mould in detail. It is aimed to assist mould estimators when preparing price quotation for their customers at the early design stage.



Health-Care Project

In the field of healthcare, AISDEL has achieved a significant milestone in the application of AI in lifestyle based disease.

Expert System for Preventive and Curative Care for Coronary Artery Disease.

The leading cause of death in Malaysia of all medically certified death is due to cardiovascular diseases and cancer is the fifth in the ranking. In order to reduce premature death and disability of mobility from this two diseases, a computer-assisted Medical Decision is developed which will involve preventive care, clinical diagnoses and, evaluation of risk factor modification achievement.

The main objective of the project is to develop an Expert System which is capable in assisting doctors, nurses and paramedics in managing screening and follow-up activities by providing a computerised data entry system, a therapeutic support and a statistical analysis. The system will produce automatic interpretations, with minimum need for user interaction. The laboratory test results, patient's history and symptoms that relate to heart disease and cancer are entered into the computer by nurses or doctors to produce accurate diagnoses and reports.

Other Projects

- * **Berth Allocation Scheduling System** : The system generates the possible schedule of berth allocation for ships, with aims of minimising the waiting time for ships before they can berth at the port.
- * **Job Shop Scheduling System** : The system will generate the scheduling plan for the production line to optimise the usage of resources like man power and machines. It is specially useful to be used in factories, assembly lines and other related areas.
- * **Time Table Scheduling System** : The system will automatically generate the most possible time table for the users based on resources available such as teachers, subjects and classrooms. The concept of the system can be applied in any schools, colleges and universities in Malaysia.
- * **Tour Package Expert System** : The system has been designed to assist the travel agents in giving advice on the most attractive Tour Package to the customer based on his or her requirements in a very short time span.

FACILITIES

We have a sophisticated Artificial Intelligence Laboratory used to support a variety of research and development activities. Our lab consists of 3 units of UNIX Server, 29 units of HITACHI workstation running UNIX operating system, and several personal computers running Windows 95 and Windows NT. These facilities also include various popular programming language, commercial expert system development tools, artificial intelligence tools and database tools. More recently, we have a training room which is tastefully furnished to provide a conducive learning environments for staff and participants and a library dedicated to up to date information on AI.

OUR STAFFS

We maintain diversified young and dynamic knowledge software engineers trained in Japan and work intimately with other six long-term Japanese experts. As a professional, we always stay in tune with evolving computer technologies, hence we are adequate to provide our client with technical leadership in the full range of artificial intelligence technology.

Dissemination of Technology

* AI Short Course for Managers (1 day)

This course is motivated by the need to provide SMI's with a clear picture of what AI can and cannot do, and to help them understand broader implications of adopting the technology. It is also intended to acquaint the novice with the new technology and its evolution and to address the engineering and management consequences of employing such systems.

* AI Short Course for Engineers (3 days)

The purpose of the course is to give a detail technical training on developing the Expert System. The participants will be exposed to the steps on developing the ES from the scratch.



Enquiries

*for more information on AISDEL and our services,
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SIRIM Berhad**

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The National Development Policy

INTRODUCTION

Under the First Outline Perspective Plan (OPP1), covering the period 1971–1990, the Government has implemented four development plans from the Second Malaysia Plan (1971–1975) to the Fifth Malaysia Plan (1986–1990). These development plans have been implemented within the framework of the New Economic Policy (NEP) which was introduced by the Government in 1970, after the racial riots in 1969, to promote growth with equity with the objective of fostering national unity among the various races.

The Second Outline Perspective Plan (OPP2), covering the period 1991–2000, has been formulated based on the National Development Policy (NDP). The NDP will build upon the achievements during the OPP1 to accelerate the process of eradicating poverty and restructuring society so as to correct social and economic imbalances. It provides a broader framework for achieving these socio-economic objectives in the next 10 years within the context of a rapidly expanding economy. In formulating the NDP, the Government has considered the views and proposals from various groups including the report of the National Economic Consultative Council on the post-1990 policy.

National unity remains the ultimate goal of socio-economic development because a united society is fundamental to the promotion of social and political stability and sustained development. Development policies and strategies under the NDP take cognisance of the diversities of Malaysians—ethnic, linguistic, cultural and religious as well as regional so that a harmonious, tolerant and dynamic society could be progressively created. Also, continued social and political stability as well as the efficient management of the economy are factors crucial to the realisation of its goals and objectives.

The NDP will set the pace to enable Malaysia to become a fully-developed nation not only economically but in all aspects by the year 2020. The Government envisions that by the year 2020, Malaysia will become a united nation, with a confident Malaysian society, infused by strong moral and ethical values living in a democratic society, liberal and tolerant, caring, economically just and

equitable, progressive and prosperous, and in full possession of an economy that is competitive, dynamic, robust, resilient and socially just.

While the NDP maintains the basic strategies of the NEP, its new dimensions will be to:

1. Shift the focus of the anti-poverty strategy towards eradication of hard-core poverty while at the same time reducing relative poverty (Hard-core poverty is defined as households receiving less than half of the poverty line income (PLI) which is RM370 per month for household size of 5.1 in Peninsular Malaysia, RM554 for household size of 5.4 in Sabah, and RM452 for household size of 5.2 in Sarawak in 1991);
2. Focus on employment and the rapid development of an active Bumiputera Commercial and Industrial Community (BCIC) as a more effective strategy to increase the meaningful participation of Bumiputera in the modern sectors of economy;
3. Rely more on the private sector to be involved in the restructuring objective by creating greater opportunities for its growth; and
4. Focus on human resource development as a fundamental requirement for achieving the objectives of growth and distribution.

