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The Human Factor in the Multimedia Environment

(By Azizi Meor Ngah, Group Executive Director, Utusan Melayu Bhd)

1. INTRODUCTION

The history of human race has always been punctuated with the process of evolution and revolutions in spiritual, cultural, political and economic. The evolution of mankind, the industrial revolution and the media revolution with the introduction of electricity are some of the events that changed the way ahead for the survival of mankind. Progress in the material development of mankind is an unending quest for excellence, dominance and convenience. Another revolution that is happening but with more compelling consequences in the making, is the convergence of telecommunications, broadcasting and computing technologies. This convergence will consequently transform the way we live and do business. The impetus in the emergence of multimedia has brought about the changing of mindset, paradigm shift and the widespread use of Information Technology in business re-engineering and in trouble-shooting exercises.

Multimedia heralds a borderless world with seamless communication. This is the beginning of a new era with dire consequences for those totally unprepared and oblivious of this pervasion. The impact of this development on the human factor in the industry needs to be closely examined and strategies have to be mapped out in order to be fully prepared.

2. THE CONVERGENCE AND THE OVERLAPPING ROLES

The convergence of computing, broadcast and print industries is happening. The next three charts are extracted from "Designing Business" by Clement Mok (Adobe Press). The charts are based on a series by Tony Oetingger that was published in the 1991 report from Harvard Business school.
In the 70s, products and services belonging to the domains of publishing, computer and telecommunications are distinct. In the publishing and broadcast world, content such as newspapers, magazines, television and film, were produced using traditional methods and distribution often means physical handling of the products. Publishing and broadcast existed in isolation and have nothing much to do with computing or telecommunications. Computers are much dedicated to data-processing functions—not widely used for communication or publishing.

The telecommunication sector focussed on providing telephone services.

The 80s saw the introduction of new digital media and some overlap in products and services in the three industries. New digital media such as compact discs and laser discs emerged in the publishing world. The 80s also saw publishing becoming more automated with the advent of desktop publishing and other customised software packages. Computers and consumer electronics merged further with new products shown in the chart. Products such as video games and electronic mail introduced computers into the world of entertainment and communications.
Telecommunications companies begin to dabble with the publishing business using digital media such as teletext, videotex and audiotex distributed over television and telephone infrastructure.

The 90s with the exponential growth and popularity of the Internet saw the emergence of many more new services and products as shown in the chart. The convergence taking place at an accelerated pace began to blur the lines of distinction between the services and products of the three sectors. Today we see software companies taking large stakes in the publishing, entertainment and broadcast businesses (news like Microsoft acquiring companies such as WebTV, Comcast CableTV, NBC, make the headlines every other month or week!)

Telecommunication companies are no longer just providing telephone services. They are involved in cable TV, Internet access, and other information services such as tele-education, video-conferencing, etc. At the same time, newspapers and broadcast companies are investing in electronic publishing via the internet, CD-ROMs, intranets and extranets. We also see extensions of services for consumer electronics appliances, computers, telephones, etc. Today, the PC allows you to receive news, TV, electronic mail, live TV and radio broadcasts, shop, check your bank account, chat with friends overseas, etc. The TV is no longer just a device for passively watching programmes broadcast to your living room. You can use the TV to surf the internet, engage yourself in multi-player games, etc. Similarly, telephones can be used to check the latest stock quotes, the weather, etc. Mobile phones can be used to check e-mail and faxes, etc.

Multimedia will bring about profound changes to the way we conduct our business. We have to adopt digital technology to remain competitive and to stay relevant. In some ways, we need to abandon some older technologies, and change the way we do things. Conventional wisdom doesn't always work in this age of dynamic change. This paper discusses the human issues involved in the development of multimedia. It addresses the need for the industry to innovate and
to adapt to the new business world and work environment. It maps out strategies to meet these challenges and discusses the role of education and training.

3. THE CONVERGENCE OF SKILLS

3.1 A SHIFT IN CORE COMPETENCIES

Source: "Designing Business. Multiple Media, Multiple Disciplines" by Clement Mok, Adobe Press 1996.

We have seen how the convergence of print, broadcasting and computing brought about new goods and services. The chart above shows the interaction of related skills for media-related industries: advertising, publishing and broadcasting, multimedia and graphic design. It also shows how some of these traditional skills or professions are
overlapping with skills in business-oriented professions such as Investment Banking and Venture Capitalism; and technology-oriented skills in the Computing, Engineering and Telecommunication industries. The chart depicts the need for new media companies to engage people with multiple skill sets from: left-brain, right-brain, technology-oriented and business-oriented professionals.

