NARROWING THE DIGITAL DIVIDE IN MALAYSIA: ISSUES AND INITIATIVES

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ABSTRACT

Equity of and access to information and communication technologies (ICT) is currently a burning issue in many countries around the world. Malaysia, as a nation with about 22 million inhabitants, has taken some strong strides in recent times to bridge the access and equity gaps through appropriate policies and strategic national programmes. This paper will examine some of the key elements of several of these initiatives to bridge the digital divide in the country, in particular, the Titian Digital programme. We will also be identifying some of the major challenges that this programme hopes to resolve.

Keywords : *Information Communication Technologies (ICTs), Digital Divide, Internet, Telecommunications, Personal Computers, Malaysia.*

1. INTRODUCTION

Malaysia, with a population of about 22 million, is blessed with abundant natural resources in the form of oil reserves, natural gas, tropical timber, as well as rich in primary commodities such as rubber, and oil palm¹. It is only in recent times that manufacturing (production) has overtaken agriculture as the main economic driver of the nation's wealth.

With the advent of the information and knowledge era in the last ten years, knowledge has become the key wealth creator, and this has given rise to what is commonly known as the Knowledge- or *K-economy*. To meet the expected challenges, Malaysia has embarked on a drive to intensify knowledge use in all sectors of the economy, which includes both the traditional as well as the new. This will entail the concerted efforts of all the various stakeholders in the Malaysian economy to *acquire and generate bodies of knowledge*². To fulfill the nation's aspirations and objectives, the necessary ICT infrastructures must be developed so that access to information, is on par with the

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access to basic amenities like clean water and electricity. A nation's ICT infrastructure is a very vital ingredient for the dissemination and consumption of information².

One of the long-term national development programmes is a five-year development plan. Every five years the Malaysian Federal Government will invite fresh applications from the various Government departments and agencies to submit proposals for national developmental programmes. The Eighth Malaysian Plan was unveiled in the year 2001. Among others, the Plan's key strategy is to expand the usage of ICT within and across sectors to accelerate the growth process. ICT is viewed as having a strategic role in accelerating the economic growth process by increasing the efficiency and productivity of all sectors of the economy.

In this Eighth Malaysia Plan, the Government has officially recognized the need to narrow the digital divide especially between the rural and urban areas. For ICT-related programmes alone, the Government has budgeted a total of RM5.16 billion under this Plan. Several Government Ministries have proposed and were granted funding to implement development programmes related to the basic communication infrastructure, physical ICT-centers for the various communities as well as schools, creation of more indigenous content, ICT-related awareness and training, and computerization of public services.

As a Government Corporation involved in research and development, *MIMOS* plays a pivotal role in developing the country's capabilities in ICT and microelectronics. The role is further strengthened since MIMOS is also the Secretariat to the highest ICT think-tank in the nation - the *National Information Technology Council* (NITC). This is the organization that advises the Government on matters pertaining to ICT related policies and direction in the country.

Within this eighth national plan, MIMOS was allocated some development funding to implement ICT-related programmes that would create an impact on the socio-economic activities of the nation. One of the programmes is known as *Titian Digital* in the Malay language (*Digital Bridge literally*) and is intended to develop and expand the existing ICT infrastructure^{3,4} throughout the nation so as to sustain and maybe accelerate economic growth in the face of greater global competition. This is especially relevant for those who are on the economically marginalised side of the divide. However, as we will show later on, the challenges here are much more than merely installing telecommunication infrastructures throughout the nation.

In the next section, we will examine some of the important indices that will give an indication of the country's ability to migrate to this new economy. We will then describe some of the fundamental issues and challenges that contribute towards the digital divide within the Malaysian context. Finally, a summary of the major elements of *Titian Digital* will be presented in section 8.