The efforts under the NDP to correct imbalances will focus on the expansion of capacities to generate income and create wealth and to provide the skills for Bumiputeras to effectively retain and manage their wealth. In line with this new emphasis and in order to increase Bumiputera participation in the commercial and industrial sectors of the economy, more attention will be given towards strengthening the capacities of the Bumiputera to effectively manage, operate and own businesses rather than on achieving specific numerical targets of equity restructuring and ownership. While efforts will be made to increase Bumiputera ownership, no specific time frame has been set for the attainment of the equity restructuring target of at least 30%. A review of the achievement of this target will be made by the year 2000.

The OPP2 is formulated with a shorter time frame of ten years, half that of the OPP1. This shorter time frame will reduce the risks of setting unattainable goals and the uncertainties of making development projections on which these goals are dependent upon.

DEVELOPMENT THRUST FOR THE 1990S

The objective of the NDP is to attain a balanced development in order to establish a more united and just society. The NDP will encompass the following critical aspects:

1. Striking an optimum balance between the goals of economic growth and equity;
2. Ensuring a balanced development of the major sectors of the economy so as to increase their mutual complementary to optimise growth;
3. Reducing and ultimately eliminating the social and economic imbalances in the country to promote a fair and equitable sharing of the benefits of economic growth by all Malaysians;
4. Promoting and strengthening national integration by reducing the wide disparities in economic develop-

ment between states and between the urban and rural areas in the country;

5. Developing a progressive society in which all citizens enjoy greater material welfare, while simultaneously imbued with positive social and spiritual values, and an increased sense of national pride and consciousness;
6. Promoting human resource development including creating a productive and disciplined labour force and developing the necessary skills to meet the challenges in industrial development through a culture of merit and excellence without jeopardising the restructuring objectives;
7. Making science and technology an integral component of socio-economic planning and development, which entails building competence in strategic and knowledge-based technologies, and promoting a science and technology culture in the process of building a modern industrial economy; and
8. Ensuring that in the pursuit of economic development, adequate attention will be given to the protection of the environment and ecology so as to maintain the long term sustainability of the country's development.

IMPLEMENTATION OF THE NDP

Unity

The NDP objective of building a united nation will continue to be based on the principles and guidelines provided under the Constitution and the *Rukunegara*. To be effective as an instrument for enhancing national unity, it has to be accepted by all Malaysians in the spirit of the *Rukunegara*, with all sections of society fully dedicated and committed to the task of nation building.

Eradication of Poverty

To create a more just, united, peaceful and prosperous society, more effective efforts will be made to reduce poverty irrespective of race. It is projected that the poverty rate will decline from 17.1% in 1990 to 7.2% by the year 2000. Efforts will now focus more sharply on the hard-core poor. Based on the data from the Household Income Survey, there were some 143 100 of such households in 1990 which were mostly scattered as pockets of hard-core poverty in the remote rural areas.

A more important issue in the 1990s will be reducing relative poverty. This does not involve just raising productivity and real incomes. It also requires improving the access of the lower income groups especially those in the deprived areas and less developed states to have better social services and income opportunities. The provision of better services and amenities to help and protect them will be given more attention so as to reduce income gaps and enhance their standard of living relative to those in the higher income groups.

The implementation of the strategy to reduce poverty will take into account all communities in both the urban and rural areas. Although all communities have progressed since 1970, the socio-economic position of certain groups

within the Bumiputera community such as the *Orang Asli* and the indigenous groups in Sabah and Sarawak and the Indians within the non-Bumiputera community have lagged behind. The needs of these groups will be given due attention.

Urban Poverty

Urban poverty is an issue that needs to be addressed. As the country becomes more urbanised and industrialised, it is expected that the inflow of rural population into the urban areas will put pressure on housing, social amenities and physical facilities as well as employment and income earning opportunities for urban dwellers. The capacity of the urban centres to cater for these needs will be enhanced, more opportunities for employment will be created and a reasonable level of services and amenities will be provided so that urban dwellers can enjoy a healthy and environmentally clean urban living.

Restructuring Strategy

Under the restructuring strategy, attention will be paid to employment and equity restructuring. As a more effective strategy to increase meaningful participation of Bumiputera in, and control of, the corporate and non-corporate sectors of the economy, focus will be given towards the development of a BCIC. Past efforts aimed at creating a BCIC met with little success. It is essential to increase opportunities for Bumiputera to own and operate their businesses so that they can gain experience to acquire wealth and retain it with minimal support from the Government. Towards this end, training in the area of management of wealth and in business ethics will be given strong emphasis. In addition, public enterprises and trust agencies will be geared towards providing effective support for the development of Bumiputera business. Permodalan Nasional Berhad (PNB) will strengthen its role to promote Bumiputera entrepreneurial development.

While there has been overall progress in reducing income inequalities, income disparities within the Bumiputera community are higher than among other ethnic groups. This suggests that existing programmes need to be improved to ensure that the benefits are equitably shared and priority will be given on the basis of need, capacity and commitment to productively contribute to meeting national needs.

