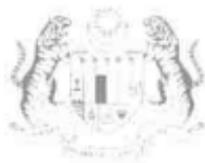




# Science, Technology and Creativity

Selected Speeches by  
Dr. Mahathir Bin Mohamad  
Prime Minister of Malaysia



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PERPUSTAKAAN NEGARA MALAYSIA

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# *The Inaugural International Dialogue On Smart Partnerships*

*(Smart Partnerships For Global Prosperity)*

*Langkawi, Kedah, 26 July 1995*

A term which we hear often is the Zero Sum Game, a game in which the winner wins at the expense of the loser. When we add up the result of the contest, there is no real gain from it. It is just a process of transferring what one contestant has to the other, the so-called winner. The net result is no different from the situation or the assets at the start.

If this is to be the basis for trade between nations, then there will be no growth for the world as a whole; only growth for one or the other of the trading partners. Thus, the growth of the poor nations must result in the impoverishment of the rich. In which case, there is every reason for the rich to prevent the poor from ever growing. Similarly the growth of the rich must be at the expense of the poor. Not being in a position to prevent this, the poor will merely get poorer.

We know in fact that this is not the case. Over the years, the economies of all the countries of the world have grown. There are many reasons for this, but I would like to draw attention to the experience of Malaysia where economic growth has not really been at the expense of others. Indeed the opposite is true. Malaysia's prosperity has benefitted most of her partners.

Early on after independence, Malaysia bucked the trend. Instead of being ultra nationalistic and ejecting foreign participants in its economy, Malaysia actually invited more foreign involvement in it.

As a result, many foreign companies invested in Malaysia. Since our main problem was unemployment, we created conditions suitable for labour-intensive industries. It was not cheap labour which we touted. Rather, it was the generous incentives, infrastructure and the political stability. The lower cost of labour in Malaysia has always been due to a deliberate policy of keeping the cost of living low.

The Japanese took advantage of this invitation most, although others also came. The net result is prosperity for Malaysia and the present full employment for its workforce.

The foreign partners who brought about Malaysia's prosperity have not suffered. Indeed they gained by being able to sell more goods and get more contracts from a more prosperous Malaysia. They, the investing companies and countries, have prospered by making Malaysia prosperous enough to buy their goods and services.

Today Malaysia in a small way is trying to do the same to the less developed economies of Southeast Asia. We are investing there in order to create employment and generally to jump-start their economic growth. The results are already being enjoyed by Malaysia and others. Not many refugees, economic or political, are landing on our shores now. Trade with these countries has multiplied manyfold. And Malaysia has not lost anything. We continue to grow at eight percent plus even as the Indochinese and other countries prosper.

"Beggars thy neighbour" is never a good policy. And today all the countries of the world are neighbours. By impoverishing neighbours a price will have to be paid, including by the country which follows this policy.

Let us take the trade war between Japan and Europe/America. Japan's emergence as an alternative source of manufactured goods was beneficial to the poor countries. The

Japanese have a different business philosophy. They want market share rather than big margins. Left to themselves, the Europeans and the Americans would have priced their goods according to what their own people could afford. If they could not, it was a simple matter to increase wages or reduce cost by down pricing the raw materials and energy from the poor countries.

There would have been nothing the poor countries could do. They would have to accept exchanging more and more raw materials for less and less manufactured goods.

But the Japanese kept their prices low in order to penetrate foreign markets and increase market share. The result was that the poor countries were able to afford products which otherwise would have been beyond their reach. If the Asian or African or Caribbean farmer could afford to buy a pick-up truck or a television or a refrigerator, it was because the Japanese were able to produce cheap, but high quality products.

The West could have adopted the Japanese approach and competed, thus bringing prices even lower. But the West was not willing to give up its profligate ways. Workers in the West wanted high wages without working as hard as the Japanese. Companies in the West took the easy way out, sacking their workers when faced with losses. And Governments continued to pay ridiculous unemployment pay, sometimes as much as 90 percent of last drawn salary. All these kept their costs high and the goods uncompetitive.

Unwilling to make any sacrifice, the West decided to render the Japanese products uncompetitive by forcing the revaluation upwards of the Yen. Today the Yen is three times higher in value against the U.S. Dollar and of course against the currencies of most developing countries.

What is the result? Japan is now going through its worst recession from which it does not seem able to recover. Japanese goods are no longer cheap. The Japanese seem unable to manage their politics with weak Governments succeeding weak Governments. Japan is in deep trouble.

But the competing economies of Europe and America have gained practically nothing. They have not been able to fill the void left by the Japanese in the international market place. Their own economies are not faring any better. Even if more European and American goods are imported into Japan, the earnings from these are not going to be significant. Despite the high Yen, the balance of trade persists in being in favour of Japan.

Clearly neither Japan nor its competing trading partners have gained anything from the Plaza Accord and the Yen appreciation. For both sides, it is a lose-lose situation.

What about the third parties, the developing countries like Malaysia? The appreciation of the Yen has trebled Malaysia's debt. Japanese products are now priced out of the reach of the peoples of the developing countries while the competing products from the West remain too expensive. At the same time most of the commodities of the poor countries are sold in U.S. dollars, which means that earnings are even less able to buy Japanese goods or pay Yen debts.

It is not just a lose-lose situation for the developing countries. It is a lose-lose-lose situation for everyone. Making Japan uncompetitive may be good for the ego but it is not very smart.

When are we going to learn that beggaring your neighbour does you nothing good? Indeed as has been pointed out, it has done everyone a bad turn. Surely the better thing to do is to Prosper Thy Neighbour.

What applies to countries also applies to companies, even to individuals. Again Malaysia can provide the example. We had an abundance of low-cost labour, the result of our low-cost of living, who are quick to learn new skills. The manufacturing companies which came to Malaysia availed themselves of Malaysia's assets which also included political stability and general hospitality. The result is that their products became affordable and competitive in the world markets.

Perhaps by investing in Malaysia, they deprive the workers in their own countries of jobs. But these are highly-skilled and highly paid workers who could be easily trained

to do hi-tech jobs with higher value added. Indeed, this is what the Japanese did.

Investments by companies from developed countries in developing countries can be considered a form of smart partnership. Similarly, cooperation between individuals possessing complementary skills falls within the category of smart partnership.

Nations, companies and individuals should really strive for a win-win situation, for partnerships which benefit both, instead of one at the expense of the other. By adopting this philosophy, individuals, companies and nations will all be more prosperous. As it is, relative to the unprecedented advances in science and technology, the world today is poor. Whole nations are impoverished. Even the rich countries are finding more and more of their citizens living under bridges, pitifully covering themselves with cardboard boxes and begging for a living.

Malaysia has striven to escape from the poverty trap. We have, to a limited extent, succeeded. But for how long can we succeed? If beggar thy neighbour remains the creed for this world, sooner or later we have to join the ranks of the unfortunate nations of the world.

The world today is dividing itself up into blocs, antagonistic blocs with the objective of gaining for one at the expense of the other. Only Asia has no trade bloc. But there is fear that Asia might unite and defy the West. Imagine a trade bloc consisting of Japan, the world's second biggest economy, China with 1.2 billion people and the potential for being the world's most powerful economy, together with Korea, Taiwan and Southeast Asia. With almost two billion hard-working and skillful people, and the capacity to make full use of modern technology, the confrontational potential is frightening. It will totally dominate the world.

Can Asia be stopped? It is not likely. Sooner or later the Asian economies must outstrip the rest of the world. Will Asia then browbeat the Western nations the way Asian countries are being browbeaten now?

It will be unfortunate if Asia's emergence as a powerful economic region results in a confrontation with the rest of the world. There is nothing to be gained by anyone in the end. Asia needs the rest of the world to be prosperous even as Europe and America need a prosperous Asian market. A troubled Europe and America is just not good for Asia.

If there is to be no confrontation, if there is to be a smart partnership between Asia and the developed world in the West, the foundations must be laid now. By adopting an unfriendly attitude towards each of the countries of Asia, the West is unnecessarily antagonising them and pushing them together. Singly they are already a handful. But united they will be beyond handling.

Whether it is admitted or not, trade blocs have formed in Europe and North America. The NAFTA is to be extended in order to include all of Central and South America. There are serious talks about close collaboration between NAFTA and the European Union.

In the meantime, Asian countries are not even allowed to talk to each other. They may not form the East Asia Economic Caucus, a forum for discussing mutual problems. Japan and South Korea are directed not to join any such grouping. Instead all must join APEC and be directed by the dominant members from among non-Asians.

All these are not likely to be welcomed by Asian countries. If they become strong, and this is very likely, then they will not forget the unfair treatment they had received. They are not likely to propose partnerships for mutual prosperity with the West. They will plump for the zero sum game, i.e. Asian prosperity at the expense of Europe and America.

Who knows what this will lead to. Confrontation, economic and military threats, nuclear war or another Cold War which goes on for decades sapping everyone's strength. All these are possible, unless we are smart enough now.

Smart partnership is about companies working together for mutual gains. It is the logical and the best approach. We should all prosper not at the expense of, but together with, our partners and even our competitors. Smart partnerships apply to individuals too, and certainly to nations worldwide.

*The Signing Of  
The Memorandum Of  
Understanding For The  
Development And The  
Manufacture Of  
National Motorcycles  
And  
Multiple Application  
Small Engines Between  
Diversified Resources  
Berhad*

*Kawasaki Heavy Industries Ltd and  
Nissho Iwai Corporation*

*Kuala Lumpur, 7 February 1995*

*(Acquiring Motorcycle Technology)*

I am particularly pleased to note the participation of two of Japan's largest corporations, Kawasaki Heavy Industries and Nissho Iwai Corporation, in this project. I believe that collaboration can bring significant benefits to the venture. Kawasaki, being long established in heavy industries and technology, has also a great deal of expertise in motorcycle manufacturing.

Malaysia has enjoyed uninterrupted economic growth in the last eight years at a rate exceeding eight per cent per year. The Government has encouraged the development of private sector expansion in particular foreign investments by providing the most favourable environment through the presence of a consistent and transparent long range national policy, coupled with various competitive incentives. I am confident that the expansion of the manufacturing sector will help to drive and maintain our rapid economic growth towards attaining the national objective of turning the country into a fully developed nation by 2020. This objective finds a parallel in Dr. Ohba's belief "manufacturing is the prime driving force for economic and social development".

Malaysia's experience in the manufacture of our own national cars, PROTON and PERODUA, has shown that Malaysians have the necessary ability to acquire the highest technology and to be sufficiently skillful and efficient to be competitive in the international market. Therefore, it is my fervent hope that the national motorcycle and small engine project will be able to achieve a much faster transfer of technology from Kawasaki to Malaysian counterparts. I trust our national motorcycles and small engines can be exported worldwide as early as possible.

The current success of PROTON and PERODUA has enabled the country to provide affordable motoring to a large sector of the population. Already Malaysia has one of the highest numbers of motor vehicles per capita in Asia. This volume has helped to ensure the development of a well established network of components manufacturing with its attendant benefits of research and development capability, high-skill labour employment and substantial foreign exchange savit

I am confident therefore that the development and manufacture of our own national motorcycles and small engines will provide another quantum leap in this direction, besides helping the country to achieve a highly motorised population. On the other hand, the small multi-application engines can be widely used in the agriculture and construction sectors to assist our people to improve productivity and efficiency with minimal capital outlay.