Traditionally, we have left-brain professionals working in tools and hardware development (scientists, engineers, etc.); and right-brain professionals handling the content development (film makers, book publishers, graphic art designers, writers, entertainers, etc.) and their skills relate quite independently to the industries where they belong. On the other hand, computer professionals are traditionally engaged in automating business processes and their job functions are confined to developing and supporting the systems they develop.

Successful multimedia environments require multiple skill sets. It also involves collaboration by professionals from the various disciplines. For example, professionals from public relations, graphic design and advertising industries need to understand technology to help clients promote their products and services across a spectrum of new media choices such as the internet, public kiosks and multimedia CD-ROMs.

Business-oriented professionals need to incorporate information technology into their business plans and strategies. New opportunities exist for businesses that can use information technology to create and capitalise on emerging markets. In fact, most reengineering strategies would use IT as the mechanism for managing change and restructuring exercises. Global business opportunities are expanding and information technology is crucial to realising and managing these opportunities. Information
Technology/communications level the playing field and offer to smaller companies to compete with bigger ones. This creates the potential to unlock the entrepreneurial energies of highly innovative companies on a global scale.

In case studies of highly successful high-technology companies such as Microsoft, an important ingredient for success is to have within the business a core group of smart people (a critical mass) who understand the technology and who are at the same time business savvy. It is hence as important to have Information technology professionals regard information systems that they build as business tools as it is for business people to recognise the importance of Information technology in working out their business strategies.

The multimedia environment also requires right-brain (creative) professionals to collaborate with left-brain (analytical) professionals and vice versa. For example, a graphic designer needs to understand information design—a way of analysing information and defining its structure and relationships between ideas.

In summary, businesses need to develop new skill sets for the multimedia environment. Many of these skills exist but it requires people from multiple disciplines to collaborate. Traditionally, many of these professions such as engineering and computing do not rely on collaboration to a great extent.

An important strategy is not only to impart new component skills to individuals but also to create a corporate culture where people learn to collaborate and communicate with others. Companies must also promote a learning culture where people continuously improve through past projects, feedback and sharing of ideas with others. The speed and
multiplicity of the technology demands it. We must adapt in order to thrive in this environment.

4. **THE MEDIA REVOLUTION**

**Time line of Human Communication.**

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<th>Years Ago (logarithmic)</th>
<th>Significant Events And Developments</th>
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| 100,000                 | - Expressive language* and Communication Tools  
                          - Homo sapiens sapiens (modern humans)  
                          - Spoken Language and the First Mediamorphosis  
                          - Cave paintings in southern Europe |
| 10,000                  | - End of last ice age  
                          - Emergence of large-scale agricultural communities  
                          - Bronze Age begins in Asia Minor  
                          - Written Language and the Second Mediamorphosis  
                          - Emergence of ancient empires  
                          - Development of document technologies  
                          - Handwritten books and libraries  
                          - Roman roads and mail services  
                          - Development of printing and pulp paper in Asia |
| 8 C. A.D.               | - Development of pulp paper in Europe  
                          - European Renaissance begins in Italy  
                          - Commercial revolution  
                          - Handwritten newsletters and newbooks  
                          - Development of printing in Europe  
                          - Printed newspapers, magazines, and books  
                          - Industrial revolution  
                          - Digital Language** and the Third Mediamorphosis  
                          - Application of electricity to communications |
| 100                     | - Wireless communication, moving pictures  
                          - Long-distance telephone (transcontinental)  
                          - Broadcast radio, radio facsimile machines  
                          - Broadcast television  
                          - Mainframe computers  
                          - Cable television, first transatlantic telephone cable  
                          - ARPANET (the Internet's predecessor), electronic mail  
                          - Microprocessor, personal computers, VCRs  
                          - Digital facsimile machines, compact discs  
                          - Digital radio and television  
                          - Virtual reality and video conferencing systems  
                          - World Wide Web  
                          - Mosaic "net browsers" |
| 10                      | * Expressive language includes signs and symbols as well as art, music, and dance.  
                          ** The origin of digital language is generally associated with the development of electronic computers in the 1940s but the basic concepts, can be traced back to the early decades of the nineteenth century. |
Roger Fidler, in his book, "MediaMorphosis--Understanding New Media" coined the term mediamorphosis to mean the transformation of communication media, usually brought about by the complex interplay of perceived needs, competitive and political pressures, and social and technological innovations. The chart above takes a historical look at the major events associated with development of communication. I would like to use this chart to set the premise for discussing how multimedia's explosive growth and accelerated change will bring about transformation of job skills that requires a shift of core competencies of today's workforce.