2. MIGRATING TOWARDS THE NEW ECONOMY

Malaysia's economic growth in the past has been largely dependent on a Production- or *P-economy*, which essentially is based on our natural resources in the agriculture and mining sectors. However, this dependence has significantly changed since the 1980's. Due to the rapid global changes taking place and the ushering in of the *K-economy*, this dependence on the P-economy must be re-looked into within the Malaysian context so that we will not be left behind in the race towards owning a piece of the global K-economy cake. Therefore it is not surprising for the Government to declare that the nation must prepare itself to be a part of this global K-economy. Although there has been some progress made in migrating to the K-economy, indications are that there are many more challenges that the nation has to face and the pace of progress may not be what the Government would like it to be. And this is where the problem lies. As a result of this slower pace of progress, it has contributed to a significant gulf between the "*information-haves*" and the "*information-have-nots*" in the country. Fundamentally, this is the chasm that divides those with access to information and those without. Furthermore, because of its implications and strategic importance, this digital chasm has also become an economic as well as a civil rights issue. Even though some of those on the disadvantaged side of the divide may not be aware of it, they must be convinced that they just cannot afford to be left behind in this global phenomenon that is affecting the world today. They have to be a part of this or be left behind. What then are the major challenges that have hindered the closing of the divide? Danowitz et al. studied this for five North African countries and came to the realization that the major barriers come from low income levels, lack of telecommunication infrastructure, language, and cultural differences⁵. This may be summarized into three broad areas, viz.

- affordability (financial), • access (language, user-friendliness, etc.), • the mind set.

2.1 The Malaysian context

In Malaysia, even though there has been a growing realization that knowledge, and mastery of ICT is vital to the country's economic survival, the pace and depth of its progress has not been very satisfactory. According to a press release by the *Malaysian Energy, Communications and Multimedia* Ministry in 2000, there are 900,000 Internet subscribers in Malaysia⁶, which unfortunately, only accounts for 4.2 % of the total population as a whole. Even though this may be much higher than many of Malaysia's neighbouring countries, we are far behind when compared with the more advanced nations of the world. The latest figures are summarized in Table 1.

2.1.1 PC Ownership

Fundamental to the issue of access is the question of the access devices themselves. Currently, the most common and popular means of getting accessibility or connection to the Internet is through a personal computer (PC). However, the current landscape may change when wireless access gains popularity with WAP-enabled devices (e.g. hand-phones, palm-tops, etc.), but for the time being, personal computers remain the

Table 1 : *Number of Internet subscribers for a selected number of countries*

Country	Internet Subscribers	% of population
United States of America	153,840,000	55.83%
Hong Kong SAR	3,460,000	48.69%
Singapore	1,850,000	44.58%
Australia	8,420,000	43.94%
New Zealand	1,490,000	39.03%
South Korea	16,400,000	34.55%
United Kingdom	19,980,000	33.58%
Japan	38,640,000	30.53%
Taiwan	6,400,000	28.84%
Malaysia	1,500,000	6.88%
Thailand	1,000,000	1.65%
China	16,900,000	1.34%
Philippines	500,000	0.62%
India	4,500,000	0.45%
Indonesia	400,000	0.18%

Source : http://www.nua.com/surveys/how_many_online/index.html

firm favourite. Unfortunately, other studies have indicated there are not enough Malaysians who own a PC compared to the size of the population in the country. This is especially obvious when we compare this with some of the more developed nations of the world (Table 2). Malaysia, with a rate of 46.1 PCs per 1,000 people, is ranked

Table 2 : *PC Ownership*

Country	PC Ownership (per 1,000 people)	Country	PC Ownership (per 1,000 people)
United States of America	406.7	Malaysia	46.1
Singapore	399.5	Thailand	19.8
Australia	362.2	Phillipines	13.6
New Zealand	263.9	Indonesia	8.0
United Kingdom	242.4	China	6.0
Hong Kong SAR	230.8	India	2.1
Japan	202.4	Taiwan	- not available -
South Korea	150.7		

Source : *World Development Report, 1999/2000*

ninth in this study, after South Korea. It is obvious the number of people who own such devices in Malaysia is significantly smaller when compared with those from the more developed countries around the world. The nation would need to increase this considerably and quickly too, if it wishes to significantly increase the number of Malaysians on the Net. The PC is currently still the main doorway to this digital world.