A second area of concern is that while the NEP has created a new pool of Bumiputera managers and businessmen, there have been numerous failures among Bumiputera businesses. To overcome this problem, the NDP will encourage Bumiputera businessmen to start business from the bottom. Emphasis will be given to the fact that to succeed in business one must start from the bottom. As an important preparatory step to achieving success potential Bumiputera businessmen will be trained as apprentices in skilled jobs and in the operation and management of small businesses. They will also be encouraged to be active partners in joint-venture operations with non-Bumiputera businessmen.

Another area of concern is the employment prospects for Bumiputera in the urban and modern sectors. Govern-

ment efforts to accelerate the pace of restructuring the employment pattern will be accompanied by strengthening human resource development to ensure that Bumiputera are better equipped for higher level occupations in the modern sector as lack of skills will result in them being pushed into lower level jobs.

Equity Restructuring

The restructuring of equity capital in the corporate sector will continue to be implemented under the NDP so as to increase the share of the Bumiputera in line with the original target of the NEP to achieve at least 30% in the ownership, control and management of the modern sectors of the economy.

The Foreign Investment Committee (FIC) will continue to monitor the restructuring of the corporate sector. The existing guidelines will be improved and modified and made more explicit to facilitate compliance by the private sector.

To facilitate progress towards reaching the equity restructuring objective, measures will be undertaken under the privatisation programme to allocate a substantial proportion of the equity in the privatised projects to the Bumiputera. At the same time, opportunities will be provided to non-Bumiputera to participate in the privatised projects.

GROWTH PROSPECTS AND POLICIES

The high growth trend of the economy in the 1970s continued in the early 1980s until the recession in the mid-80s. After the recession, the country has recovered strongly. This growth momentum is expected to continue in the 1990s as the economy firms up further with private investment and exports remaining buoyant. The Malaysian economy is targetted to grow at an average of 7% per annum in the decade of OPP2 as compared with the average growth rate of 6.7 achieved during the 1971-90 period. The share of manufacturing in Gross Domestic Product (GDP) is projected to increase from 27% in 1990 to about 37% by the year 2000, making Malaysia an industrial-oriented economy, increasingly dependent on manufacturing exports for the growth of incomes and employment in the country. Manufacturing exports are projected to account for about 81% of total exports by the year 2000, while the share of agricultural exports will decline to 6%.

Employment is projected to grow by 3.1% per annum. The expansion of the economy at the projected rate will enable unemployment to be reduced to about 4% by the year 2000. This will call for a substantial outflow of labour from the traditional sectors to the urban-based sectors of commerce and industry to meet the projected demand for labour.

The prospects of achieving the growth targets outlined in the OPP2 are good in the light of the recent performance of investment and exports and the better management of natural resources. However, the external environment is still a major factor in determining the pace of economic activity in view of the importance of foreign investment and trade in the economy.

The Government's economic policies will be aimed at minimising the impact of uncertainties and risks to

enable the country to grow at a rapid rate. The Government will continue to reduce the size of the public sector deficit to a sustainable level so as to avoid large imbalances in the resource situation. To strengthen private sector growth, efforts will be to ensure that the healthy investment climate is maintained and developed through further deregulation and simplification of administration procedures at all levels of administration.

The capacity for growth will depend increasingly on an efficient labour market which is able to match the supply of trained manpower with the requirements of the private sector. High priority will therefore be given towards human resource development so as to ensure the availability of a well-educated and trained quality labour force to meet the requirements of the rapidly growing economy.

A review of the wage system is being undertaken to further improve the working of the labour force. It is recognised that to reduce poverty and improve the standards of living, wage levels must increase. A flexible system of wages which relates wage movements to labour productivity and company's profits will provide more incentives for employers to use labour and make it possible for them to operate with higher levels of employment and profits. This system of wages is therefore in the best interest of both workers and employers.

In order for Malaysia to diversify its export base into products which will exploit new and emerging technologies, the Government will invest in science and technology infrastructure, particularly in the new and emerging areas of technology.

REGIONAL DEVELOPMENT

An important objective of regional development is to progressively integrate the regional economies of the states of Sabah and Sarawak to foster national integration and to promote the complementarity of these economies with the economy of the Peninsular states. As there is a close correlation between regional disparities and ethnic inequalities in income, correcting regional imbalances in development will simultaneously facilitate the attainment of greater ethnic income equality in the country. Although complete regional equality may not be possible to achieve due to differences in the development potential of each region the Government will continue to develop the poorer states to improve incomes and standards of living. The per capita GDP of these states, in particular Kedah, Perlis and Kelantan, is well below the national average. Despite the heavy costs it will incur to reduce the disparity, these efforts are necessary to expedite the process of reducing the wide regional imbalances in the country.

Programmes to diversify the economic base of these states will continue to be expanded and more attention will be given towards increasing value-added activities and enhancing down-stream linkages in the agricultural and the industrial sectors in these states. Improvements in agricultural activity will be sought through land consolidation in order to provide for a more efficient scale of operation and cultivation of high value cash crops. Further research and development in commercial crops will also be promoted.

In implementing the concept of industrial estate specialisation by location, the Government will encourage the process of industrial dispersion by developing well-equipped industrial estates, which are provided with sufficient physical facilities and other amenities in the less developed states so as to make the rural locations more attractive to private investors.