The emergence of spoken and written language brought about the first two waves of changes to human communication. The chart shows the evolution taking place in the space of thousands of years. The third wave, digital age, brought about by the application of electricity to communication took place in the 19th century--about a hundred years ago. Now we are witnessing a new wave of change brought about by the merging of computing, broadcast and telecommunications industries. This new form of communication is often referred to as multimedia as it involves a blend of text, images, audio, videos, as well as the ability to access vast amount of information over networks via telecommunication links. The Internet's "overnight success" over the space of thirty years shows us how new technology can change and evolve quickly. It also shows us that this next wave of change will come quickly and we have to adapt to it. This next wave of change is often referred to as the media revolution. Defendants of the print media who do not feel the threat from the introduction of television should now take a second look on the power of multimedia and telecommunications technologies. The key to this new media is interactivity and the omnipresence of computer is already part of our lives.

The proliferation of digital technology and multimedia resulted in a new two-way relationship between business and consumers. The Internet for example allows businesses to disseminate
more information to their consumers with better immediacy. By publishing new or updated product information on the net, businesses allow consumers to access the information as soon as they are published. Consumers have also come to expect the availability of such information. While it used to take weeks for companies to print product brochures and to distribute them to clients, today's technology enables clients to access these documents almost immediately. Consumers now take on an active role in retrieving and printing these documents on demand. In a way, technology is speeding up the process of decentralising access to information by empowering individuals—a trend for businesses to watch and to manage.

Better infrastructure will help businesses overcome barriers in time and space. The efficiency of digital technology also created the demand for businesses to be more responsive and efficient. Business schedules used to include a day or two for mailing deliverables to clients. Today, businesses are expected to deliver documents almost immediately through faxes and electronic mail. In the digital age, time is a luxury. Simply put, businesses will thrive by continuously adding value to their products and services and will be increasingly pressured by the demand for a faster time to market.

The proliferation of electronic mail, interactive chat, electronic forums or newsgroups allows consumers to interact directly with their suppliers and to share their experiences with other users or interest groups. Electronic commerce or merchants will subsequently remove the many layers of middlemen and hence will lower product cost. Businesses will be expected to set up such electronic forms of support for their clients. By providing more opportunities for reciprocal exchange, multimedia allows the scope and depth of teamwork to be enlarged.

The environment for learning will be greatly enhanced as group members are engaged in a number of learning processes enabled by technology. Collaboration is becoming an important
strategy. In the fast-changing multimedia environment, it is not worth trying to develop something from scratch. It is better if somebody else with the expertise do it for or with you. As John J Donnavan in his book "Business Re-engineering with information Technology" (Cambridge technology Group, Inc.) puts it: "The organisations that can detect a market opportunity, implement a solution, and deliver it quickly are the organisations that will win!".

Ray Hammond in his book "Digital Business-- Surviving and Thriving in an On-line World" published by Hodder and Stroughton, mentioned five key points about the Internet: Global, Personal, Interactive, Low-cost and Forever-growing. These five factors form the basis for his explanation on how online technologies are transforming business models and approaches. With multimedia developing rapidly in the direction of open networks like the Internet, I would like to use these same factors to form the premise for which organisations must restructure their training and business development strategies to meet the challenges of the future.

We must:

- Think global;
- Capitalise on market opportunities as soon as they arise;
- Adapt (add value to) our products and services to implement solutions quickly;
- Adopt Information Technology; and
- Harness the power of the Internet to help us connect to a fast and ever-growing market.
5. MACRO ISSUES

5.1 STRATEGIES - THE WAY AHEAD

To many businesses and even governments, taking on multimedia is moving into uncharted territory. It requires adopting bold initiatives and innovative measures. There must be leadership to spearhead this challenge. Fortunately, in Malaysia’s experience, our Prime Minister is the driving force behind this bold vision. The switch by the Malaysians is remarkable, as it was only 12 years ago when Malaysia implemented the industrial economy as its growth platform rather than being too dependent on commodities. The introduction of the information era in 1996 has taken the nation by storm and hence the need for a rapid turnaround management.