Given the potential of our market, the growth in ASEAN, East Asia and now, South Asia, I am sure that our national motorcycles and small engines venture will be successful. The acid test for this venture as for other manufacturing industries, is competitiveness in foreign markets.

# *The Launching Of Malaysia's Micro- Satellite Programme*

*(Malaysia Enters Into the Space And  
Telecommunications Industries)*

*Kuala Lumpur, 13 January 1995*

This Micro-Satellite Programme will certainly take us a step closer to achieving the ability to design, engineer, build and launch a Malaysian spacecraft. Contracts for Measat-I and Measat-II which were signed last May paved the way for Malaysia's participation in space and telecommunications technology. The Measat System, together with space research and education, are an important and integral link to support the total development of a technologically advanced and efficient communications infrastructure in Malaysia.

The launch of Measat-I on 20 December 1995 will be followed, I understand, by that of Measat-II in July 1996. In addition, two satellites, built under the Micro-Satellite programme, will be placed in orbit before the end of the decade. These four launches will firmly position Malaysia among nations that own and operate satellites built to satisfy their specific requirements.

The Measat System and Micro-Satellite Programme will provide the country with a platform on which we can further develop our space and telecommunications technology.

Hopefully, Malaysia will be one of the countries in the region that will be able to launch its own made-in-Malaysia spacecraft.

For this purpose, MAXSTAR has been established. The members of MAXSTAR are : Binariang Sdn. Bhd; Telekom Malaysia Berhad; Bahagian Kajian Sains Angkasa (BAKSA); The Malaysian Institute of Micro-Electronics Systems (MIMOS); Universiti Sains Malaysia; Universiti Malaya; Universiti Kebangsaan Malaysia; Universiti Teknologi Malaysia and Universiti Pertanian Malaysia. MAXSTAR is an example of how a commercial project has led to cooperation between the public and private sectors to serve national interests. MAXSTAR will undertake a Micro-Satellite Programme that will enable scientific research activities, in and from space, to be carried out.

The Micro-Satellites have several applications that will benefit the community. The first Micro-Satellite weighing about 50 kilogrammes will be designed to carry out scientific and educational operations and remote sensing, i.e. the gathering of data from the earth's surface for resource management, land use and the protection of the environment.

It is planned that subsequent Micro-Satellites would be capable of sophisticated applications including material and component testing in space and earth-based pollution monitoring.

The aerospace industry can also expect significant derivative benefits from the work that will be undertaken by MAXSTAR.

The Government is pleased to note that following the G-15 Meeting in New Delhi in 1994, India, through the Indian Space and Research Organisation or ISRO, will support Malaysia in its space programme. ISRO will assist us in the development of our technology to build and launch satellites. It is also our hope that this participation by ISRO will lead to collaboration in other related activities such as satellite broadcasting.

As part of the MEASAT contracts, Arianespace and Hughes Space and Communications, Inc. have also agreed to actively participate in Malaysia's space programme. Our space

programme, which involves participation by India, France and the United States, demonstrates Malaysia's ability to interact and work globally.

Malaysian institutions of higher learning will benefit through participation in MAXSTAR. It is envisaged that Universiti Sains Malaysia will be able to offer courses in satellite and launch vehicle technology and applications starting from the 1996/1997 academic year, ultimately leading to the establishment of a space technology faculty.

The space and communications industry requires vast capital, human and technical resources to acquire and to keep pace with the rapidly advancing technology. To this end, the Government recognises the need for selected alliances among Malaysian companies and between these companies and foreign technology partners.

When Malaysia first put forward the idea of a national car, it was thought that we were being too ambitious. However, the record of Proton has proven our capability not only to have control over our own commercial destiny, but also our ability to interact and compete globally. Whilst we are equally ambitious in the task before us, we are confident that the success of this programme will serve as a role model and inspire future generations.

# *The 2nd Afro-Asian International Conference On Power Development*

*(Using State-of-the Art Technologies  
In Power Development)*

*Kuala Lumpur, 5 September 1994*

This conference demonstrates our commitment to closer ties in order to enhance South-South cooperation. I hope this conference will lead to more exchange programmes, not only in technical fields, but also in enhancing social and cultural ties.

Modern technologies require adequate and reliable electricity supply to operate efficiently. Thus, the demand for electricity, particularly in developing countries with rapid economic growth, will not only grow but must improve in quality all the time.

A major challenge is to efficiently operate the supply system in order to provide reliable and affordable electricity to all categories of consumers. This can only be achieved by adopting state-of-the-art technologies which will enable developing countries to leapfrog and enjoy world-class electricity supply.

A recent study by ESCAP indicates that about US\$1.4 trillion would be required to finance infrastructure development between 1993 and 2000 in the Asia-Pacific countries. The power sector alone requires up to US\$630 billion or 45 percent

of the total. Only US\$500 billion was identified as available or already committed. Consequently, the financial 'gap' for infrastructure projects amounts to around US\$900 billion.

The provision of adequate infrastructure is one of the prerequisites for sustainable economic and social development. Developing countries must now examine and 'experiment' with non-traditional and virtually untried methods to implement needed infrastructure development. The ability to learn from failures is as critical as the lessons from the success of any experiment.

The fundamental challenge before governments is to improvise ways to advance the process of systematic change and to guide it through successive stages to completion. The issue is not whether reform should be more or less radical, but how to ensure that the reconstruction of the institutional structures and development of new norms do not lag behind liberalisation and deregulation. The right approach seems to be to marry boldness with realism.

Malaysia is fortunate because of its experience in managing many forms of privatisation and privatised projects. Progressive and phased removal of subsidies in favour of the 'users pay' principle is now well accepted. But that does not mean that the poor should do without. With our strong desire to create a caring Malaysian society, the 'haves' are made to or encouraged to extend assistance to the ever fewer 'have-nots' so they too can enjoy a reasonably good life. There should not be poverty in the midst of plenty.

In the power industry, we began with corporatising the Government power authority and then selling off a substantial portion to the employees and the public through the listing of Tenaga Nasional Berhad (TNB) or National Power Limited. In order to speed up the generation of power, the Government allowed other investors to set up Independent Power Plants (IPPs). However, transmission and distribution remain with TNB. TNB has already signed five power purchase agreements with the IPPs. Over 4000 MW of new capacities, representing about 30 percent of total requirements, will be provided by IPPs

in Peninsular Malaysia by 1998. Of course, there may be excess capacity. It is up to the IPPs and TNB to increase the consumption of power in order to take up any excess. The power generation and distribution business can contribute towards economic growth and it should therefore be encouraged.

Successful privatisation of other types of infrastructure - for example - shipping, ports, airlines, highways, telecommunications, water supply, sewerage and airports, provide us with the confidence to pursue and implement other privatisation projects.

Although there are fears that private power generation would lead to the neglect of our environment, Malaysia has laws that ensure environmental compliance and protection. Environmental impact assessments are mandatory for all major power generation projects as they are for most industries. We are equally committed to playing our role to protect the global environment and achieve sustainable development. Malaysia is a signatory to the International Framework for Climate Change. Our goal to become a developed and industrialised nation remains a high priority. We hope to achieve this while limiting carbon dioxide emission, a natural by-product of burning hydrocarbons for power.

One important carbon dioxide-free power source is hydroelectricity. Malaysia is committed to developing the Bakun project despite opposition from ill-informed environmentalists. The area involved is relatively small and every care would be taken to conserve as much as possible. By all measures, the development of hydro power is less damaging to the environment than the perpetual burning of fossil fuels. The oil and gas resources of our country are not limitless, but we will use it to create the necessary national wealth for the development of the hydro power potentials in Sarawak, which is sparsely-populated and rich in hydro power.

Harnessing our vast hydro resources will enable our country to switch from depleting to renewable energy resources. The long-term positive impacts of hydro power projects in reducing global greenhouse gas emissions far outweigh the ecological impacts.

The economic reform towards the free market economy sweeping the world must be managed well. Malaysia has undergone the transformation from an agro-based to an industrial economy in just over a decade. The progress after the privatisation of TNB and the smooth introduction of large IPPs has enabled Malaysia to build up a wealth of experience.

It would perhaps be worthwhile for developing countries to share the experiences in order to lessen the cost of experimenting. Some Malaysians who have acquired expertise in this area are keen to join in the power development of other countries.

# *The Official Opening Of Pioneer Technology (M) Sdn Bhd (Technology-Key To Development) Muar, Johor, 9 June 1994*

Malaysia is proud to say that between 1991 and April 1994, a total of RM77.7 billion worth of investments has been approved for the manufacturing sector. Of this total, foreign investors accounted for RM42.8 billion or 55.1 per cent of total investments.

In our efforts to realise our objective of becoming a fully industrialised nation, great emphasis has been placed on the manufacturing sector, which is expected to be the major source of growth for the next three decades or so. Within the manufacturing sector, the electronics sub-sector continues to be a strong driving force, registering a remarkable output growth rate of 29.6 per cent per annum between 1988 and 1993. It also recorded annual average growth rates of 30.4 per cent and 24.4 per cent respectively in terms of export and employment for the same period.

Japanese investment in the manufacturing sector, especially in the electrical and electronics sub-sector, has always been significant. Between 1980 and April 1994, a total of 452 projects with investments totalling RM6.9 billion were granted

approval in this sub-sector, accounting for 36.5 per cent of total Japanese investment in the manufacturing sector during this period. Not only that, the bulk of the industry's output is also exported. In 1993, total exports of electronics products were valued at RM46.7 billion, of which RM5.4 billion or 11.6 per cent was made up of audio products.

Recognising the important contribution of the electronics industry to the economy, the Government has always provided support and encouragement in terms of ensuring the prevalence of the appropriate investment climate for its growth. The basic thrust of the Government policy will be to diversify the industry, not only to enable the production of a wider range of electronic products but also to create more effective forward and backward linkages.

Currently, two crucial issues facing the industry that are of concern to us are the low-level Malaysian participation and the lack of linkages between the electronics industry and the local supporting industries. Therefore, the Government has decided that among the conditions for the granting of tax incentives will be the requirement of local content and the development of linkages with local industries.

It is also the Government's intention that more local entrepreneurs, particularly Bumiputera entrepreneurs, should venture into supporting industries. Investors should actually welcome these conditions as they would:-

- (i) enjoy the convenience of component suppliers located nearby, coupled with prompt delivery and good technical services, and;
- (ii) counter the rising cost of components from Japan following the appreciation of the Yen which has led to the need to find cheaper sources without compromising quality.

This is where the small and medium industries (SMIs) can play an important role as suppliers of parts and components to the large companies engaged in the production of final products. The Government has established a special Vendor Development Programme to facilitate the advancement of the SMIs in the

country. In 1992, the Government introduced the 'Electrical and Electronics Components Scheme' in the consumer electronics sub-sector for this purpose.

Technology is the key to development. It is our hope that with the enhancement of sub-contracting relationships with major consumer electronics firms, the Malaysian firms may gain substantially through the transfer of technology, especially in respect of the manufacturing and sub-assembly process, quality assurance techniques as well as the operations management know-how.

In order to enable this transfer of technology, it is important that manpower training be stepped up.