HUMAN RESOURCE DEVELOPMENT

During the decade of the 1990s, human resource development will assume new importance. A productive and efficient labour force must be developed with strong ethical and moral values and a commitment to excellence. With the increasing globalisation and inter-nationalisation of the world economy, the country will face more competition in trade and investment. In view of the challenges ahead, Malaysians should be well-equipped with a strong base in education and training including the ability to communicate in a second language, for example English, which is an international language of commerce. The Government will continue to emphasise the increased use of Bahasa Melayu by all Malaysians as a fundamental tool for unity.

The Government will give high priority to human resource development in the allocation of expenditures under the public sector programme. Special emphasis will be placed on improving the quality of education and facilities in schools so as to reduce the problem of school

drop-outs especially in the rural areas and facilitate their training at the higher levels of the education system.

With rising incomes, the demand for higher education will increase further in the 1990s. In view of the large financial resources required to provide this locally, the Government has to review the existing system of financing higher education and introduce new measures, such as the setting up of an open university that will result in reducing the financial cost to the Government.

The main burden of industrial training is now borne by the public sector. It is essential that the private sector now cooperate with relevant government agencies to provide training related to market needs with emphasis on developing innovative skills and technical competency. The creation of national wealth through proper management of natural resources can only be achieved if the nation is able to acquire fluency in science and technology (S&T) and research and development (R&D). Malaysia is short of high level manpower specialised in S&T and R&D. To keep up with foreign technologies and advancements and to reduce dependence on imported technology, increased efforts will be made to enlarge the pool of Malaysian scientists and specialists and provide them with proper incentives to serve and develop their professional careers in the country. More Malaysians, especially Bumiputera, will be encouraged to pursue relevant advanced professional and technological degrees in selected universities and institutions overseas.

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Seventh Malaysia Plan (1996–2000)

The Seventh Malaysia Plan was presented to the Parliament on 6 May 1996. With its launching, the Malaysian economy will enter the second phase of the Second Outline Perspective Plan (OPP2), 1991–2000. The first half of the OPP2 was in many respects a momentous period of rapid progress for the nation. The growth in Gross Domestic Product (GDP) during the Sixth Malaysia Plan period, 1991–95, significantly exceeded the Plan target. The last year of the Sixth Plan itself represents the eighth consecutive year of rapid growth, making the period the most buoyant and the longest sustained growth achieved thus far. Even more significant, the high growth rate was achieved within an environment of relative price stability. With the strong fundamentals underlying the rapid expansion in the economy already in place, together with a sound social and political environment, the nation stands poised to approach the second phase of development under the OPP2 with greater strength to meet the challenges of our time. It will also provide the stage for the Government to accelerate the attainment of the objectives of balanced development as envisaged under the National Development Policy (NDP), with the overriding objective of creating a more united and just society.

Largely guided by the objectives and strategies of NDP as enunciated in OPP2, the Plan has the following as its thrust:

- Macroeconomic stability
- Poverty alleviation and restructuring of society
- Productivity-driven growth
- Enhancing competitiveness
- Industrialisation for the future
- Human resource development
- Technology development
- Information technology
- Privatisation
- Sustainable development
- Quality of life
- Addressing social problems
- Moral and ethical values
- Administrative improvements

MACROECONOMIC STABILITY

Macroeconomic management during the next five years will be aimed at maintaining high growth with stability to facilitate the attainment of socio-economic objectives with the context of a rapidly expanding economy. Real GDP is expected to grow at an average rate of 8.0% per annum. Efforts in combating inflation will continue to be pursued through appropriate monetary and fiscal policies as well as administrative and supply adjustment measures.

Monetary aggregates will remain as the intermediate target of monetary policy which aims at the effective management of liquidity. Fiscal policy will reinforce monetary policy in curbing price pressures. There will be the emphasis of budgetary restraint on operating expenditure in line with fiscal prudence. Planning for public sector investments will take into account the overall state of public finance, the balance of payments position and the capacity to implement development programmes. Budget deficits will be kept within prudent limits while the use of borrowed funds will be minimised. This financial discipline will reduce further the nation's debt burden and dependence on foreign financing, thus avoiding the adverse effects of exchange rate movements.

Financing private investments will require new instruments of funding, more effective promotion of savings and the mobilisation of resources through the capital market and the banking system. Simultaneous development of the equity market and private debt securities will provide the private sector with the necessary resources to finance their investments including large infrastructure projects.

The overall balance of the balance of payments will be strengthened so as to maintain a sufficient level of external reserves. As in the past, the current account deficit is expected to be fully financed by new FDI as well as through reinvestment. Strong economic fundamentals, political and social stability as well as expanding business opportunities will continue to attract foreign investors. Increased potential for development will also encourage investors to reinvest their profits. It is also anticipated that more Malaysian investors will venture abroad to form strategic alliances and establish networks with foreign partners, make inroads into foreign markets, source local inputs for foreign ventures and internationalise their production structure.

Simultaneously, additional measures will be instituted to improve the current account of the balance of payments. As the persistent deficit was attributable mainly to the services account, particularly the high repatriation of profits, dividends and interest and payment for freight and insurance, more vigorous efforts will be undertaken to address this problem. Aggressive promotion to develop selected services for export such as education, tourism, health and consultancy services will help to reduce the services deficit. Efforts will also be taken to achieve greater backward integration to produce capital and intermediate goods which will over time reduce the size of the deficit as local sourcing of inputs is enhanced.