5.2 TRAINING & EDUCATION

On a national basis, manpower planners need to shift a large proportion of the workforce from other sectors to Information Technology and Multimedia services sector. It would require substantial long-term investments in training current members of the workforce. And it demands major investment and reforms in the existing education system to meet these goals. As an example, in Malaysia the government is taking the following initiatives:

- Start Smart Schools where the curriculum adopts the use of IT in teaching and learning;
• Import professionals and knowledge workers from abroad to shorten the long lead time for the workforce to be ready;
• Provide unrestricted and user-friendly work permit for foreign knowledge workers;
• Increase the number of technical and business professionals graduating from Malaysian universities;
• Set up multimedia universities and encourage local universities and colleges to offer twinning programmes with top IT and multimedia universities from abroad;
• Create university-company partnerships to educate and train potential employees in specific skills;
• Send students overseas to learn new and emerging technologies.
• Re-train its massive civil servants to fit into the Electronic Government plan for Putra Jaya projects.

In a press interview, Malaysia's Education Minister Datuk Sri Najib Tun Razak said that the ministry had plans to increase manpower and absorb computer literates to support the functions of the Multimedia Super Corridor. He said that between 1991 and 1995, institutions of higher learning had churned out 7,479 graduates in the fields of computer science, multimedia and information technology. It was expected that by the year 2000, public institutions of higher learning would produce 15,000 graduates in such disciplines.

A similar announcement was made by the Chief Secretary to the Government on re-training 133,500 civil servants who would act as the 'critical mass' to spearhead the ambitious plans of having a paperless government. This 5 year plan would train all layers of management from top to bottom i.e. 500 senior officers; 15,000 management and
professional staff; 38,000 support group I; and 80,000 support group II. It was reported that there are now 850,000 civil servants in the Malaysian Government machinery.

5.3 THE NEW TRAINING

By merely producing more graduates or importing them from overseas alone will not solve the manpower needs for nurturing a new industry such as multimedia. These efforts must be complemented with retraining of the current workforce (with the relevant core competency skills) to meet the increasing demands. New attitudes towards what constitutes training and how it is accomplished must also be developed and encouraged.

Schools must emphasise exploration and discovery learning through the use of computers. These "microworlds" allow one to learn by mistakes and experience. This is a useful attitude to develop as new media (multimedia) evolves very quickly and the workforce of the future must be nimble enough to adapt quickly to it in order to succeed.

People should also be trained to adopt a new attitude towards training. They should be able to decide more for themselves about what to learn, and how to learn it. Individuals must be resourceful and cut their own paths to skills and knowledge with the assistance of information technology tools.

In the multimedia environment, learning is no longer an isolated event. Much like in the real world, learners should be able to consult each other, experts and instructors, and a wide range of learning resources. Computer networks bring some of these within easy grasp through the concept of distance education and help to remove physical boundaries.
of access to information and people. The widespread use of personal computers, voice mail, e-mail, cellular communications, real-time video conferencing will give people more options.

5.4 ENCOURAGE / FUND RESEARCH & DEVELOPMENT

To promote a powerful learning organisation within a country, the government must provide a mechanism for learning: by funding research but making that research available to businesses. In Malaysia, the government has started the HRD (Human Resource Development) fund where it becomes mandatory for businesses from several sectors to contribute one percent of what they pay out as salaries to employees to the fund. Companies then get reimbursement from the fund when they send their employees for training. The Singapore government has a similar scheme. This initiative will encourage companies to invest in training. To encourage the development of multimedia, it should also be possible to extend this scheme to companies spending money to develop multimedia and other related technologies that will extend the possibilities of delivering training in ways different from today's classroom or lecture style of instruction.

5.5 NATIONAL INFORMATION "SUPERHIGHWAY"

Just as businesses must learn to handle multimedia and new work environments, countries must also learn to cope with what can be foreseen as a transition to digital age economy. Many countries have started doing this, investing in huge amounts of funds in projects related to multimedia. Malaysia's MSC, Singapore's Singapore One, America's Internet Two (Next Generation Internet Initiative) and the likes are testimony to the fact
that countries realise the potential brought about by information technology and multimedia. They see that the only way to survive in the future is to invest in technology and leapfrog the competition.

All these initiatives share this approach: enable a new generation of network (connectivity) applications to advance the nation's economic and social goals. These massive projects can only take place after the country has in place the necessary infrastructure. This infrastructure includes:

- Provision of bandwidth and advanced network technology
- Development of strategic applications to showcase what the technology can do
- Create a talent pool of experts to spearhead the development

It is no doubt that these projects are costly. It is important then for the government to partner with the private sector for realising such goals.