Research and Development (R & D) plays an important role in the process of our development. Thus, new elements that are being introduced into the fiscal incentive structures to encourage R & D activities reflect our commitment to this. It is hoped that foreign companies will avail themselves of these incentives and will eventually set up their own R & D centres in the country.

# *The Opening Ceremony Of The German- Malaysian Institute*

*(Improving the Quality Of Our Workforce)*

*Kuala Lumpur, 31 May 1994*

The opening of the GMI is of great significance to Malaysia. Firstly, the opening of the GMI represents another milestone in our continuing effort to invest in human capital formation in order to realise higher levels of economic growth and human development. Secondly, it is yet another example of how international cooperation, if well intended and conceived, can be of mutual benefit to all parties.

The GMI, as its name suggests, is born out of bilateral cooperation. It has taken cognizance of, and has tried, to bridge the Malaysian Government's concern for training avenues for potential Malaysian craftsmen with Germany's well-known comparative advantage in precision and production technology, vocational training, and specialised instructors. The GMI is also a hybrid between factory and school — a teaching factory so to speak. It seeks to combine theory and practice in one so that its trainees are assured of entering the world of work without the fear of job mismatch.

The GMI will be one of the main providers of highly skilled technicians. Although when fully operational in 1998, GMI's total capacity is expected to be only 450, nevertheless the role of the GMI in creating and augmenting the supply of trained manpower at the advanced level cannot be understated. What is desired is that with the highest standards of teaching provided, coupled with state-of-the-art equipment, the GMI will be able to contribute towards improving the quality of our workforce.

The quality of the workforce is essentially the decisive element in a country's road to economic success and prosperity. Improving the quality of the workforce is, in a nutshell, what human resource development (HRD) is all about.

The Malaysian Government places strong emphasis on human resource development because of our belief that the population represents our ultimate resource. Under the Sixth Malaysia Plan, about 13 percent of the Federal Government development budget has been allocated for education and training. This is a relatively high proportion of development expenditure, and compares very favourably by all international standards.

The education and training of the country's workforce involves many role players. In addition to the Government, other key actors include employers, workers, schools, training institutions, unions and even parents. Skill development is, however, very often perceived as the domain and responsibility of the Government.

Workers too must realise their own HRD responsibilities. If our workers are to adapt to the new work environment, they must begin to play their part in materialising that training culture. Workers must constantly improve their skills and develop new skills, thereby preparing for the changes that technology will bring to the shop floor. It is through simply higher productivity growth that workers will be able to improve their real incomes. Workers should seek to improve their standard of living not through simply demanding higher wages, but through improving their productivity. Productivity comes not only through the use of more capital, better work

organisation, and proper work attitudes, but more importantly by workers and their employers investing in skills development.

Even as developing countries such as Malaysia continue to emphasise the importance of cost competitiveness and the need to promote productivity through hard work and sacrifices, there are attempts by some to link trade with international labour standards. If these attempts succeed, income for a few may go up, but most are likely to be unemployed. The disparity between the rich and the poor will be enhanced.

An integral part of competence is social competency, and this has to be emphasised because it touches on our core value system. The development of the values and attitudes of the country's manpower must become a necessary component of all training programmes.

Looking a little into the future, I see a lot of opportunities for the GMI. Although the current mandate of GMI is to produce highly-skilled technicians for industry, training institutions like the GMI should consider creating linkages with institutions of higher technical education offering degree-level education with a view to providing avenues for their graduates to enhance their education and skills. Such linkages will also strengthen the practical and industrial exposure of the engineers who graduate from these institutions, in view of the combination of practical training at GMI and further academic education at the University level.

It was recently found in many developed industrialised countries, that nearly half of the skills of technical workers become obsolete within three to seven years of formal education and training. This phenomenon, which is largely due to the rapidity of technological change, has resulted in a rapidly changing job content. It is for this reason, among others, that skill delivery institutions must institute greater collaboration with the industry in order to keep pace with technological advances in industry and their corresponding manpower needs.

*The Launching Of A  
Special Supplement On  
Malaysia's Technical  
Capacity And  
Capability In The April  
1994 Worldwide Edition  
Of Scientific American*

*(Malaysia: An Attractive Centre  
For High-Tech Industries)*

*Kuala Lumpur, 3 June 1993*

I support this initiative to publicise worldwide Malaysia's technological capability and capacity, which to me, seems to be a well-kept secret. At a time when major multinationals are in dire straits in their home countries, their Malaysian operations are prospering. What is the secret behind this success which is counter to worldwide trend? I suspect it has something to do with the overall Malaysian business environment and the high productivity of its labour, based on the trainability and technical competence of the workforce.

We have a simple but clear vision for Malaysia, namely that by the year 2020, we want to be a developed nation having the following attributes:

- A united nation with a sense of common and shared destiny;
- A psychologically-liberated, secure and developed Malaysian society;
- A mature democratic society;
- A fully moral and ethical society;
- A matured, liberal and tolerant society;
- A scientific and progressive society;
- A caring society with a caring culture;
- An economically just society; and
- A prosperous society.

Thus, one of the characteristics of Malaysia in the year 2020 is a society that is scientifically progressive, a society that is innovative and forward looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilisation. This vision is not a dream. In fact, Malaysia had recognised the importance of science and technology in development since independence in 1957. The role of science and technology has been enshrined in the Rukunegara and incorporated in her educational programme. Thus, the development of primary and secondary schools, universities and polytechnics, has been implemented with science as the key discipline in order to produce skilled and competent scientific manpower. This, in fact, has been realised and has borne fruits, as evidenced by the rapid modern technology-based industrialisation of Malaysia.

Further steps have been taken to prepare Malaysia not only to be a consumer of technology, but also a contributor to new technologies and scientific discoveries. Research has not been neglected in the universities. In fact, the Government, through its funding programme via the Intensification of Research in Priority Areas (IRPA) mechanism, has provided a substantial fund for research in the universities and research institutes.

Since independence, several institutes have been set up for applied research which have contributed to the economic development and industrialisation of the country. Further strengthening of this development is facilitated by the provision of policy guidelines such as the Industrial Master Plan, the Technology Action Plan and Vision 2020. The national R & D allocation is being increased, with an anticipated doubling in the proportion of GDP between 1990 and 2000 (from 0.8 percent to 1.6 percent of GDP). The private sector R & D is being stimulated through several programmes, including direct grants, incentive schemes and fiscal and monetary benefits.

Thus, with these developments, not only has new knowledge been generated, but highly-trained personnel have, and are, being produced to man the high technology-based industries. Concurrent with science and technology development, encouragement is given to Malaysians to be more innovative and inventive and the first step is the passing of the Patent Act in 1986 while the Industrial Design Act is being prepared for Parliament. Thus, the intellectual properties of Malaysians and the foreign investors alike are protected, paving the way for the orderly transfer of technology to Malaysia. Foreign investors can bring in their technology freely with the knowledge that their technology is protected in the country. Both government administration and the NGOs are playing an active role in inculcating the innovative culture through several activities including the annual Inventors' Fair. Recently, Malaysian investors participated in the Geneva Exhibition and five out of six entries won medals, including one gold medal. All these efforts in building up the scientific and technological infrastructure, and competent scientific manpower, are directed to the success of science and technology-based industries in the country. These industries reflect the level of Malaysian technological capability.

Steps have also been taken to assist in the commercialisation of scientific discoveries so as to nurture the development of indigenous technology which, it is hoped, will play an important role in giving Malaysian industry the extra competitive edge. One of the steps taken is the establishment of the Malaysian

Technology Development Corporation (MTDC) which seeks to assist in the commercialisation of research and innovations developed in the country. The Malaysian Invention and Industrial Design Society - an NGO - also plays a role by recognising or assisting inventors who require its support through providing seed money, the preparation of a business plan for submission to MTDC or the setting up of a venture capital company. It must be noted that some inventors have already been successful in developing commercially-viable products.

In support of this development, several critical services have been strengthened. Malaysia's five year plans have concentrated on building up infrastructure for social, economic and industrial growth. These include communications, transport, health and R & D. In the decade between 1981 to 1990, Malaysia spent US\$7.8 billion on telecommunications alone, the biggest spender in South East Asia and second only to Singapore on a per capita basis. Started about 10 years ago, the Government has successfully implemented an extensive privatisation policy. So far highways, telecoms, railways, postal services, power generation, ports and airports, to name some, have either been corporatised or privatised. Competition is being encouraged in order to stimulate rapid development at the minimum cost to the consumers.

Political stability and a well-developed financial mechanism are among the most important conditions for industrialisation to flourish. In Malaysia, both of these conditions have been accorded high rating by world opinion.

All these steps have borne results in the form of successful commercial ventures by both the local as well as foreign entrepreneurs and foreign multinationals. It is heartening to see the transition of Malaysia from a commodity-based exporter to a producer and exporter of manufactured products.

The electronics industry growth is probably the most spectacular success that Malaysia has achieved in terms of speed of growth and future potential. Beginning from 1972, the industry has grown from almost nothing to become the largest

industrial activity of the country. The industry is also undergoing rapid transformation from almost complete concentration on semi-conductor components to a more balanced mix of sub-assemblies and end products.

Several examples may be highlighted to illustrate the success achieved, of which two are given here. Motorola started with one plant in 1972 and is now in the process of building its fifth. Beginning with mostly manual assembly, it has progressed to automated assembly and testing using largely local expertise. It now does wafer fabrication in a specialised plant in Seremban. In another plant making communications equipment, Motorola has an R & D team of about 100 engineers involved in all aspects of communications gear, from electronic circuits to mechanical designs.

Intel is another success story that indicates the level of sophistication achieved using local expertise. Nowadays, most of Intel's most advanced microprocessors are assembled and tested in Malaysia using automated equipment and processes designed, fabricated and integrated locally.

The telecommunications industry era can be considered to have begun with the corporatisation of the Government-owned Jabatan Telekom in 1986, followed by privatisation in 1990. As a result, telecoms services have become more widespread and reliable while advanced data communication services are being offered or planned.

Competition has been introduced by the Government in the provision of enhanced and advanced services. The rise of the cellular telecommunication industry is a prime example of what can happen. The domestic cellular growth rate is more than 50 percent per annum, far higher than the rate for wired services.

In the manufacturing area, Malaysian-owned companies have succeeded in penetrating foreign markets for terminal equipment as well as for infrastructure development.

Malaysia decided to undertake the project of producing the country's first national car, the Proton Saga, in 1983. The

venture has been an overwhelming success, winning two golds and one silver medal in 1988, and another two gold medals in 1990 at the British International Motor Shows. It obtained the vote of 'the Best Value for Money' car in a British motoring magazine in 1991 and two more gold medals alongside a Manufacturer's Excellence award for the new sleek and aerodynamic Proton Iswara in 1992. It has just introduced another model, the Proton Wira, and technologically, it has progressed further by increasing the number of car components manufactured locally and establishing comprehensive R & D facilities. Malaysia's automobile industry is expanding and a second national car is in advanced planning. Malaysian-owned assembly plants now design and produce jigs for their own use and for export.

You will agree with me that we should tell the world that Malaysia is an attractive centre for high technology-based industries and that Malaysia is a good technological partner for their continued competitiveness. In the true spirit of Malaysia Incorporated, I hope the corporate sector will play an active role in publicising our positive assets and providing testimony to the actual situation in Malaysia. We must also inform the world that besides Malaysia's scientific and technological capabilities, the country also provides other benefits and incentives, has a skilled and scientifically competent manpower, and a workforce with a positive work culture.