While PCs were more commonly found in institutions of higher learning or computer organisations in the past, the user-friendliness of such machines plus the advent of the Internet have made them useful and popular in the homes. In Malaysia, one can get the very basic Internet-ready PC for about **RM 2,500 (USD 657.9)**. However, this does not include the cost of Internet access. Even though the Internet charges in Malaysia may not be the lowest in the region, they are comparable to that of a neighbouring Asian country like Singapore.

Table 3 shows the mean monthly gross household income by stratum for both the urban as well as rural areas in Malaysia. The average monthly expenditure per household for urban area is RM1,945 while for the rural area this is RM1,270. Would an average rural household spend RM2,500 to purchase a PC, considering they only have a disposable income of only RM448?

Table 3 : Household expenses and incomes for the rural and urban sectors in Malaysia

Household (monthly)	Urban		Rural	
	RM	USD	RM	USD
Income	3,103	817	1,718	452
Expenses	1,945	512	1,270	334
Disposal Income	1,158	305	448	118

Source : Malaysia Yearbook of Statistics, 2001

2.1.2 Network Access Charges

The data shown in Table 4 is based on a 40-hour off-peak rate per month. It may seem logical that with such low costs, a large portion of the Malaysian public should be able to afford such access. Even though the cost of access in Malaysia is marginally lower than that of South Korea's, we only have 6.88% of the population on the Internet (as in Table 1). The reasons why not many Malaysians have gained access to the Net has not been studied in detail.

Even though Malaysians seemed to be enjoying low access fees by being eighth in the list of countries studied here (Table 4), we moved up the list when this is normalised with respect to the country's *Gross Domestic Product* per capita.(GDP). The cost of Internet access as a percentage of the GDP. of the country is shown in Table 5. Malaysia's access fees are now the third most expensive in this list. With the exception of Japan

Table 4 : *Comparative cost of Internet access*

	Country	ISP Charge* (USD)
1	Japan	84.80
2	Indonesia	41.74
3	New Zealand	36.80
4	United States of America	36.80
5	Australia	35.20
6	United Kingdom	31.20
7	South Korea	28.80
8	Malaysia	22.15
9	Singapore	15.52

*based on a 40 hour off-peak rate per month.

Table 5 : *Comparative cost of Internet access as a percentage of the GDP per capita*

Country	ISP Charge* % of GDP per capita	Country	ISP Charge* % of GDP per capita
Indonesia	1.47	Australia	0.17
Japan	0.37	United Kingdom	0.15
Malaysia	0.24	United States of America	0.12
South Korea	0.23	Singapore	0.06
New Zealand	0.22		

and Indonesia, all of the other countries in this list have shown a value less than Malaysia's.

3. STRATEGIC INTERVENTION

The adoption of ICT across the population, in particular, the Internet, will probably not improve, if this is left to the market forces alone. In such a situation, only the rich will benefit. ICT adoption needs to be addressed from several aspects. It is just not about having more of the population signing up with the friendly neighbourhood Internet Service Provider (ISP). Neither is it just about buying a PC for home use as well. Other important elements of the infostructure such as appropriate software and applications, standards and protocols, policy, etc. have to be quickly put in place too.

Compared to many of the countries in the region, Malaysia may have a significantly large number of homes with telephone access (Table 6) and a much higher Internet

Table 6 : *Number of telephone subscribers*

Country	Telephone Subscribers	Ratio (# Pop. per Phone)
Australia	8,700,000	2.1
China	105,000,000	12.0
Hong Kong SAR	4,470,000	1.5
India	12,000,000	81.9
Indonesia	1,276,600	161.6
Japan	64,000,000	2.0
Malaysia	4,154,193	5.0
New Zealand	1,700,000	2.2
Phillipines	1,900,000	38.4
Singapore	1,400,000	2.5
South Korea	16,600,000	2.8
Taiwan	11,526,000	1.9
Thailand	1,553,200	38.8
United Kingdom	29,500,000	2.0
United States of America	182,558,000	1.5

penetration as well. However, this penetration rate is still far behind that of the more advanced countries in the world. Evidently, having a good telecommunication infrastructure is just not enough. A closer look at some of those countries that are already significantly advanced in telecommunication infrastructure suggests that there should also be concerted efforts to increase Internet penetration in other areas (mindsets, cultural differences, etc.) as well.