POVERTY ALLEVIATION AND RESTRUCTURING OF SOCIETY

During the Seventh Plan period, efforts will be made to further reduce poverty and income disparities between ethnic and income groups, and regions. The expected improvement in economic performance will strengthen the Government's ability to pursue the basic philosophy of development which emphasises growth with equity. The present distributional programmes will be further consolidated and improved to increase their effectiveness in order to establish a stronger foundation for national unity.

The Plan envisages that the incidence of poverty among Malaysians will be reduced to 5.5% while hardcore poverty will be practically eradicated by the year 2000. The implementation of poverty eradication programmes, including the Development Programme for the Poorest (PPRT), will be focused towards alleviating poverty in areas and among groups with high incidence of poverty.

In order to promote a more viable Bumiputera Commercial and Industrial Community (BCIC), Bumiputera entrepreneurs will continue to be encouraged to be involved in strategic industries such as aerospace, automotive, machinery and engineering, petrochemical and telecommunications. The packaged programme, such as vendor and franchise development, introduced under the Sixth Plan, will be further expanded. To further increase participation of Bumiputera entrepreneurs in strategic industries, specialised training will be provided to improve their technical knowledge and at the same time create a sense of mission among them. More private sector entities, including multinationals, will be encouraged to involve as anchor companies or franchisors.

Efforts will continue to be undertaken to restructure the employment pattern to reflect the ethnic composition of the population. Particular attention will be given to increase the supply of Bumiputera manpower in the professional and managerial category through education and training. Bumiputera will be provided with more facilities to acquire appropriate skills, necessary exposure and experience required by the private sector.

As part of the efforts to increase Bumiputera equity ownership, participation and control in the corporate sector, Bumiputera will be equipped with appropriate skills to manage and operate their assets and wealth on a sustainable basis. Bumiputera individuals, institutions and trust agencies will be encouraged to expand their activities and explore new markets through business ventures abroad and create more opportunities for other small-scale Bumiputera companies to participate in related activities. Efforts will also be geared towards increasing and mobilising Bumiputera savings in trust funds and cooperatives as well as Islamic-based resources such as *zakat*, *wakaf* and *Baitulmal*.

During the Seventh Plan period, efforts will be made to increase household income in line with the anticipated high growth of real GDP, and also to narrow the widening income disparities among ethnic and income groups as well as between urban and rural households. The middle-income group will be further expanded and this is expected to narrow the disparities among the income groups. In

addition, programmes and projects in education and training, health and other social amenities as well as income-generating activities are expected to continue to improve the standard of living of the bottom 40% of the population.

In view of the rapid rate of urbanisation, the Government will undertake necessary measures to contain the increase in the number of urban poor. Although the incidences of poverty and hardcore poverty have decreased, the number of poor households in the urban areas increased slightly, mainly due to the redefinition of urban areas in 1991. To reduce the number of urban poor, the Government will give priority to income-generating projects as well as provision of adequate basic amenities, including low-cost housing.

PRODUCTIVITY-DRIVEN GROWTH

In the past, the Malaysian economy was mainly input-driven particularly through investments, with capital accumulation contributing almost half of potential output growth. The Seventh Plan will promote a shift in focus from an input-driven towards a productivity-driven strategy by enhancing the contribution of total factor productivity (TFP).

During the Seventh Plan period, employment growth is expected to average at 2.8% per annum, lower than the growth of 3.4% experienced during the Sixth Plan period, thus reducing the contribution of labour to growth. This relatively slower employment growth is expected to result from greater use of labour-saving practices as the economy moves towards greater capital intensity. At the same time, the robust growth of private investment of 16.6% during the Sixth Plan is expected to decelerate to 7.8% despite the relatively significant level of investment of RM385 billion required to achieve the target of the Seventh Plan.

Skills upgrading, capital deepening, technology development and organisational improvements will underpin the transformation of the economy towards productivity-driven growth. With a high proportion of the labour force in the young-age group, investments in human capital to increase skills and knowledge of workers will enable each unit of labour to deliver more output of higher value-added products. Accelerate skill development programmes under the Seventh Plan will improve the supply of technically proficient manpower and expertise. With a better quality workforce, the learning curve and gestation period associated with the application of more advanced automation systems and the acquisition of new technology will be shortened. This will support the shift towards higher technology—and capital-intensive industries.

High rates of physical investments need to be combined with improvements in technology development and management. Gains in technological development are not confined to frontier innovation or new inventions but include mastering existing technology and keeping up with constant changes as well as learning about new technology to be applied, adapted and improved. While efforts to nurture indigenous technology development will be undertaken, local industries should continue to acquire

technologies of other advanced nations. Simple improvements could come from interactions with the market and related firms such as sub-contractors and suppliers of materials and services. The strong presence of multinational corporations (MNCs) in Malaysia should also assist in this process, particularly in the efforts towards making Malaysia as a centre of excellence in R&D in selected manufactured products such as electronics, and rubber and tropical wood-based industries.

ENHANCING COMPETITIVENESS

Another critical facet of the development thrusts will be enhancing international competitiveness in the face of intense global competition, advances in technologies and changing consumer markets. As more countries participate in the globalisation process, the world will be entering an era of increasing competition, in which countries will not only compete against rivals in their own league but also against a continuous stream of newcomers. In this context, Malaysia, with its open economy, will set the right priorities and make the necessary commitment to compete more effectively in the international market place.