There are many fiscal incentives offered to companies for upgrading technical capability of workers and for product development as well as for the more basic-type R & D. The Government is also removing restrictions on the employment of foreign R & D personnel and technical experts, although it pays to employ Malaysians, as they are equally competent and cost less.

Finally, I am sure that many of our foreign investors will be able to testify to the fact that Malaysia also provides a peaceful and attractive place to live. Despite having all the amenities of a developed country, the cost of living here is very much lower than in developed countries.

*The Inception Meeting  
Of The Industrialists  
Steering Group (ISG)  
And The Launch Of  
CPSP And MIGHT  
(Towards Globalisation Of Business)  
Kuala Lumpur, 22 February 1993*

I am a firm believer in the need for an effective partnership between government and the private sector for effective management of development and growth. Malaysia's success can be attributed, in part at least, to the strong public-private sector relationship.

In the current trend towards globalisation of business, a strong public-private sector partnership is not only necessary but also critical. Globalisation is not just about doing business worldwide; it is about decentralisation, about greater autonomy in the off-shore units, about backward and forward linkages between the different processes and business activities and about re-investment in countries where the globalised companies operate.

Globalisation is about integration of business for greater efficiency and profitability in tandem with the planned growth of the national economy. In other words, globalisation requires making available technological resources in a coordinated fashion - for the mutual benefit of businesses operating in a number of host countries.

Companies aiming to globalise have as their strategy the formation of business alliances in order to maximise the use of assets, to share costs and risks and to establishing presence in main markets, thus extracting all possible comparative advantages.

Globalisation is not without side effects, some of which are good and some bad. For one, the relationship within the globalised firms become a complex mixture of competition and cooperation. Also, there may develop relationships of interdependence among developing and developed national economies, and the blooming of relationships between business establishments and nation states.

It is through the nurturing partnership between the public and the private sectors at the national level (such as MIGHT) and international level (such as CPSP) and the cooperation between them, that the process in globalisation can be fully exploited. These partnerships however can only be effective, in this context, if they operate as cooperative networks innovatively, allowing for flexibility, adaptability and mutual trust.

Malaysia's Vision 2020, of which I am sure you must have heard, with its objective of making Malaysia a fully developed nation by the year 2020, can only be achieved if industry plays its part fully in a government-industry partnership. While the government can provide the appropriate environment for growth, and perhaps set the general direction for business activities, it is the industry which must ensure that growth takes place. Industry has a major role to play as the engine of growth.

It is on this premise that we have vigorously promoted the Malaysia Inc. concept and initiated programmes to put the concept to work. In this context, we have established the Malaysian Business Council (MBC) to allow for a process of creative consultation and meaningful dialogue among policy-makers, civil servants, corporate leaders and politicians. MBC addresses current and emerging domestic and international issues impinging on Malaysian development in order to generate consensus on national economic directions and strategies, and to promote productive cooperation between the public and private sectors.

I am pleased to note that the MBC, together with the National Council for Scientific Research and Development, has initiated the public-private sector group called MIGHT (Malaysian Industry-Government Group for High Technology).

MIGHT, I understand, is formed to prospect for business opportunities for Malaysia through strategic exploitation of technology for the attainment of the Vision 2020 objectives.

The formation of MIGHT is timely and commendable. This government-industry partnership must work towards strengthening our current comparative advantage so as to sustain, and even enhance, our competitiveness. This can be done through technology-based businesses developed on local or foreign-sourced technologies, or those originating from strategic alliances.

MIGHT must involve the participation of as many and as wide a spectrum of Malaysian companies for multi-perspective views that will enable actions at both micro and macro levels.

Larger membership will increase the possibilities and opportunities for new businesses through strategic alliances in the emerging mode known as Virtual Corporation.

In Malaysia, MIGHT will have the opportunity to foster and trigger the process of Virtual Corporation by cooperatively strengthening needed expertise in companies. Government support for this is reflected in the setting up of the unit for MIGHT in the Prime Minister's Department.

The Commonwealth Consultative Group on Technology Management (CCGTM) must play its role in promoting the new process of prospecting technology for national competitive advantage. The CCGTM, as you know, was initiated in Kuala Lumpur. It was established by the Commonwealth Heads of Government when they met in Kuala Lumpur in 1989. CCGTM has evolved from being an agent of change - reforming public sector technology management - into a cooperative networking organisation that facilitates the interaction between the public and private sector in technology management for growth.

I am gratified by the success of the CCGTM in its bold initiative to garner the support of the private sector at the Commonwealth and international-level, culminating in the formation of the CCGTM-Private Sector Partnership (CPSP). This partnership can take advantage of the strategic geographic position of Commonwealth countries on all continents, and their varying levels of sophistication, to promote business through the transfer of the best practices in technology management.

*The Official Opening  
Of Canon Opto  
(Malaysia) Sdn Bhd  
(Technology Transfer Poses No Threat  
To Japanese Companies)  
Shah Alam, Selangor, 22 February 1991*

The successes by Canon in Malaysia, I believe, is not an isolated case. In fact, success stories of foreign companies in Malaysia seem to be the norm since Malaysia overcame the recession.

While these success stories abound, we also see a parallel escalation of Japanese interests, in Malaysia. From 44 project applications with Japanese participation in 1986, the number of applications received last year increased to 229, or more than five times, the 1986 total. Even more impressive was the proposed Japanese capital investment which shot up from \$285 million ringgit in 1986 to \$6,738 million ringgit in 1990, more than 23 times the 1986 volume.

While all these numbers and figures are encouraging, more attention should now be directed at the quality of manufacturing projects that are being set up by Japanese investors in Malaysia. A growing area of concern among the business communities in the Asia-Pacific Region, especially among the ASEAN countries, is that of technology transfer. Technology is much needed to spur our economies towards a higher level of

industrialisation and to develop our workforce into one that can handle the changing demands of industry. We believe that Japan can provide that technology.

It is our hope that the Japanese multinationals in this region will pass on some of their technologies to local companies. There should not be too much concern over any adverse effect of doing this for the Japanese companies, since it is a fact that Japanese technologies are not static. They advance very rapidly and as a result, the technologies transferred to Malaysia will not be in a position to challenge the latest in Japanese technologies.

The benefits for the Japanese companies are in being able to source components and have the vendors network locally, which will reduce costs. Japanese companies can work together with Malaysian manufacturers to develop products which can meet the stringent requirements of export markets. This co-operation can even be further extended into the improvement of product price and delivery time. Although efforts to work together with Malaysian companies have been going on for some time, they are however not on a large scale. However, there have been cases where Japanese companies have sent their own engineers to Malaysian manufacturers to help them improve production capabilities and quality. This is encouraging.

Malaysian companies, on the other hand, have been said to be reluctant to invest in additional machinery and even to shy away from taking investment risks. Local companies should take advantage of proposals for co-operation by Japanese companies. Such proposals for co-operation can also come in the form of joint-ventures between Japanese components and parts suppliers and Malaysian companies, where the risks are shared and technology transfer progresses in a more organised fashion.

I have been told that a Japanese company producing audio products in Malaysia has steadily increased its Malaysian content from 18 percent when it started in late 1988, to 52 percent by late last year. This company has also developed a total of 113 suppliers in this region, about half in Malaysia and the rest in Singapore. About 60 percent of the 113 companies are Japanese-affiliated, indicating that the concept of technology transfer through joint-venture is feasible.

Besides developing local suppliers, other ways in which Japanese companies can integrate themselves into the Malaysian business network is to continually attempt to source raw materials and intermediate inputs such as sub-assemblies locally, and to set up more integrated projects in Malaysia.

The rapid growth and economic dynamism of this region is undeniable. South-East Asia is also an integral part of the East Asian Region which has a population of nearly two billion people or 37 percent of the world's population, representing a huge potential market. Japanese business enterprises in this region will be a growing presence, and a long-term one, and this presence will only thrive in a politically stable and economically sound environment.

Malaysia provides this environment. The Government of Malaysia has been consistently successful in ensuring political stability, sound economic policies and good infrastructure, including an educated and trainable workforce. But the development and training of this workforce must be undertaken largely by the companies themselves. They should spare no effort to inculcate good work ethics and a culture that places a high value on company loyalty and productivity. Where Malaysian workers have been inculcated with good ethics, they have proven to be good and highly productive workers. It is hoped that their productivity will be fairly rewarded. It is the Government's hope that Malaysians will gradually earn better incomes without hurting the profitability of the companies. The Government will work to ensure that investors in Malaysia will never regret their decision. I feel that Canon has no regrets.

***The Official Opening  
Of The 8th Meeting Of  
The Islamic  
Foundation For  
Science, Technology  
And Development  
(IFSTAD) Scientific  
Council***

***(Need For Muslim Nations To Enhance  
Cooperation In Science And Technology)  
Kuching, Sarawak, 23 February 1987***

Islam has never enjoined upon its followers to be ignorant and to fear knowledge. Indeed, the Quran asks us to study the stars and the environment and the animals created by Allah S.W.T. Such a study cannot but be scientific in character, even if it is also related to faith. Surely when Allah enjoins upon us to do something, it must be for our own good. In the case of science and technology, we know that our failure to follow the injunctions of our religion has resulted in our present weakness and our being at the mercy of our enemies and those who do not wish us well. It is time that we realise this. It is time that we use the Quran as a guide, and not just as a part of the performance of rituals. It is time that we emphasise the "do's" as much as the "dont's". There are too many things that the Quran tells us to do which we ignore or de-emphasise.

Islam is not at fault. It is not the cause of our backwardness or weakness. It is we and our incorrect interpretations and unbalanced teachings, who are wrong. We must atone for our wrongs by correcting them. Insha-Allah, we will gain success, as indeed the early followers of Islam succeeded, in the first 100 years of the Hijrah. It is therefore the duty of IFSTAD not only to spread and promote scientific and technical knowledge, but also to preach the correct teachings of Islam with regard to the search for knowledge and the need for science and technology.

It is said by some Muslims that we should not seek knowledge for the sake of knowledge. They deplore this approach because they feel it is Western and secular. But have we not noticed that knowledge initially acquired without any specific benefit in mind, eventually proves to be useful and of benefit? Usually, knowledge discovered by scientists is of no use to the scientists themselves. But to some others, that knowledge could be translated into something worthwhile. If the knowledge is applied for a bad purpose, it is not because the knowledge is bad. It is because evil people use it for their own ends. The knowledge should not be blamed or shunned.

The discoveries that Western scientists have made have rendered their countries rich and powerful. Today, we are forced to pay high prices for the products derived from these discoveries, particularly in the field of defence. And because we have to do this, we have become totally dependent on the so-called Western technology. We are helpless against them. Such is the advance that they have made that every aspect of our life is governed, or at least influenced, by their know-how. The food that we eat is produced using fertilizers devised by them, milled and transported and even cooked with something they invented or produced. The power and light we use owe everything to the inventions from their fertile minds. We move from place to place in vehicles using a variety of internal combustion engines designed by them. And the worst part of it all, is that we are not even capable in many instances to repair and maintain these products ourselves. We need them and the more we need them, the less is our independence.