With about 1.5 million Internet subscribers in the country, and over 4 million fixed line residential subscribers⁸ Malaysia may have sufficient fixed line network infrastructure to cater for any immediate and huge increase in the number of Internet subscribers without the need of having to expand the infrastructure aspects at this point in time. Additionally, with the emergence of the *Wireless Application Protocol* (WAP) in recent years, wireless access may gain more acceptance and popularity. Consequently, access to the Internet will no longer be dependent on the fixed line communication networks anymore. On the software side, strong interests in making useful and reliable software available with minimal or no charge, in the form of the freeware movement will also bring about considerable savings in the cost of PC ownership. For example, the *Star Office* freeware, running on the *Linux* operating system (another freeware) has the looks and feel of the popular Microsoft Office suite, but is distributed free of charge! Although it is not receiving the wide appeal or popularity which we believe it deserves, eventual wide spread acceptance in pre-loading it in new home PCs can drive the prices

down further. We feel that technically, in no way are these products inferior to their more popular cousins.

The Government, with all its immense resources at its disposal, can initiate massive programmes throughout the country to gain the attention and interest of the public in order to make this assimilation of ICT into the nation's economy a success. Such initiatives would be in addition to other economic or financial incentives that the Government can offer through the relevant Ministries to the private sector. One such initiative is the Universal Services Provision (USP) Fund that will help finance projects to expand ICT infrastructures that may otherwise be uneconomical for the service providers to invest⁹.

In the next few sections we will look closely at some of the solutions that may address several key aspects of the digital divide.

4. COST OF ACCESS

One obvious solution to address some aspects of the challenges described in the previous sections would be to lower the price of the access devices. Encouraging increased competition within the PC industry may be one way in which the price of PCs may come down quickly enough. Moreover, our local PC industry will also have to broaden their markets, to target not only the local markets, but global ones as well. The anticipated sales volume within the country may not be enough for them to enjoy economies of scale to lower their selling prices further. Government intervention to support such initiatives should be encouraged; as such price reductions will be vital in making these information access devices more affordable.

Furthermore, in many of the advanced Western nations, there are usually several Internet Service Providers, and the competition they provide will promote the cost of access to be competitive. Within Malaysia, the Government has already granted licences to several more operators to manage such services. Licences to operate such services should be increased appropriately, not decreased. However, this is only one part of the solution. On a broader perspective, such solutions may involve various other alternatives. Lower prices, leasing arrangements, and even free computer deals may bridge the digital gap and make the cost of access affordable to many.

5. EXPANDING COMMUNITY ACCESS CENTERS

Even though prices of computing devices and Internet access fee may drop, it is unlikely they will fall to a point where most homes will have computers and Internet access quickly enough so that the people would not be left behind in the current transition to a new economy. Therefore, some solutions to address these gaps should also be provided. An interim solution may lie in providing Internet access at community access centers for those who cannot afford to have such access in the comfort of their homes or work place. These are usually the minorities, for example, people earning lower incomes, and the unemployed, etc.

Alternatively, the wealthy companies of the country should be encouraged to donate computers, appropriate software or maybe even set up such community centers for these purposes. In the state of Selangor, private enterprises have pledged financial support for the setting-up of 91 IT Community Centres in rural towns while the State government is planning to establish another 11 Centres¹⁰. The Government should actively encourage more corporations to take an active role in addressing the nation's digital divide issues. Incentives such as corporate tax deductions should be considered by the Government to encourage more corporations to take this initiative. Some Asian countries are already adopting such a strategy. Perhaps a greater challenge would be to change the mindsets of segments of the population so that they are more receptive to ICT, which has both social as well as economic implications. This will be addressed in the next section.

6. BUILDING AWARENESS

Many Malaysians have already embraced ICT, but yet there are many more who have not. We believe that more Malaysians should realize how crucial and relevant ICT is to their lives. However, this is not about having Internet-ready refrigerators nor about washing machines that can access the Internet for its optimum washing programmes¹¹. Having such ICT gadgetry will not bridge the digital divide.