INDUSTRIALISATION FOR THE FUTURE

Malaysian manufacturers will be encouraged to adopt new strategies that will enable them to target production for the global market. By going international, firms will be able to seize new and wider opportunities from more diversified markets, while simultaneously enabling them to introduce greater capital intensity and benefit from technology utilisation. This shift from dependence on the domestic market to production for the export market will necessitate firms to venture into large-scale operations and increase production capacity in order to enjoy the benefits of economies of scale. Large-scale production for the world market will induce greater utilisation of technology and skilled manpower, and through these, efficiency and productivity enhancements will be obtained that will bring about lower unit costs of production. These efforts will increase the quality and output of local products and improve Malaysia's export competitiveness. Large-scale production will provide adequate supplies of products such as cement, automobiles and steel products which registered unexpected increases in demand in the domestic market during the Sixth Plan period. In addition, this global approach to industrialisation will help to reduce the import content of local production, thereby improving the balance of payments position.

HUMAN RESOURCE DEVELOPMENT

During the Plan period, the principal thrust of human resource development efforts will be the preparation of a strong human resource base for long-term economic growth and global competition. Given the shift towards a productivity-driven economy, the emphasis will be on increasing the efficiency of labour utilisation and greater capital and technology intensity in production.

A productivity-driven economy will require higher levels, of professional and skilled manpower as well as administrative and managerial expertise. In this regard, the

upgrading of skills and knowledge of the labour force, promotion of managerial competence and initiative as well as advancement of scientific and technological know-how, will be pursued during the Plan period.

The Government will continue to play a major role in human resource development. Educational and skills training institutions will be expanded, upgraded and restructured, where necessary, to increase skill formation in the country and make training more responsive to industry needs. The education system, in particular higher education, will be reformed and a quantum leap in enrolment in the engineering and science fields will be necessary to increase the output in these areas. Accelerated industrial development in the country will require more expertise and post-graduate training, particularly in technology engineering. In addition, emphasis will be placed on promoting IT in specific areas, computer literacy and other supporting disciplines.

To complement Government efforts in human resource development, private sector participation and collaboration with the public sector will be encouraged in tertiary education and skill training. The amendments to the University and University Colleges Act, 1971 and the introduction of the Private Higher Educational Institutions Act, 1996 will enable the private sector to play a greater role in the provision of tertiary education.

Efforts to expand the supply of manpower for the labour market will involve encouraging greater female participation as well as utilising the pool of public sector employees who will be retiring. Measures to be taken by the Government will include amendments to the Employment Act, 1955 to allow for greater part-time employment and the adoption of flexible work practices in the private sector for greater female participation in the labour force as well as the setting up of a special unit to facilitate the reemployment of public sector retirees on a selective basis.

TECHNOLOGY DEVELOPMENT

The greater use of technology and development of a strong domestic capability are major factors in meeting the objectives of productivity-driven growth and industrial competitiveness. Appropriate policy and institutional reforms aimed at strengthening S&T, enhancing R&D and improving its management will be undertaken. In addition, stronger cooperation in technology development will be fostered between industry and the universities and research institutions. These efforts will help promote technological capability in the public and private sectors.

Strategies for S&T planning and implementation will be adjusted to improve efficiency and effectiveness of research agencies in order to increase their role in enhancing the transfer of technology and bridging the gap between R&D institutions, academia and industry. Increased funding for R&D will be made available to strengthen domestic capability in key enabling technologies such as advanced materials, biotechnology, automated manufacturing technology, electronics and IT. The establishment of centres of excellence within and among universities and research institutions as well as commercialisation efforts of R&D activities will also be supported. Institutions

involved in R&D activities will be encouraged to work closely to improve innovativeness and ensure that the knowledge and skills developed will be industry-related. Greater emphasis will be placed on promoting co-financing and joint programmes of research between industry and public sector institutions with a view to transferring research output for commercial and industrial applications.

INFORMATION TECHNOLOGY

IT will play a significant role in national development, particularly in improving efficiency, productivity and competitiveness. The critical role of information in investment decision-making and global competition has thrust IT into the forefront of economic development. During the Seventh Plan period, the thrust of IT development will be to further develop IT infrastructure in order to create a strong foundation for building a knowledge-based industrial economy and an information-rich society. IT will permeate all sectors and enhance their respective contributions to growth.

Realising the important role of IT as a catalyst for national development, the Government has initiated the construction of the Multimedia Super Corridor spanning Kuala Lumpur to the new KL International Airport (KLIA) at Sepang. The Corridor will be supported by the provision of world-class physical and information infrastructure. The Government will develop KLIA and the new administrative centre at Putrajaya and equip them with state-of-the-art communications technology and IT infrastructure. The private sector, especially world-class multimedia companies, will also be encouraged to locate in the Corridor to undertake remote manufacturing as well as introduce high value-added IT goods and services, thereby enabling Malaysia to become a regional IT hub.

The contribution of the manufacturing sector will be further enhanced through integration of IT into the production process which can help manufacturers boost production, reduce costs and ensure quality products. For the SMIs, investments in IT will be encouraged through creation of awareness of its benefits and provision of support for consultancy studies and joint research projects.