We may blame and condemn them for their misuse of the power they gain through science and technology but we cannot say we are totally blameless. We have come to this state of dependence because we are still arguing about acquiring knowledge of science and technology, we are still talking about what is secular and what is not in our interminable discussions in air-conditioned, electrically-lighted and sound-equipped conference halls of unsurpassed architectural beauty.

In the name of Islam, stop this fruitless polemics and get on with education, with the quest for knowledge and with research. If we don't like the results, as for example Darwin's *Theory of the Origin of the Species*, discard or disregard them, and go on to others which are not against our belief. Do not condemn all knowledge simply because some areas of knowledge are bad or irreligious.

The present prolonged worldwide economic recession and unsettling political trends coupled with the problems of drug abuse, unemployment, depressed commodity prices, fall in the oil prices, increase in protectionism, and debt problem, has affected us in one way or another. Cooperation among Muslim countries in the acquisition of scientific and technological know-how therefore, seems to be more urgent than ever.

We must promote greater efforts to strengthen our cooperation in science and technology so as to minimize cost and share the benefits. Malaysia is fully committed, and will continue to contribute, to the development of Muslim countries in all spheres of common interest, including the field of science and technology. I wish to reaffirm Malaysia's support to IFSTAD's objectives, functions and activities in the field of science and technology. We strongly support such activities which are essential for the purpose of achieving rapid, coordinated and wide-ranging socio-economic development of the Muslim Ummah.

It is my hope that in this Meeting, the Council will be fully conscious of its responsibility and will be able to examine thoroughly, the issues before it in a frank, sincere and pragmatic manner and with full conviction that our endeavours would be

fruitful. In other words, the Council will have to find ways and means of implementing successfully the resolutions adopted by the Fifth Islamic Summit Conference in Kuwait, especially on scientific and technological cooperation.

We are also conscious of the rich historical experiences of the Muslim world in the fields of science and technology, and of the need to foster the distinctive Islamic culture which combines the universal, spiritual and moral values of Islam with the world view of science. I believe that the intensification and strengthening of cooperation and collaboration in science and technology would contribute immensely towards solving many of the problems faced by the Ummah and the Islamic world as a whole.

# *The First Asean Science And Technology Week*

*(Development Of ASEAN  
Science And Technology)  
Kuala Lumpur, 24 April 1986*

It is gratifying to see the high rating that science and technology are accorded in ASEAN countries. As these related areas of knowledge have helped build up the economies and standards of living of the developed countries, so will they for the developing ASEAN countries.

It is said that the Pacific will replace the Atlantic region in terms of development and advancement in the 21st century, if not now. Before we get carried away by this rosy prospect, let us examine the true strength and potential of the different regions of the Pacific. We see the growth of Japan and the burgeoning economies of South Korea, Taiwan and Hong Kong as undeniable facts that will contribute towards the bright future of the Pacific. But do we really have reason to believe that the ASEAN countries will contribute their portion?

True, the growth of the ASEAN countries in the 60's and 70's has been remarkable. But is that growth really sustainable? Has it got a sound basis? Already that growth has slowed down and we know that it is due to too much reliance on primary commodities. Prices of primary commodities have slumped and

they will never again be what they were in the last two decades. Clearly, the ASEAN nations have structural difficulties in terms of economic growth. They have to re-examine themselves and take corrective measures if they want to make the Pacific dream come true.

What are the weaknesses of the ASEAN countries? Certainly their poor knowledge and application of science and technology is one of them. But there are others.

Scale is one of them. In a mass consumption economic world, the ASEAN countries can only claim to be members of the junior league. We like to talk of our 250 million population. It sounds like a big market. But we are not one market. We are a fragmented market. In terms of purchasing power, together we are equivalent to only 25 million Americans or Europeans or Australians. Since we are fragmented, we do not even have the leverage of a 25 million American market. Such is the weakness of the fragmented ASEAN market that only three percent of Malaysia's production of rubber can be consumed domestically. ASEAN needs the world more than the world needs us. As more research and development of substitutes are done in the developed countries, the threat to ASEAN commodities will continue to increase.

ASEAN's strength is derived from political co-operation. In this field, we work closely and are quite effective. But there is a limit to political leverage. The price of goods are still determined by supply and demand. Cartels and agreements can work for a time, but not forever. The collapse of the Tin Agreement is a very recent reminder of the facts of economic life.

While ASEAN is fragmented economically, Europe forged ahead with the European Economic Community. The EEC is not a complete success, but the already powerful purchasing power and consequently, economic leverage of each European country, has been tremendously enhanced by the common stand of the Community countries. In the face of this, it is naive to dream of ASEAN as a part of a new Pacific economic locomotive.

There is no doubt that there is an indigenous ASEAN science and technology. We probably never defined them as science and technology. We just devised things that work, without going into any depth the scientific or technological basis of the things we devised. But the base is there. It only needs modern systems and approaches to relate them to modern science and technology. In fact, if we do, we are going to find ourselves relating to a way of life that we no longer lead. Like it or not, we are now a part of the mass consumption economy of the world. Therefore, our science and technology must be re-oriented to this economic fact.

We cannot go back to invent the wheel. We have to leap-frog and go straight into more modern science and technology. Here, we have to learn from the advanced countries. The basics are easily available but when science and technology are needed to improve our productive capacities, we will need help. This is where for ASEAN, our dialogue partners are most needed.

I am glad to say that in most instances, this help is given ungrudgingly. Various projects have been initiated where new technologies have not only been made available, but in many instances, financed by dialogue partners. The presence of representatives of ASEAN Dialogue Partners at this Conference is further evidence of the interest and willingness of the Dialogue Partners in the development of ASEAN science and technology.

Still, there has been much talk about the unwillingness of the advanced countries to transfer technology. While this may be true in some cases, it is also important to consider the readiness of the ASEAN people to accept new technology. At the risk of stepping on some toes, I would like to say that sometimes, we are neither psychologically nor attitudinally prepared to receive the technology we need.

The fact is, that if we have some special scientific or technological knowledge, we would also be unwilling to impart such knowledge to our potential competitors. If we are going to get anywhere in the acquisition of technology, we must prepare

ourselves fully and go after what we want. Beginning with the basics that we can acquire fairly easily, we have to do our own research and development.

With a population of merely 25 million by Western economic standards, research and development in ASEAN cannot be fragmented into duplicating national approaches, except where the finer refinements are involved. Already with the co-operation of dialogue partners a lot of common research is done. Indigenous ASEAN science and technology could also benefit from a co-operative approach.

The field of science and technology is vast. No single country can afford to go into all. ASEAN will have to specialise and find a suitable niche. Even then, there is a need for each ASEAN country to identify what it can specialise in, from the identified niche. The limited resources in men and money of the whole region can then be allocated more effectively.

The vulnerability of the Malaysian economy to changes in external demand for its primary commodities has made us realise the need for further diversification into manufacturing for export. R & D activities therefore have to be directed towards increasing productivity and diversifying the industrial base to ensure that Malaysia has a competitive edge and to enable entry into overseas markets. Greater emphasis will be directed towards R & D activities in processing our primary products and adding value for exports.

In order to strengthen the indigenous technological capacity and capability, serious efforts will be made to transfer technology from abroad. In order to achieve maximum results, Malaysia will be educationally and psychologically prepared to receive new technology. This will be done through a number of activities and policy instruments.

Science will be demystified by exposing the Malaysian man in-the-street to the scientific basis and explanations of everyday happenings. This will be achieved through informal exposure to exhibits at science centres, botanical and zoological gardens, science-based museums and simple planetarium. The exposure

will be done as early in life as possible. It is hoped that eventually the Malaysian society will consist of large numbers of people with enquiring minds and a desire to search and research their environment. In other words, Malaysians will become more scientifically inclined.

I believe that the rest of ASEAN also share some of the aspirations of Malaysia. We must promote greater efforts to strengthen our co-operation in science and technology so as to minimise cost and share the benefits. Malaysia will continue to contribute to the development of ASEAN in all spheres of common interest, including the field of science and technology. I would also like to urge that the dialogue partners of ASEAN continue to support the efforts of ASEAN to improve its technological capability and to promote the growth of science and technology. In the past, a number of dialogue countries have made generous contributions to ASEAN. Their generosity will not go unrequited. In an interdependent world, a prosperous ASEAN resulting from a balanced and scientifically-based development, will be able to contribute more towards world trade and prosperity than if it were poverty-stricken.

*The Opening Of The  
2nd International  
Combined Scientific  
Meeting Organised By  
The Colleges Of  
General Practitioners,  
Physicians And  
Surgeons Of Malaysia  
(Dramatic Advances In Medical Technology)  
Kuala Lumpur, 12 September 1984*

Meetings such as this provide an opportunity for the medical profession in this country to update their knowledge and skills, as well as to exchange experiences with other colleagues from abroad. The advances of medical technology have been breathtaking. For the new generations, grown accustomed to beta blockers, psychotropic drugs and steroids, it must seem inconceivable how medicine was practised before penicillin. Even more dramatic advances lie ahead of us. But the question that has to be asked is whether we can afford the cost of modern medical technology? Even in as rich a country as the United States, soaring health costs have become a burden. Nearly two thirds of health insurance costs in the United States are spent in

maintaining the last two years of life. That does not seem to me to be an efficient way to spend health funds.

Although only a developing country, Malaysia would still want the best of modern medicine. But our resources are limited and, whether we like it or not, we will lag behind in the provision of some of the most sophisticated facilities. Scientific meetings will have no time for these mundane matters, but they are facts that must be faced by the government and the people. As a renegade doctor-turned-administrator, I cannot help but dwell a little on this unscientific aspect of medicine.

Malaysia's medical problem is compounded by the inheritance of an accident of colonial rule. The British colonial government, faced with the problem of providing medical care for British expatriate officers, decided to set up Government hospitals where the officers could be given free treatment. To encourage locals to switch to Western medicine, these government hospitals also provided free treatment for anyone willing to be attended by doctors. The free hospitals became very popular and evolved into a part of the Government service. If any fee was charged, it was nominal. In the days when mixtures and powders cost a few cents, the Government could well afford the dispensing of free treatment. But today, an antibiotic capsule may cost a few dollars each, making medication extremely expensive. Surgery is even more costly. Of course doctors and specialists do not come cheap either. Free medical treatment in Malaysia is now a heavy burden despite the nominal charges. And the trend is for the burden to become heavier.

Some will think that this is a problem for the Government alone. Actually it is not. It is a problem for the nation as a whole. The treatment is not really free. The people are paying for it, not directly of course. The question that they should ask themselves is whether their money is being spent on the right people, i.e. the deserving poor. Or could it be possible that some business concerns and even insurance companies and funds are taking a free ride on possibly the only non-contributory medical insurance scheme in the world.

I am sorry to focus on what seems to be a local issue at an international conference like this. But while you discuss enthusiastically on the technological advances in medicine and surgery, you should also spare a thought for the rapid escalation in cost. When you become cost-conscious, then the technology of cost-cutting will receive serious attention. Indeed, to a certain extent it already has, although it may not be because you are concerned over the cost. When a famous surgeon moves from theatre to theatre, performing only the most sophisticated part of surgery, while assistants start the operation and close up the patient, what you are doing is mass surgery where costs are cut. The concern that will arise from mass surgery is not poor quality of work, but a lack of personal involvement on the part of the surgeon. If carried too far, the surgeon will recognise only a certain part of the anatomy of the patient and not the patient himself. When that happens hospitals will become repair shops. So, no matter how advanced medical technology becomes, there must be a certain degree of personal relationship between the patient and the doctor, if medicine is to remain meaningful. Nevertheless, mass or production line surgery does cut cost. There may be other ways if doctors learn to appreciate that cutting cost is important. And, of course, it is important, for high cost of medicine must deprive the poor of adequate medical attention.