There should be initiatives started to reach out to groups that fall into the information poor category and let them know why it is important that they should be involved -- how ICT and the related technologies can open new opportunities, and make a difference for them and their children.

Bringing new technology to the population is one thing, but getting them to embrace this wholeheartedly is another, as there may be other real concerns that can prove to be major barriers. For instance, valid concerns have been raised about children's 'safety' while using the Internet and issues like this have to be tackled before the Government can introduce the Internet to more homes. While there are currently software systems that can bar minors from visiting pornographic sites, for example, many may not be aware of them. Progress has also been made in other areas. For example, web sites that provide guidance to parents and teachers in selecting what is culturally acceptable, in the local languages have also been developed (see <http://www.bijak.net.my>).

The Malaysian Ministry of Rural Development, through the *INFODESA* (literal translation means Information Village) programme, has embarked on a massive initiative to create ICT awareness among village heads, women, poor students and orphans. From 1998 till 2001, 83 awareness courses have been organized with an average attendance of 85%. The Ministry is also currently implementing various awareness and training courses under the Eighth Plan for the management of *INFODESA* center websites, management of *INFODESA* centers, computer literacy and surfing, installation and

computer maintenance, web development, content development, and basic ICT-based entrepreneurship skills.

7. LOWERING LANGUAGE AND CULTURAL BARRIERS

As we have outlined in the earlier sections, issues related to the infrastructure is only just one from a list of contributing factors. There are also language and cultural barriers that would have to be addressed, as the Internet today is predominantly Western and Anglophone. What is acceptable to the Western society may not be to another society, and in a population where English is not our mother tongue, accepting and understanding the contents of web pages in this language can sometimes prove to be a tremendous challenge. The latter issue is even more pertinent in many other parts of Asia. Education or training programmes should also be provided for those who may have missed the opportunity, but remained keen to learn. The older segments of society who have not been exposed to these new technologies should also be encouraged to undergo such assimilation programmes. Minority segments of the society or those who are disadvantaged should also be encouraged to pick up sufficient ICT skills. For example, within the Malaysian context, the percentage of women who are computer literate is still low compared to the men¹². Moreover, the literacy rate in Malaysia is in the region of 73% to 80%¹³. Fundamentally, this means that three out of four Malaysians are able to read and write. However, this need not necessarily be in the current language of the Internet - English. Suitable educational programmes will also have to be developed to help them assimilate into the Internet society. Content development in any of the other local Asian languages in the country should be encouraged too.

8. TITIAN DIGITAL

"Titian Digital" is a nation-wide programme that will encourage the application of ICT to all segments of the rural community. Titian Digital was conceptualized based on the following observations:

- a) Provisioning of ICT infrastructure in rural areas is inadequate, largely due to low economic returns.
- b) Rural population has reduced from 49% in 1990 to 38% in 2000.
- c) The average household income increased by 92% from 1992-1999 while those from the rural areas have only increased by 81%.
- d) Many ICT promotional activities are ad hoc and focus only on awareness with unclear economic agenda.
- e) Web-based tools are still too complex and the cheapest PC is still too costly for large segments of the population.
- f) Mastery of the current language of the Internet is still a barrier.

As such, the development of the *Titian Digital* programme is based on the following hypothesis:

- a) The average population can be empowered through appropriate use of ICT for sustainable economic and social development,

- b) Knowledge-based economic activities can be grown in rural areas, and
- c) Students can be harnessed to assist parents in IT literacy