PRIVATISATION

The pragmatic approach towards privatisation resulted in the successful implementation of the programme during the Sixth Plan period. It contributed to accelerated economic growth through greater investment, corporate expansion, improved efficiency and productivity, enhanced competition in some sectors and generated multiplier effects in the economy. The efficiency and productivity of the privatised entities increased through improvements in the quality of service and management systems, and the development of positive attitudes as well as changes in the mind-set of employees.

As envisaged, the privatisation programme reduced the administrative burden of the Government in terms of recruitment, promotion and training of personnel. Since 1983, 11.4% of total public sector workforce has been transferred to the private sector. Savings generated from privatisation programmes, either from capital expenditure,

sale of assets and equity or corporate tax revenue, not only enabled the Government to reduce its borrowings, but also made available additional resources to finance projects in other sectors such as education and health.

Privatisation enabled Malaysians to enhance the acquisition of new technologies and expertise either through management contracts, consultancy services or new investments in specific areas of telecommunications, transport and utilities. Bumiputera participation in the economy was enhanced through privatisation as evident by their participation in equity ownership and management. Privatisation also benefited all Malaysians, including those in the lower-income group. This broad-based participation was achieved through share offers to members of the public, employees of privatised entities and institutional investors.

During the Seventh Plan period, privatisation will be accelerated in order to improve efficiency and productivity, sustain economic growth and further reduce the financial and administrative burden of the public sector. Regulatory bodies will be strengthened to ensure that they function effectively to protect the interest of the Government and the general public. In determining the appropriate quantum of user charges, the Government will be fully conscious of undue costs to the general public. Bumiputera participation will continue to be emphasised and Malaysian entrepreneurs encouraged to participate in privatisation projects abroad.

SUSTAINABLE DEVELOPMENT

Sustainable development will continue to be emphasised during the Seventh Plan period to ensure that the well being of the present generation is not met at the expense of future generations. Economic, social and environmental aspects will be integrated into the development process. The environment will be improved and resources utilised more efficiently to ensure that improvements in living standards are made without compromising the needs, interest and welfare of future generations.

During the Sixth Plan period, Malaysia introduced a number of measures to protect its environment and conserve its natural resources. All major projects were subjected to environmental impact assessment. In addition, air and water quality have been closely monitored. Measures have also been taken to conserve the country's forest through reforestation and banning the export of logs as well as strict control over illegal logging. These efforts to conserve and protect Malaysia's natural heritage led to an expansion of the area under permanent forest reserves resulting in an estimated 59% of the country being under forest cover and about 72% under tree cover.

During the Seventh Plan period, the Government will continue to balance growth objectives with environmental concerns. Environmental considerations will increasingly be integrated into sectoral policies in order to ensure sustainable economic and social development. Besides acquiring the requisite technical capacity, the Government will implement more efficient and cost-effective command and control measures to reduce and minimise pollution as well as improve the quality of life.

Environment and resource management will be guided by the proposed National Environmental Policy, which aims at promoting economic, social and cultural progress through environmentally sound and sustainable development. A Plan of Action will be drawn up to operationalise the Policy, which will focus on the establishment of a strengthened institutional framework, enactment of relevant legislation and regulations and creation of an efficient and effective enforcement and monitoring machinery. During the Plan period, measures will be undertaken to bring about better management of solid waste, toxic and dangerous substances, and radioactive waste. As a result of these measures, air and water pollution is expected to be reduced.

The success of efforts to safeguard the environment and ensure sustainable development requires the active participation of all sections of society. As such, environmental education and awareness campaigns will be intensified to encourage Malaysians to adopt a more environment-friendly consumption pattern and lifestyle. Efforts will also be directed at upgrading and integrating environmental and natural resources planning data. In particular, environmental-health complaints and problems will be closely monitored. These approaches, together with the use of innovative legislative and market instruments and mechanisms, will further substantiate efforts to promote sustainable development.

QUALITY OF LIFE

Although rapid economic development is a prerequisite to create greater opportunities for improving the quality of life, the social, cultural and psychological aspects are equally important and must be harnessed to merge with the overall development process. As such, emphasis will be given to provide increasing opportunities for personal advancement, healthy lifestyles, the pursuit of knowledge, better housing and medical facilities, clean environment and adequate recreational amenities.

During the Seventh Plan period, education and health, which are two vital components for a better quality of life, will continue to be priority sectors. The Government will continue to provide education as well as health-care services. The current policy ensures that every child has access to at least eleven years of education. With the expansion in public and private education facilities, enrolment at the tertiary level in institutions of higher learning will increase from about 12% of population in the age cohort 19-24 years in 1995 to about 15% in the year 2000. With regard to health, all Malaysians will have access to preventive and curative health services and efforts will be made to further improve the ratios of medical personnel and hospital facilities to population. As changing lifestyles are increasingly causing higher incidences of heart and pulmonary diseases, greater attention will be given to health education programmes that promote a safe and healthy lifestyle, including the elements of good diet and the benefits of regular exercise.

Other efforts include provision of adequate and affordable housing, wider coverage of paved roads, safe water and sanitation, sewerage and electricity supply, and

increased accessibility to secondary schools and technical education as well as health facilities in the rural areas.