It is in the context of these that Malaysia has decided to privatise some of the Government's social facilities. We are not about to deprive the poor of free medical treatment. But the present system enables even those who are able to pay, to avoid payment altogether. Indeed, firms which should have taken medical insurance for their employees are availing themselves of free treatment. With privatisation, only the needy would be accorded free treatment.

*The International  
Symposium On  
Technology, Culture  
And Development  
(Technology, Culture And Development)  
Kuala Lumpur, 12 December 1983*

This is perhaps the first time that Technology and Development are to be linked and studied together with Culture. The tendency has always been to forget culture entirely when dealing with technology and development. The result is that importation of foreign technology and concepts of development has been disappointing to a lot of developing nations. The interplay of technology, culture and development, while it can be complementary, can also tear a society apart if not fully appreciated, integrated and guided.

We know that man does not live by material gains alone. We must have a reasonably satisfying spiritual and cultural life. We should not forget that man requires spiritual nourishments in addition to the material necessities in order to enjoy a decent existence.

Let me say a few words about culture and its role in the advancement of technology and development. What a society is, is truly the result or the product of its culture - particularly the value system aspect of culture. Of course, if we care to go further backwards, we will find that the value system of a

society is influenced by its environment. But the environment can be shown to affect different societies differently. Thus, continuous hardship may either reduce a society to passive fatality or it may induce a hardiness which enables the society to overcome the challenges of life.

Assuming that the environment has produced passivity and a fatalist philosophy, the value system will be such that innovation and inventiveness will be uncommon. Indeed, lethargy normally develops. The struggle against adversity will not characterize that society. In the really bad cases, the society is given to extreme self-pity and dependence on others.

Self-pity and dependence on others is in fact a characteristic of a lot of under-developed or developing countries. Such countries are usually lacking in discipline and the will to fight adversity. The value systems and culture of the society in these countries are influenced by the basic philosophy of dependence on others and passivity. There is no reaching out for knowledge and advancement. Rather, there is a continuous clamour to be given everything in the ready-to-use state.

For such a society, technology transfer is not possible or at least is not easy to achieve. The attitude militates against it because the acceptance of new technology requires a certain degree of discipline and desire for change and self-improvement. Basically a transfer of technology is like the acceptance of a fishing rod in order to get food instead of getting the food itself when that is what is asked for. Few would have the patience to go fishing when hungry. Similarly, the passive society would not want to learn to make an electric fan when it is hot. It is easier to buy or be given an electric fan. This is a simplistic analogy of the cultural resistance involved in the transfer of technology, but nevertheless, it is an apt analogy.

The point that is being made is that before technology can be successfully transferred or while it is being transferred, the cultural resistance must be overcome. This can only be done if there is an understanding of the culture of the transferee community, or better still, the differences of the cultures of the transferors and the transferees. If there is this understanding and

the right allowances or preparations made, the transfer of technology will succeed. If culture is ignored, there will be resistance and failure, or insignificant success, at best.

On the question of the transfer of technology itself, I would like to look back into history, our best teacher. Over five thousand years ago, the Egyptians discovered the technique of glass blowing. This technique spread through the Mediterranean, Europe and Asia with very little improvement until recent times. There was no clamour for a transfer of technology nor any organised effort to do so. Nevertheless, technology transfer did take place and was eventually improved upon. Mass production techniques for the manufacture of glass tubing and plate glass have now been devised and perfected. In navigation, the Arab travellers perfected the astrolabe, while the Europeans learned about the compass from the East. These are striking examples of the dissemination of technology. The social and political consequences of this diffusion are well-known.

Today, the so-called Third World countries are striving to achieve rapid material progress by wholesale importation of a variety of technologies from the advanced countries. However, analogous to the process of the life sciences, technology cannot always be transferred without considerable adaptation. The receiving country has to meet one vital prerequisite: trained manpower, before it can successfully absorb an imported technology. This principle seems to be commonsense, yet it is often forgotten in the surge of national pride and personal greed that lead to excessive absorption of foreign technology. The results have not been entirely to the good of the recipients' societies. If we look closely, we will find that the absorption of foreign technologies implies and involves cultural changes. If the cultural changes are incompatible with the existing culture, then disorientation and confusion results. Needless to say, a disoriented and confused society is not the kind of society that is desirable.

Perhaps it would not be irrelevant for me to refer briefly to the pricing of technology. No technology is too dear if the resulting outflow of economic benefits exceeds its aggregate

real cost. On the other hand, no technology is too cheap if it involves a seemingly unending entanglement with servicing costs and inventories that ultimately impoverishes the recipient and renders it more and more dependent. There is an old proverb - "Beware of Greeks bearing gifts", I believe this refers to the story of the Trojan Horse. There is a significant precept here for all the newly-developing countries.

Developing countries have to be careful not to acquire obsolete technology which some advanced countries may wish to dump on them. In finding a fair and reasonable price for purchased technology, a Third World country has to take into account not only what it must pay the supplier, but also the whole of the real costs involved in adopting the technology and training local manpower to operate it.

It is my observation that the more dynamic the pace of modernisation in a country, the greater will be its need for new foreign technologies. Technology in development is not a one-off affair. It is a flow with an exponential growth rate. Any country which hopes to be a substantial recipient of the new technologies developed by the advanced countries must have an expanding capacity to absorb more of such technologies.

I have spoken of resources including manpower as prerequisites of this absorptive capacity. Now I will turn to one of the most critical aspects of economic progress. This is popularly known as "R & D", or Research and Development.

I would emphasise that while some 'R' and a little 'D' may have to be imported all the time, there is no real substitute for sustained R & D at home. In a world dominated by national self-interests, it would be naive to expect any country to carry out R & D for the benefit of another country. We must carry out our own R & D to meet our own needs. Any work done by other countries should be regarded as a bonus which may not be depended upon as a reliable source.

I do agree that research always seems to be rather expensive. And, good research must be terribly expensive. Yet, if we are to succeed in development, we must invest substantial resources in

research. The high costs appear to be so because excellent work frequently needs to be spread over a long period before its applied value ultimately becomes apparent. Then an even longer period is needed before any application can yield worthwhile economic results. Third world countries must therefore be selective in research and may perhaps be forced to limit themselves to researches in application before they venture into pure research. It must be remembered that with such a wide field open to research, there is no way for any country to cover every aspect of research. Somewhere along the line it will have to buy the results of the work of others, no matter how advanced and rich that country is.

Our primary problem is to identify areas in which we wish to disburse our limited research funds. Whatever is funded should be adequate. Here we enter the domain of politics and priorities. Research results are the tasks of scientists. Priorities for funding are the business of the policy makers. Harmony between these two parties will optimise progress.

Above all, in Research & Development, the greatest problem is to frame the right question so that the proper lines can be laid down for rigorous empirical enquiry. That problem can be overcome if there is an understanding of the development needs of the country.

# *The Opening Of The International Conference On Islam And Technology*

*(Islam And Technology)*

*Kuala Lumpur, 2nd June 1983*

Until quite recently, development has been construed as being incompatible with religion, in particular Islam. Islam was viewed as an obstacle to development. Even today, there are people who still believe that religious values constitute a major obstacle to progress.

This view has been replaced slowly by a more positive stance among the academic circle, but there are Muslims who still reject progress and development as not in consonance with Islam. This is most unfortunate since Muslims constitute about a billion of the world population and Islam does subscribe to progress and development.

While Islam places importance on the hereafter, it does not preach the rejection of this world. Islam makes the acquisition of knowledge obligatory on all Muslims - male and female - and Islam requires its followers to work and to do good. Only ignorance of the total philosophy and teaching of Islam makes one believe that Islam is opposed to development. It is true that there are certain aspects of development which are bad, and in such cases, they are not only not in line with Islamic principles,

but also socially undesirable. But development and progress, within the parameters permitted by Islamic principles, can never be incompatible.

Knowledge is progress. Prophet Muhammad (s.a.w.) told us to seek knowledge even to China. China at that time was not the centre of Islam but a centre of civilisation, and therefore, this urge to seek knowledge even to the remotest part of the world by the Prophet (s.a.w.) should make the Muslim truly aware of the importance of acquiring knowledge. Certainly what the Prophet (s.a.w.) meant then was not Islamic knowledge, but the knowledge which is temporal in nature. At the same time, knowledge is not meant to replace our faith, but to support our faith. In many instances in the Quran, Allah (S.W.T.) draws our attention so that we reflect on the infinite cosmos and to creations as proof of His Existence, Oneness and Power.

In Islam, the quest for knowledge, and the satisfaction of our curiosity is a pursuit for truth. Knowledge is, therefore, not for the sake of knowledge, but for truth. In addition, knowledge is also to be of service to mankind. In other words, knowledge is subjective - it should be in support of the quest for Divine Truth and to serve the good of mankind.

There are branches of knowledge which need not necessarily lead us to Divine Truth, but we cannot reject them as long as they can serve to improve our well-being. Mathematics, physics, astronomy, chemistry, biology, engineering and others have been in the service of mankind from the beginning of man's history. Not only has this body of knowledge served us, but they have also helped us to understand, to a certain extent, the mystery of creations. Early Muslim scholars had a share in the development of the various bodies of knowledge. It is unfortunate, however, that even though knowledge can help strengthen our faith and improve our well-being, there are individuals who preach the irrelevance of knowledge and progress to Muslims.

Technology is the specific application of knowledge in the various fields in the service of man. Certainly, there can be abuse of knowledge and technology. Defence technology can be

abused for offensive and destructive purposes. Space technology can be diverted from one of space exploration to one of military surveillance. But this only indicates man's weaknesses, rather than the wickedness of knowledge and technology.

The fact that a third of the world's population is Muslim and they inhabit the less developed parts of the world today, shows how much Muslims are dependent on others for their well-being. The image of the Muslims today compared to the period of excellence during and immediately after the time of the Prophet (s.a.w.), is most distressing. This is far from what Islam promises and expects of us, and it is of our own making. Today, Muslims can only be proud of its part - the relics of Islamic civilisation at its peak.

Today, Muslims are a deprived group, generally lacking in resources and capability. Their image is not the image of a people who are strong in faith, progressive, united, tolerant and knowledgeable. No doubt the orientalist have to some extent painted a wrong picture of Islam and Muslims, but Muslims themselves, in their orientation and conduct, have not done much to erase this tarnished image.

The progress of making as a whole cannot depend on a segment of the world, the so-called developed world. If the world is to achieve a better state of well-being, everyone has to play his role, Muslims irrespective. After centuries of backwardness and dependence, it is now time that Muslims improve their state of well-being and contribute to the well-being of the whole international community by acquiring knowledge and technology and use them for their betterment.