It emphasizes the innovative use of ICT to enable and sustain economic growth and prosperity for those who have been sidelined, particularly rural folks, by the global information tidal wave that is currently sweeping through the world. Elements within this programme basically address many of the major challenges of the digital divide that are of great concern to the country. Such a programme may accelerate the penetration of ICT within Malaysia so that the nation can be better prepared and equipped to move into the K-economy. In addition, it is also expected to help develop and strengthen the electronic community of rural entrepreneurs so that they can create employment for the surrounding communities. That is not all. *Titian Digital* will attempt to overcome the issues related to access and affordability of ICT for all segments of the Malaysian society, regardless of their race, creed or physical location. This programme is also expected to promote and facilitate a wider acceptance of teleworking. Through the replication of successful *digital centers* throughout the country, it is hoped that there will be a reduction of social problems facing the youth of the country whereby their energies may be harnessed for better and more productive use. This programme focuses on linking content from subject matter experts with rural entrepreneurs and farmers to bring economic growth through higher efficiency and productivity in the value chain. Subject matter experts may include for example, agriculture experts and food technologists from various government agencies as well as the relevant funding agencies. With the centers set up, and better opportunities for employment, either through actual work at the centers or through teleworking, there may no longer be a need for people, especially the youths, to migrate from the rural areas to the urban areas. Generally, they migrated to the cities because of the better economic opportunities found in such areas. Unfortunately, the quantum and speed of this migration has placed a considerable strain on the physical as well as social infrastructures of the major towns and cities. Insufficient housing, traffic congestion, waste disposal, insufficient clean water supply, etc. are just some examples of the consequences.

Table 7 : *Rural population as a percentage of the total population in Malaysia*

	1970	1980	1991	2000
Rural Population	73.2 %	65.6 %	49.0 %	38.0%

Source : *Yearbook of Statistics (1998), Year book of Statistics(2001)*

Table 7 gives some indication of the trend in the migration of the rural population over a period of about 30 years. There may be a host of reasons why this is happening, but in search for a better livelihood by being at the center of better economic opportunities is at the top of the list⁸. To ensure the success of the *Titian Digital* programme, MIMOS

will be working closely with government agencies, non-governmental organisations, as well as the other appropriate partners. For example, MIMOS will be working very closely with the Ministry for Rural Development to address digital divide issues affecting the rural community.

The *Titian Digital* programme is divided into two major components. In the first part, basic physical infrastructures will have to be put into place where none exists or is grossly insufficient. Under the proposal, connectivity, acculturation and content will be developed to enable rural communities to have access to “*information*” without having to leave their villages. It is hoped that successful models would be replicated to other parts of the country. Here it is necessary to stress that the rural community need to constantly utilize the facilities provided in order to reap the full potential of the center. Key change agents such as motivated students and community leaders would be trained on how to use and manage the access provided. It is anticipated that there will be many of such centers developed within the period of five years. Such digital centers will serve their surrounding communities within a radius of 2 to 10 kilometers. In addition to providing the basic Internet access, these centers will also provide facilities for teleworking, distance learning, community integration, application development, content aggregation as well as a public service outlet. With the expected influence of these centers on the surrounding areas, we expect the rural communities and the urban poor to directly benefit from this programme and become active participants in the digital economy by 2005. However, it is obvious that MIMOS will have to work with the content experts to codevelop these applications quickly and efficiently.

Despite a clear direction for implementing *Titian Digital*, the challenges are equally high. Even at its current stage, *Titian Digital* is faced with the following issues:

- a) How to reduce the cost of infrastructure and speed up its roll-out?
- b) How to share limited resources, avoid duplication of efforts and maximize its impact and benefits?
- c) How to generate new products, services and knowledge-based activities?

9. CONCLUSIONS

When the Internet first began in the early eighties in this country, many would have thought that this was just another of those “*techie*” fads that would quickly fade into oblivion - just like *bell-bottoms* and *hoopla-hoops*. However, as time has shown, not only has it become firmly entrenched in the technical arena, but it has also become a vital ingredient for the economic growth of the country. With its ease of use and extensive reach, no one should be left behind in learning how to use the Internet for personal gain - be it economically, intellectually, or otherwise. This will be especially crucial as Malaysia advances into the 21st Century and the K-economy, where having access to computers and the Internet may be the key to unleashing the inherent potential in each and every one of us so that we can become productive and successful members of society. A local writer¹⁴ aptly summed this up with the following quotation,

*Give a man a fish and you feed him for a day,
Teach him how to fish and you feed him for life.
Teach a man how to tap the Net and cast it wide,
And you'll teach him how to create wealth.*

As we have illustrated in the preceding sections, there are several important contributing factors to the digital divide, viz.

