

**SPEECH BY TUN DR MAHATHIR BIN MOHAMAD AT THE MSC MALAYSIA LEADERSHIP
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“THE MSC AND LEADERSHIP IN THE INFORMATION AGE”

1. Through the ages the human race has made huge radical leaps forward through innovations. At first each change took thousands of years to be made. But as time passes the frequency of the radical changes took place more frequently so that every few centuries there would be a change.
2. Thus after several millennium we went from being hunters and gatherers to agriculturists where the plants and animals were systematically cultivated and reared. This changed the way of life from nomadic to sedentary as food supplies were ensured through agriculture.
3. For centuries after this change there were only minor improvements to increase productivity to provide for a growing population.
4. Then came the age of industry when the production of goods, whether essential or not, were through organised facilities which depended less on individual skills and more on organisational capabilities. The industrial age saw faster growth of the industrial economies so that relatively speaking the agricultural economies became poor. All the time the industrial machinery and management were improved so that more goods would be produced for more people. It would seem that forever industrial manufacturing would be the generator of wealth. But this was not to be.
5. After two hundred years the industrial age gave way to a radical innovation in the form of easy availability of information and communication. The invention of the transistors made this possible. Big at first, the size of the transistors were reduced until a huge number of them could be put in a centimetre square of silicon chips. They serve as switches, turning power on and off. The binary system enable this simple switches to spell out complex equation and figures to represent information. The speed of the signals enable almost immediate access to information of all kinds. The speed kept on increasing as the micro-circuits became smaller and smaller.
6. This is the age that we are in now. We went into the industrial age much later than the countries which initiated it. We were therefore handicapped and had to depend on the expertise and technology of those who had exploited them earlier. Now we have an opportunity to go into the knowledge age at the same time as the other countries, and other people, the countries and people which are more advanced economically than us. We must know that in any race, starting together with our competitors is far better than starting after they have left us behind. That is why handicapped though we are we needed to make the start in

this new age of knowledge now, at the beginning. Our chances would be better if we are not left behind by having missed this start.

7. It was for this reason that Malaysia, despite having entered the industrial age only recently decided to go immediately into the information age, signalling it by initiating the unique Multimedia Super Corridor. This project will provide the infrastructure and the knowledge for the people to be trained and to actually be involved in research and development and in the businesses made possible by the quick and easy access to information.

8. Much progress has been made with the MSC but it is not quite what was expected. An International Advisory panel helps to guide and monitor the progress being made. But obviously we have as yet not developed a research culture which would speed up our progress in ICT. Nor have we learnt to use the power of information and the hardware that has been developed, as much as we should in order to grow our economy.

9. All that I am saying would be already known to all of you. A university was set up in the MSC to produce the personnel to go into this new industry. But it is unfortunate that having seized the opportunity to start together with the others we decided to fall behind, to let others go ahead as we neglect this information potential. The fact that our competitors are better equipped, and are prepared to provide more funds than us has only increased the gap between them and us. To catch up with them will be a difficult task. Maybe we will not achieve it even if we try. But for certain we will be left far behind if we do not try at all. The situation is not as bad as with the Industrial Age when we were late by two centuries. We are now behind only by a few years. But the speed of progress in the information age is far, far greater than in the industrial age. If we take the development of the telephone we will understand the speed of development in this age. To catch up we really have to go all out.

10. When we initiated our move into the Information Age we were really badly equipped. Our people were not qualified educationally. In fact many did not even know the role that information would play or how it could be made use of in this new age. Of course everyone knows that to do anything we need to know as much as possible about the things that we have to do. All our activities in life and in the community are based on knowledge. The industrial age would not be possible if we had no knowledge of the sciences, technology and engineering involved, the production methods or the market and the cost involved. It is knowledge that had spurred the radical changes exemplified by the different ages.

11. So why should we now call this new age the age of knowledge, of information. What is new about the contribution of knowledge to the way we do things?

12. The difference is that the access to knowledge this time is unlimited and the speed of access is almost instantaneous. We are so bombarded with information that the skill lies in the choice of the knowledge to be used. That is why search engines have become crucial. It was the realisation that search must be facilitated and expedited that gave birth to Microsoft, Google, Yahoo and others. The search engines have resulted perhaps in the most lucrative real business in the world. But such is the need for instant access that new engines will be invented in the future, and more use can be made of wireless access.

13. The mouse and the screen are now a part of life itself. We cannot do anything without them. Yet before we had the mouse and the search engines we had to learn complex computer languages in order to squeeze out the information in the computer. The inventor of the mouse and the point and click method did away with "Fortran" etc and now anyone can use the computer.