Although Muslims are a deprived group, there are Muslim countries which are endowed with resources. There are also Muslims with skills and expertise. What is wanting is a cooperative effort to see to the utilisation of these resources for the common good. In this age of space technology and the microchips, Muslims have a lot of catching up to do. Every minute of indifference on our part to the changing technology, may mean decades of efforts to achieve parity.

As Muslims, we must be concerned with our way of life. But indifference and rejection cannot help in making us better Muslims. On the other hand, it will make us more dependent on and influenced by, others. It is only by being involved in the quest for knowledge, and in developing the necessary technology for our benefit, can we survive this age of rapid change and challenges.

I do not claim to be an expert on technology, but what I have seen has made me more confident that for Muslims to be an effective partner in the modern international community, and to be of service to mankind, we must strengthen our resolve to acquire the necessary knowledge and technology in keeping with the times. Much of the responsibility lies with the Muslim scholars and practitioners to instill among Muslims the right spirit and attitude that can help Muslims catch up with the others in the field of modern technology.

For us in Malaysia, we cannot be indifferent to the rapid technological changes around us. The resources that we are blessed with cannot be expected to last forever unless we develop our capability, technology and know-how to exploit them efficiently by ourselves, to explore new opportunities and to prepare for the future. Others will not help us forever. Others will not help when we most need help. We can only depend on ourselves. In a world that is shaped by technology, our rejection of it can only lead to continuing weakness and to possible extinction. Already some Muslims have lost faith and have rejected Islam because of our poverty in technology and the achievements that are associated with it.

# *The Official Opening Of Forum Sains Kebangsaan, University Pertanian Malaysia*

*(Science And Technology As  
A Basis For Development)*

*Kuala Lumpur, 10 May 1983*

Man is God's special creation. While science may regard him as one of the categories of animals, his ability to reason differentiates him from the others. He has all the animal instincts, but he is more mobile and able to control his environment and destiny.

Man's ability to reason enables him to progress, from one stage of being to another - from a primitive state to a more civilized state. In other words, he is gifted with the ability to choose, between good and bad, to differentiate what is moral and immoral. He has the choice of what he should be, and become.

From history, we see this progress, though it may not be linear. Today, we are at another stage of progress. The achievements made within this last few centuries have been unprecedented. Discoveries, inventions and innovations, in the fields of science and technology have changed almost everything, and we are on the threshold of an age of excellence.

Given man's ability to make choices to serve his general good, the question is whether he is fulfilling the mission of promoting greater humanity? This may sound philosophical - and philosophical indeed - but, this is the question facing man all the time - before, now and in the future. It is for this that he is gifted with the ability to reason, not just to seek knowledge and truth, but with the knowledge to be of service to humanity.

Existence is not just living and surviving - eating and making merry. Existence is a quality of fuller fulfillment - materially and spiritually - a better quality of life and living. Development is, therefore, an environment that enables individuals to have a truly meaningful existence as human beings in the context of the whole scheme of existence, and therefore, a process for achieving this higher state of well-being. It is a totality and a balanced progress within a normative framework, at the core of which is humanity.

National development is a major preoccupation of modern states. It is an instinctive response to man's quest for better existence. National development is the process of achieving a better state of well-being, given a certain set of norms and values of what is good and desirable.

The concept of development and national development has gone through a process of change and adaptation itself. While initially its emphasis was more on material economic progress, today, more and more, it is seen as a total upliftment and balanced progress. Today, development is no longer accepted as a culture-bound Western-biased phenomenon, but as a contrived phenomenon with importance placed in its particular context. Its material and physical components are regarded not only as a dimension, but more as a means for realising a greater, fuller and meaningful human existence, materially and spiritually.

Science has indeed played an important role in development. Development - its concept and techniques - owes a lot to scientific development, both in the fields of soft and hard sciences. Unfortunately, modern day branches of knowledge developed more or less independently of each other. The people of various disciplines, again as a modern day phenomenon of

knowledge explosion and obsessions with protecting the legitimacy and mystique of one's field, do not necessarily share a common philosophy about the place of science and development. It is indeed, unfortunate, that philosophy which has been the apex of, and an integrative point of pre-modern knowledge, is no longer performing that role.

Thus today, many people are still arguing about value-free and value-laden science. While such arguments may have its merit, humanity is at stake. Science - both hard and soft sciences - are not optimally utilized for the exclusive good of man; its abuse allows the evolution of a culture that is contrary to the higher ideals and basic norms of humanity. Moral decadence, brutality and social upheavals, militancy and oppression are manifestations of some dysfunctional effects of science on modern day generations. Not that science is bad, but some people who apply it, lack humanity at heart. If there is misuse or abuse, it is the society. We should not place the blame on science. The pursuit of science must go on, and even at a greater pace, but serious considerations must be given to enable science to be utilized for the greater good of men and humanity. It is an area within the realm of conscience.

A greater segment of the human race in every period of human civilization lives in indignity - oppression, hunger, disease, famine, and poverty. This we are also witnessing in our times today. Yet, the paradox is that we also claim that we have the potential of producing enough food for the whole world population, and to raise the standard of living of the whole human race to a level unknown before.

Today, vast sums of funds are being used for military purposes and human sufferings are made to support the war industry. And again, vast sums are spent to maintain international outfits whose preoccupation is empty rhetorics. Big nations may be able to indulge in these luxuries but not the smaller nations. We are still far from meeting the challenge facing humanity. To optimise the application of knowledge, science and technology for the betterment of mankind is a challenge facing us, the present generation.

Malaysia is most fortunate. Though events in our history have posed us with many problems, we have the necessary ingredients to make Malaysia a case of success in national development. Given abundant natural resources, what we need now is a motivated and hard-working society with high moral values and discipline, and the proper application of science and technology to serve our needs and aspirations for greater achievements.

In our case, science and technology, and indeed the whole spectrum of knowledge must be developed and utilized as a tool for fulfilling our aspirations towards peace, prosperity, unity and justice for all Malaysians.

In its widest sense, science is the systematic method of describing and controlling the material world and is based on the study of natural laws of the Universe. The development of scientific laws, theories and principles over the last 6,000 years is a result of man's enquiring mind in his search for knowledge and truth. Science does not create, but discovers what exists.

We in Malaysia view knowledge and science as the prerequisite of all human endeavours. In accordance with the teachings of Islam, we believe that it is our duty to create and develop a conducive environment for the promotion of knowledge and sciences, which in essence, are efforts in confirming Divine Truth. Our Prophet Muhammad s.a.w. said "The quest for knowledge is obligatory on every Muslim".

Science does not just serve human curiosity, but more importantly, it is to serve his needs. We cannot deny that the world is shaped by technology and that the successful application of science has resulted in technological breakthrough as well as in the production of trained and competent manpower for national development. Science is 'know-why' while technology is 'know-how'. In other words, science produces knowledge while technology helps in the production of wealth. Science without the by-play of technology becomes sterile, and technology without science, becomes moribund.

Let us take a lesson from history. The golden age of Islamic civilization was the period of high achievement in various sciences. This has triggered the Renaissance in Europe and led the West on a new road to scientific development and glory. Science in the Islamic world became neglected and eventually led to the decline of the Islamic civilization as a pacesetter in world affairs.

Today, nations including Malaysia, look forward to science and technology for salvaging stagnant economies and in overcoming misery and poverty. However, in order to ensure a healthy development, there must be a balance, both in the development and application, of hard and soft sciences. This is necessary if we are to ensure a balanced development and reduce the unintended consequences and undesirable effects of development.

Science and technology is a powerful instrument of social change; its effects on modernization are not merely through improved technology but also through changing the lives of individuals and of societies and nations.

Some generalisations have been made on the reasons why developing nations show little progress towards achieving greater prosperity. Firstly, it is the lack of adequate resources, especially skilled manpower and advanced technical know-how. Secondly, the failure to recognize the important role of science and the scientific community; the scientists are kept 'on tap - not on top' and denied positions of social responsibility. Thirdly, out of necessity, a high priority is given to arms build-up than to scientific and social development, and fourthly, there is a lack of sincere co-operation from advanced nations which are still holding fast to the theory of scarcity, and are reluctant to see the developing economies as equal competitors and partners in international affairs.

Such generalisations may not be wholly applicable to Malaysia, but being a developing nation there is much to be done to take us through the take-off stage.

On achieving independence, we embarked on programmes in nation building and socio-economic development. 'Rome was not built in a day', but we do not have all the time in the world either. So we strived and made use of the resources and capabilities that we had. Now, through this cumulative process, we are on a stronger foundation for greater achievements.

Where before we had no university, we now have five universities and numerous technical institutions. Education in the sciences has been encouraged and given higher priority over the general education in the arts. We established research institutions in agriculture, forestry, medical sciences, industry and even on the application of nuclear materials. A National Council for Scientific Research and Development, a consultative body to advise the Government on scientific and technical matters and to ensure that research activities are geared towards national development needs and goals was established in 1975.

Education is important. Every year, thousands graduate from universities and colleges in our country as well as from colleges and universities overseas, and many are being trained in science and technological fields. We are aware that the development of our human resources is equally as important as the development of natural resources. Without indigenous science and technology, the resources of a nation cannot be fully exploited for our development.

With our efforts, we have progressed in a number of fields. In terms of research, on the production of rubber from *Hevea* plants, we are ahead of other nations; our work on tropical diseases is commendable, and our approach to land settlement is an example for many developing countries. We cannot be contented with our achievement but, on the other hand, we have to address ourselves to the challenges ahead of us in entering the new decade.

Whether there is any need for extensive education in science and technology for Malaysia is no longer a question. The task before us is to ensure that our educational development and our research are constantly geared towards our specific cultural, socio-economic and political milieu. Do science curricula in our

schools and universities contain the elements that are needed? What are the necessary adaptations to be required? These are basic questions which are pertinent to our aim in fostering a dynamic scientific community.

The greatest challenge in science education is the process of instilling the right attitudes to learning and conducting our work. Attitude is a product of environment. The attitude towards work and production of technological goods shown by the Japanese differs greatly with that of the Western nations such as Britain or the U.S.A. and this factor explains partly for the advancement in high technology attained by the former. On the other hand, the attitude towards enquiry and towards seeking new knowledge has put Britain and the U.S.A. ahead of others in terms of innovations and inventions. Similarly, the Germans have excelled themselves in chemistry because the Germans in general are thorough in their analyses, classification and construction of systems. It is therefore essential for us in Malaysia to develop and incorporate into our culture, the kind of attitudes that can make science and technology the basis of our development.

What we want in Malaysia, at this point in time, is a greater, more aggressive, and appropriate utilisation and application of science and technology for our development in the various fields. Our economic growth requires the concurrent development of agriculture and industry whose symbiotic relationship should be maximally nurtured and developed together. Whereas agricultural technology must necessarily be adapted to the specific environment or ecological circumstances and the local farming system, industrial technology and techniques, if so needed, can usually be transplanted without major modifications. Nevertheless in both cases, given the specific needs and the peculiarity of a given situation, supporting institutions will be required to help select or generate the most appropriate technology and to adapt it to suit the local needs and conditions. Therefore, the improvement of indigenous technology and adaptation of imported technology, deserves close attention. In this regard, we need a sensitive scientific and research community.