5.6 PRIVATISATION, DEREGULATION AND GLOBALISATION

Private sectors are driven by profits. To encourage private sector participation in new projects in the multimedia environment, the government has to adopt the following strategies:

- Deregulate the broadcasting and telecommunications act;
- Simplify the process for foreign experts to apply for work permits;
- Encourage local companies to partner foreign high-tech companies in joint ventures which in the end will result in transfer of technology to the country; through smart partnership
- Encourage companies to think global;
- Encourage banks to make provisions for high-tech multimedia companies to get access to funds;
- Provide tax incentives for companies to research and develop the strategic applications;
- Educate the public on the benefits of these projects through seminars, conferences and the media.

6. MICRO STRATEGIES

6.1 THE NEW WORKPLACE

Businesses themselves must also take appropriate measures. To begin with, companies must adopt the use of Information Technology aggressively to enhance processes and products. People need to work in teams to achieve these goals. There is hence a need to develop interpersonal skills and increasing technical skill sets. With increased implementation of information technology, companies must provide support to individuals to think differently with the new tools. People must be encouraged to manage their own learning goals and careers. More people will be engaged as "knowledge workers"—people who handle information than physical things. More work becomes "mind" work and can be carried out by increasingly sophisticated digital technologies.

Businesses must be prepared to face the fact that increasingly, the majority of people engaged in knowledge work most likely will work from their homes or in decentralised work environments close to their homes. With information technologies and telecommunications, organisations can connect to knowledge workers of various skills.
Businesses must be prepared to get connected. In the Silicon Valley, high-technology companies have fibre optic cable for high-speed computing and teleconferencing. Homes enjoy a similar degree of connectivity. This concept is emulated by upcoming developments of Malaysia's Multimedia Super Corridor (MSC).

6.2 TRAINING, RETRAINING AND RETOOLING

At the industry, company and individual level, structured training of new staff and retraining of existing staff are important agendas. The training programme must be holistic, i.e. not focussed on the physical and mental skills alone. There is a need to change the attitude of staff members and to adopt the new work culture to develop a learning and well-informed organisation. The best way to manage change as mentioned earlier is by creating a critical mass of IT specialists to spearhead the change process and to harness the work culture. Projects need to be prioritised and its initial success must happen to build confidence and teamwork.
On a company basis, the greater challenge is to overcome the fear to accept new technology and adopt the change in work culture. The people, in most organisations, is the most difficult to change as reflected in the triangular change element below:

![Triangular Change Element]

The easiest to change is the technology followed by procedures.

At the management level, the re-engineering process would include restructuring the organisation; review the current compensation package; reduce the headcount through redeployment and early retirement of staff who cannot adapt to the new work culture.

The experience at Utusan also indicated that retooling staff with new basic equipment including introducing new tools, computers and software, the intranet etc. simultaneously has worked quite well. It is important to note that in the information era, change must be transformational and not incremental. This rapid change of technology requires that staff be dynamic and knowledgeable. On many occasions, the introduction of a new staff member into the company has helped to make the change effective. It is important that there must be strategy innovation and business Leadership in order to ensure the change programme is effectively implemented.
7. CONCLUSION

Multimedia will be pervasive and it will increasingly challenge countries and companies to develop sound strategies to succeed. The environment (both work and business) for multimedia to develop requires commitment from governments, companies and individuals to adapt to the rapid and dramatic change that technology brings. At this point, we must be able to identify these challenges, prepare the infrastructure, develop strategic applications and stay alert to the changes in technology. For all companies out there, act now because changes will come quickly and revolutionise the way we do business. The media revolution indicated the changes that swept the industry since time immemorial.

Change can be traumatic and it must be well managed. A well-planned and structured strategy must be mapped out to ensure there is enough contingencies to manage the change process. As it is, the paradigm shift in Malaysia with regards to IT, the promotion of multimedia has been a government initiative and hence with such leadership, it is easier to filter down to the industries, organisations and the man-on-the-street. However, there is a need to understand the shift in core competencies when handling the human issue.

In the discussion on training, retraining and retooling, there must be a critical mass of early adopters to spearhead the change. There is a need to leverage the use of multimedia as a mechanism for such a process to happen and to identify that is the right way to go ahead.