14. All this is made possible by the invention of a tiny chip with positive and negative switches accompanied by digitisation of everything that we have to handle in the process of doing whatever work that we have to do.

15. By assigning numbers to everything and reinterpreting these numbers, we are able to make unlimited calculations and reproduce pictures and sounds in whatever colour or tone that we want instantaneously. We are able to activate the movements of things and programme their response with great accuracy, far more precise than can the human hands.

16. Having developed these capacities, we need to apply them to the things we are doing. Programming enables us to do very complex things. Combined with sensors, the equipment that we operate can respond to all kinds of stimulus. Even the kind of stimulus can be diversified. Instead of electrical impulses, we now have the RFID (Radio Frequency Identification), wireless detection of movements or even stationary objects etc. Voice activation is now possible. And all these sensors are capable of operating over vast distances, even through millions of miles in outer space. One cannot list out all the things we can do because of the microchip. There are far too many.

17. The heart of all these miracle is still the microchip -- which is basically a silicon bed for all the millions of negative and positive switches which respond to commands or to the sensors. The possibilities in the use of these chips are unlimited. How things respond depends on the programme and the specific responses required.

18. It is in this programming that everyone will get the opportunities to design and apply to everything we do in life. Thus the teaching of languages for example can actually be expedited by the use of special programmes. Writing programmes is already a big business.

19. Since so much information can be put into a tiny chip, Malaysia was first in the introduction of the multi-purpose card. The common I.C. card can now carry cash, be a credit card, open doors, switch on electronic apparatus etc. etc. One is limited only by one's imagination.

20. No one has a monopoly on imagination. We need only to imagine a need to do things faster, or more accurately, or at a specific time etc and the chip can be designed to do this including to switch itself on and off.

21. This is where we can be leaders in the information age. We can go into a certain field in robotics for example and improve it or accord it new capacities. We can design automated robots which can take over all the work of the human workers so that motor vehicles can be assembled at a faster rate and much more precisely. We can improve the performance of automotive or aircraft engines by installing sensors which will activate corrective measures or inform us of the conditions prevailing. Through the GPS (Global Positioning System) we can locate almost everything on the surface of the earth or the atmosphere. We have been able to rid ourselves of the film and replaced it with the memory card, even in video action recording with authentic sounds.

22. We know how the Japanese have been able to produce humanoids which perform almost as well as human beings. They have made great strides in this fields so that their humanlike robots can actually fight each other and should one get knocked down, it would get up by itself. Our people have also produced robots and automation equipments but we need to improve on them.

23. The militarists will be looking at these humanoid with an eye on the possibility of having robot soldiers and robot armies. It would be great if future wars would see robot armies fighting robot armies, with no human getting hurt or killed. But I am afraid the militarists would want to use their robot armies equipped with automated weapons against humans, to win wars by killing as many of their enemies as possible without any loss to their own people. Already they are coming up with all sort of unmanned vehicles operating on land, at sea, in the air and in outer space. It is unfortunate that I.T. is being applied to killing people instead of saving them. Even the practise of medicine and surgery has benefited from the sensors and the microchips.

24. All these marvellous things are made possible by our knowledge of electricity, electronics, binary numbers and alphabets, communication and wireless communication etc. Without this knowledge we would not be able to apply them to the things I have mentioned. Without this knowledge we would be less productive and less able to achieve quality as well as precision.

25. Truly there are literally trillions of applications possible. There can be no doubt that those with this knowledge will lead the world. More than leading they would dominate the world.

26. We will probably never be able to dominate the world. But we must acquire enough of these knowledges so as to benefit from them directly. That is why we have to go into this field, into this knowledge age now. We must not be left behind. We must take a leading role. The setting up of the Multimedia University is a step in this direction. We must train and produce as many ICT engineers as possible to enable us to keep up with development in their fields and to man the new industries we must have in order to become a developed country.

27. The MSC has been created to facilitate our entry into the Age of Information and Communication. We must be willing to dedicate our lives to research and development in ITC. We must know the current state of the science and knowing this identify a niche for ourselves.

28. The whole country must be seized of this opportunity to benefit from a start without being handicapped. The scientist as well as the non-scientist must appreciate this need for research and development.

29. To those in charge of the funds, I would like to point out that funding research is not like investing in a business. We cannot predict, and most certainly we cannot guarantee a return on investments. The funds expended on research are never wasted. At the very least, we would be adding to the sum total of our knowledge in the field concern. But if the research yields results the return can be many, many times greater than the funds expended. So those in control of the funds must be more appreciative of the character of research and be more willing to provide the needed funds.

30. I hope that never again will we see the kind of short sightedness and vindictiveness that killed Invent Q Jaya.