In our effort to enhance improved technology, expenditure alone may not serve our goals. There must, at the same time, be a right attitude to see to a balanced development of a continuous innovation chain linking scientific research, market research, development design, production, and market acceptance. Experience elsewhere has indicated the need to keep basic and applied research in proportion to development and design, and to other scientific and technological activities. A proper and systematic co-ordination of science, technology and production is a must. And since linkages between government, production and research are important, and that their effectiveness may be more decisive than the actual physical form of the overall organisation, then a well formulated strategy and plan, with the necessary co-ordinative mechanism, is a prerequisite, and necessitates a centralised function, at the national level where decisions can be made in relation to national goals and priorities.

In the process of utilizing science and technology for development, we must make the best use of our national scientific and technological potential, in a two-way interaction with economic and social planning. We need to strengthen the supporting activities, and raise the general level of productive competence. We need to make the best use of imported technology, while at the same time generate appropriate indigenous ones. This requires attention both to the mechanism for the transfer of technology, and to the propagation of our own scientific and technological competence. In other words, we need a balanced distribution of scientific and technological personnel, besides an adequate supply of managerial and entrepreneurial talents.

Since the impact of industrialization through science and technology, industrializing countries have been facing the problem of striking a balance between adopting Western technology and maintaining traditional values. The adoption of new technology, and along with it alien negative norms, is not what we want. There is this twin problem of preserving positive traditional values on the one hand, and changing attitudes and values to suit the demands of modern technology on the other. We must be sensitive to this and our education, formal and

informal, has an important role to play to see to it that our people can sieve through what is necessary and appropriate.

The teaching of science must take a new orientation. The overall objective of the new approach in science teaching is to foster a living science, as a dynamic force for societal improvement. Our efforts must be geared towards the creation of a scientific mind. So far, science teaching has remained in its traditional form where sciences are taught for science sake, without showing much of its usefulness and practicality in everyday life. In the classrooms, scientific laws are learnt, not discovered; hypotheses are not tested but taught. Such a curriculum does little to develop an attitude for a critical enquiry, adaptability and objective understanding. Thus, the ability to critically observe, analyse and conclude on everyday phenomena has remained to be the exclusive realm of scientists alone. The general public continues to be passive consumers of scientific facts, discoveries and inventions. In fact, there is a tendency for some people to look upon science as something mysterious and complicated. As such, scientific discoveries and inventions are not analytically viewed as ordinary achievements of mankind.

The make up of a scientific mind begins from young, and there must be continuous follow through. Given the present situation, the task again falls on the scientific community to assist in making science education more interesting and applicable to the daily lives of the different level of our people. Science must be made to serve, and not as a plaything of exclusive few who are scientists. We must strive to see to the birth of Malaysians who not only specialize in various fields, but both having and able to utilize the tools and instruments of science and the humanities as a way of life.

The question of social-technical balance in development is an important dimension. In striving for a balanced development of scientific and humanistic knowledge, there is a need to incorporate within the social dimension, moral and religious elements. As a matter of fact, we have made a good start in this respect through the restructuring of the primary school syllabus

where a more scientific and natural approach to the study of nature and society is complemented by the inculcation of religious and moral values. We will continue to strengthen this base at the secondary and tertiary levels so that increased technical learning at these levels would not result in the production of scientists who are not socio-culturally sensitive.

In working towards the above objectives, our scientists themselves have a big role. They should organize themselves into some kind of a national society which will serve as a forum for exchanging ideas on matters relating to science and development. Many models are available but one which suits our own needs and special socio-political situation will need to be evolved.

Advancement in science and technology is important in national development. At the core of it is research and development (R&D). This coalition of research and development, underscored by the role accorded to R & D by most developed countries, where the component of R & D is around 2 - 3 percent of the Gross National Product, and the priorities of research areas are quite well-defined. However, in Third World countries this component has been lacking, be it in terms of funding, organization or the establishment of priorities. For example, research expenditure for most Third World countries has been less than the UNESCO recommended ratio of 1 percent of GNP. In the case of Malaysia, public expenditure on research was only 0.63 percent for 1980 and 0.64 percent for 1981.

Among the logical reasons cited for inadequate research funding are the huge capital outlay involved in R & D, as well as the long span of time necessary before benefits can be reaped, and this is especially so in the case of basic research. Greater commitment will have to be given if we are to see the support role of science and research come to reality. While the public sector role is critical, no less important is the share of the private sector. No less also is the critical role of research entities to organize institutions and research threats as proof of their capability and sense of commitment. We must now concentrate

to set our priorities in the light of our long-term objectives. Basic and applied research are complementary and mutually reinforcing. The product of basic research must not be merely imported, but instead basic research must be undertaken locally for the upgrading and adaptation of information for advanced applied research as well as the exploration of new frontiers. In the case of Japan, there is no denying that a great investment has been put into the establishment of infrastructure for basic research as far back as the 1930's. The present advanced stage of Japanese science and technology can be attributed to this investment. Presently, Japan has one of the most elaborate mechanisms for science policy organisation in the public sector as well as the most comprehensive network of basic and applied scientific research institutions in both the public and private sectors. Indeed, Japan spends some 3 percent of her GNP for research - the highest research investment in the whole world.

Research and development also require manpower planning and development so as to ensure adequate supply of manpower necessary to carry out research and utilize the benefits of research. Manpower policy must be tailored to cater for the needed development. The task of performing intensive formal, as well as in-service training functions, should be jointly provided by the public and private sectors, and it is hoped that this can be made possible in the future. In Japan, private corporations have enormous training facilities including enrolment into company-owned technical schools, colleges as well as two-year training apprenticeships for newly-hired engineers. This is possible partly due to the life-time employment system whereby investment on training of personnel is not wasted due to high turnover of employees.

From the experiences of our six national plans, we should be in a better position to devise a national manpower development plan that incorporates not only the necessary training of manpower in critical areas of science and technology, but also the contribution of the private sector in the training as well as the forecasting of future manpower to meet required targets.

Co-operation between the private sector and the public sector is still the essence. This no less fits our concept of Malaysia Incorporated. The private sector will have to shoulder some of the responsibilities in R & D as well as manpower planning and development. On the other hand, the bureaucracy has to fully appreciate the nature of research and its benefits to national advancement. It is in this light that leadership in research organizations should be headed by competent managers who can organize efficient research and appreciate the needs and aspirations of scientists. At the same time, to ensure maximum productivity of research, sufficient motivation must be devised in terms of status, incentives and rewards. Only then can support, funding and utilization of research be given its proper place, be it in terms of basic or applied research, between agriculture and industry, and even between foreign and local expertise.

# *The 12th Meeting Of The Commonwealth Science Council (CSC)*

*(Towards A More Equitable Sharing  
Of Scientific Resources)*

*Kuala Lumpur, 24 August 1982*

Malaysia feels honoured to host this meeting in the firm belief that the advancement of science and technology is a sine qua non for further progress of the less-developed countries (LDCs) as much as it is for the advanced countries.

Malaysia fully appreciates the role of science and technology in development. We believe that modern science and technology is not only necessary for the modernisation of our industrial sector, but also of our agricultural sector. Further, we believe that science and technology should be used not merely for the material development of our nation, but also for the enhancement of the quality of life, and the achievement of peace and harmony, both within the country and also in the relations between nations.

Malaysia is undergoing a fairly rapid rate of development and modernisation. While we need the cooperation of the advanced countries to boost our

economic growth, we also place considerable emphasis on self-reliance. The harnessing of scientific and technological knowledge is vital to that self-reliance. We are not about to invent the wheel again, but the application of discoveries and inventions originating elsewhere is a part of the exercise in self-reliance. Of course, we intend to fully utilise all the foreign expertise that may be made available to us.

However, the scientific knowledge and technology of the West cannot be simply imported into the country. It must be properly adjusted and adapted in order to fit into the special needs and requirements of the nation. As such, our own research must be directed firstly to the identification of the scientific and technological knowledge that can be utilised in the country, and secondly, to modify that knowledge and its application in order to fit in with our peculiar situation and needs.

These are our major interests, in so far as they involve the advancement of science and technology in this country. We think that they should also be the areas of interest of other developing nations. We cannot afford to spend too much of our time and limited resources on the basic scientific and technological research as do the rich and advanced nations. We only hope that these countries will share relevant discoveries with us. Only with such readiness to share and help can there be a more meaningful and satisfying relationship between the developing and the developed countries. Clearly the developed countries of the Commonwealth can play a more meaningful role to lessen the problems and difficulties of the developing countries within the Commonwealth.

The potential of the Commonwealth Science Council in bringing about a more equitable sharing of scientific and technological resources is enormous. As a catalyst, the Commonwealth Science Council can enhance

collaboration among member countries of the Commonwealth in increasing the capabilities of individual nations to use science and technology for their economic and social advancement. It is only then that the Council can justify its existence.

As you are aware, one of the targets of many developing countries is industrialisation. This is also the case with Malaysia. In the quest for industrialisation, research is constantly needed, even if the level of research is elementary. Indeed research and development, whether rudimentary or otherwise, is now a basic requirement of industry. In order that R&D can contribute to productivity, the system and the methods must be learnt through exchanges of expertise between the advanced and the developing countries, as well as among the developing countries themselves. Inter-country and inter-industry cooperation is, therefore, most useful.

I would like to take this opportunity to make some specific reference to the type of help and assistance that developing nations like Malaysia require in order to progress further. I am mentioning this so that those of you representing the developed countries may examine further how you can help us in return for the kind of cooperation and support that we can give to your own efforts in achieving further advancement.

Firstly, there is a need to train our own core of scientific and technological personnel. The Commonwealth Science Council can certainly assist. The cost of training in your respective countries should not be so high as to be beyond our reach. Scientific and technological knowledge like all other forms of knowledge, we believe, increases as you share it with others. The more our scientific and technological personnel go to your countries for training, the more will your countries be able to extend the frontiers of

knowledge in the application of new discoveries. As a bonus, our personnel who have gotten used to your techniques and equipment are going to act as the best salesmen of your research and other products when they return to work in their own countries.

Developing countries are so designated because they are relatively poor. If they are going to be able to buy from the developed countries the equipment and products they need, they must be helped to attain the financial capacity to do so. This is where the developed countries should be more liberal - not only in importing products from developing countries - but also in the transfer of scientific know-how and technology. The chances of developing countries subsequently outstripping the developed in the utilisation of scientific and technological know-how are so slim that it should be totally discounted. Only the most primitive of the discarded industries will find a place in the developing world. If then the products are bought by the developed nations, the developing nations will have the financial capacity to import technology and other needs.

The world community of nations is like any human society - the poor outnumber the rich. Like a human society, the division of nations into rich and poor must lead to conflicts between the two. Human societies have devised many ways of reducing their tendency towards such conflicts. Thus, even capitalistic societies provide protection and help for the poor at the expense of the rich. The concept of graduated tax on incomes is a typical example. But the community of nations has not yet accepted the principle that the rich should help the poor. Perhaps it is because poor nations are incapable of threatening the rich, as poor workers are capable through their unions. But whatever the reason, certainly the social responsibility of nations is not well developed.

I would appeal to the scientists who are attending this meeting, to be not only scientists, but also people with a conscience. The sense of responsibility for the well-being of the world should, where appropriate, override the narrow interests of one's own nation. The poor countries need help - not hand outs - for their development. Scientific and technological knowledge is one instrument that can do this. And so the Commonwealth Science should be very positive in this task of spreading the kind of knowledge that builds nations.