- ✓ the wealth of the nation,   ✓ the technical infostructure.
- ✓ the (computer) literacy rate and/or mindset of the population,

In addition to this set of challenges, Malaysia, as a small Asian country does have additional and unique ones to overcome. Ours is a multiracial and multi-religious society and although each community shares similar core values, there are significant differences. In addition, while many of us can communicate in English, the national language that unites the various races is the Malay language.

While PC adoption and usage among Malaysians is growing, the challenge is to accelerate the process. To be on par with the world standard, we will need to expand our computer density to 7.7 million PCs - an additional growth of 5.2 million PCs over the next few years¹⁵. Within the country and in many places around the world too, various initiatives are already in progress to come up with a more affordable computer, without sacrificing any of the main functionalities. Furthermore, we believe that such initiatives should not only be targeted towards the PC alone, but to extend this to all the essential peripherals as well. Generally, a PC alone may be insufficient to cover even the most basic of computing needs, for the users would need access to printers, scanners, modems, as well as some of the more essential software. All these can add up to a very hefty sum of money.

Secondly, a low computer literacy rate level will only lead to an equally worrisome low level of PC ownership, for the computer illiterate would not be aware of the advantages of owning one. However, solutions to reverse this trend could be more challenging, for they may have to involve significant curriculum changes in the schools. Basic computing courses may have to be introduced at all the schools to equip the younger generation with basic computing skills and knowledge. Various initiatives by either the private or public sectors to address this issue are already operating on the ground, e.g. the Government sponsored National Smart Schools programme, the MIMOS driven Smart Learning Environment, etc. A different approach may be needed to educate the existing computer-illiterate adult population. Clearly, there is much more the Malaysian Government will need to address with great vigor. The current cost of PC is still unaffordable to those with low disposable income and this is compounded by the lack of segmented content that is formulated to fulfill the needs of those “*information-lacking*” communities. Let us also not become unrealistic to assume that these “*information-lacking*” communities would choose to bring a PC into their homes instead of putting food on the table for their family as their first priority.

Malaysia may already have sufficient financial resources as well as the necessary infrastructure (fixed telecommunication network)⁹ in place to fuel any further growth in the number of people connected to the Internet. However, there will need to be stronger commitment and support from both the Government and the Malaysian society for this to succeed. Appropriate development plans must be quickly put into place to address these challenges as the nation cannot afford to be left behind in the race to remain competitive enough to face the many economic challenges in the new world order. Perhaps more importantly, the Government must also realize that there may be other viable alternatives. Malaysia must continually strive to increase the tele-densities and improve the service levels, even though they may be at adequate levels presently.

DISCLAIMER

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REFERENCES

1. Yearbook of Statistics, Malaysia 2000.
2. "Dr M: Pursue knowledge vigorously", New Straits Times, page 2, August 22nd 2000.
3. "Infostructure: A Key Concept in the Information Society", Alfons Cornella. <http://www.infonomics.net/cornella/ainfoang.pdf>
4. "Alberta's Information Technology and Telecommunications Infrastructure: Building on Our Strengths," Marshall M. Williams. http://www.gov.ab.ca/sra/publicdocs/itt/itrpt_to.html
5. "CyberSpace across the Sahara: Computing in North Africa", A. Danowitz, Y. Nassef, and S.E. Goodman, Communications of the ACM 38(12), page 23-28, 1995.
6. "Cheaper Internet access rates being considered", New Straits Times, page 7, January 23rd 2000.
7. <http://www.tourismindonesia.com/>
8. Seventh Malaysian Plan.
9. "Local e-readiness at a high level", Computimes, March 1st. 2001, pp 10.
10. Collaborative Action Planning Workshop: Bridging the Digital Divide, 11-13 November 2001, Seremban, MALAYSIA
11. "I don't want the fridge to do my grocery list", New Straits Times, page 10, March 13th 2000.
12. "Women told to pick up IT Skills", New Straits Times, page 16, August 22nd 2000.
13. Ethnologue: Languages of the World, Thirteenth Edition, Editor Barbara F. Grimes, 1999.
14. "A Kampung Gets IT", SH Lim. <http://itmy.newscom-asia.com/jan1m20/foc1.htm>
15. <http://www.pcoc.com.my/why.html>