ADDRESSING SOCIAL PROBLEMS

Rapid industrialisation and the consequential rise in urbanisation and rural-urban migration have resulted in an increasing occurrence of negative social behaviour. Social problems such as drug addiction, child abuse, loafing, juvenile delinquencies, unhealthy lifestyles and strains on the family unit are beginning to emerge. In 1994, there were 17 600 reported cases of drug addiction, 8938 cases of AIDS, 871 cases of child abuse and 4774 cases of run-aways. Given that there are many unreported cases, the situation could be worse and this can impair the moral fabric of future generations if measures are not devised to address them.

The Government will establish a high-level inter-agency committee to formulate policies and programmes for enhancing social and family development. Institutional support will be reviewed to provide greater focus and coordination of preventive and rehabilitative programmes for specific target groups such as children, youths and parents. Religious and moral education will be intensified to instil good social behaviour and promote healthy lifestyles.

MORAL AND ETHICAL VALUES

Spiritual, moral and ethical values need to be inculcated in the quest to be a fully developed nation as envisaged in Vision 2020. A good value system emphasises moral and ethical behaviour based on religion, customs and traditions. These values will be further emphasised as a critical component in the nation's drive towards becoming a fully industrialised nation.

To inculcate positive values and ethics, attributes such as discipline, honesty, diligence, integrity, resilience, tolerance, thrift and respect for elders, which characterise the social fabric of Malaysia society will continue to be nurtured through the education system, business organisations and associations and family-oriented programmes. Moral values and ethical behaviour will be given greater prominence and recognition. In this regard, the *Rakan Muda* programme besides propagating a healthy lifestyle for youths, is also aimed at instilling positive values among them. All Malaysians will be encouraged to inculcate a deep respect for these values and adopt them as a code of conduct.

Other measures include the promotion and the development of a caring society, as an integral component of the value system and the formulation of codes of ethics for the work place.

While attributes such as friendliness, and hospitality will continue to characterise Malaysian society, developing a sense of common identity and shared purpose among all Malaysians continues to be crucial to nation-building and the creation of *Bangsa Malaysia*. Fundamental to these is the need to instil a sense of national pride built on Malaysia's heritage, achievements and potential with the view to evolve a national *esprit de corps*. In this regard, efforts will be made to further popularise national sports

and other national events. All these processes are expected to promote the adoption of positive values and attitudes as a way of life among all Malaysians.

ADMINISTRATIVE IMPROVEMENTS

For the continued enhancement of productivity-driven growth and human resources development, the role of the public service is paramount. This necessitates the active participation of the public service not only in policy formulation but also in the implementation of strategies and programmes that will facilitate the attainment of the objectives of the Seventh Plan. To ensure this, the public service will continue to accord high priority to the implementation of administrative improvement programmes that will contribute towards building a more effective and efficient public service. The public sector will continue to assume the role of pace-setter, facilitator and regulator. This role requires strong leadership, total commitment, creativity and innovativeness at all levels.

The continued cooperation between the public and private sectors through the implementation of the Malaysia Incorporated Concept will provide the edge necessary to compete in the global market. Closer interaction between the two sectors will be accomplished, among others, through dialogue sessions at the ministry, department, state, district and local levels. Rules, regulations and procedures will continue to be reviewed to further facilitate the growth and competitiveness of the private sector. In this context, the information system and databases in the public sector will be enhanced, while the Civil Service Link (CSL) will be expanded and upgraded to disseminate information to the private sector.

The public sector will continue efforts to make Malaysia an information-rich nation. Public domain information will continue to be disseminated through the CSL, Palm Oil Information On Line Services (PALMOILIS), South Investment, Trade and Technology Data Exchange Centre (SITTDEC), Malaysian Science and Technology Information Centre (MASTIC) and SIRIMLINK. The use of computer networking will be expanded through increasing the number of databases. Further upgrading of IT standards in the public sector will be made through Internet, the implementation of the Government Integrated Telecommunications Network (GITN), enhancement of computer

security and the development of IT personnel and IT awareness.

The public sector will create mechanisms to enable the realisation of the nation's goals, including national competitiveness and the development of human capital and physical infrastructure. This necessitates sustaining sufficient levels of public investment and safeguarding the quality of important public services, particularly, education, basic health care and research. The public sector will ensure that present and new challenges to the nation are properly addressed in order to sustain high economic growth with equity and stability.

CONCLUSION

The Seventh Plan period presents an important phase for charting new courses and strategies to face future challenges. The major challenges will be to provide sufficient skilled workers, promote capital deepening and create a more technology-oriented culture to effect the structural transformation towards a productivity-driven economy as well as embark on world-scale operations. It will build on the strengths and achievements attained so far. A number of strategies will be formulated to meet these challenges. The accomplishment of these strategies will shift the locus of development to a higher growth path, open up new opportunities and build greater resilience and dynamism. This will strengthen the ability to pursue the fundamental policy of achieving balanced development and national unity, as envisaged in the NDP.

To ensure that policies are relevant and aligned to changing conditions and environment, flexibility and pragmatism will remain important ingredients in policy implementation. Through this, an appropriate strategy mix is expected to evolve and provide viable development options. Creativity and innovativeness will be encouraged to ensure continuous upgrading of performance for national development.

*Note: For further details regarding the **Seventh Malaysia Plan**, please refer to the **Seventh Malaysia Plan 1996-2000** book, published by Percetakan Nasional Malaysia Berhad, 1996.*