

Bridging the Digital Divide

A Vision to a Digital Inclusive Society

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Prologue

In the Information Age, it is a time of rapid change.

Change, however, does not always produce the desired results. On one hand, it offers the positive opportunity of access from home to commerce, information, communication, and employment. On the other hand, it also a threat that the Information and Communication Technology (ICT) is not accessible to everyone who desires to use it.

If poverty, low education attainment, inability to see the screen, hear the sounds, or use a keyboard become barriers to access to the ICT, we, as a society, **will lose the talents and contributions of a large part of our population. It is a tragic waste of human capital.** We, will create a two-tiered society in which a substantial number of people will be marginalized.

Digital Divide was one of the areas I mentioned in the Digital Hong Kong 2005 (2nd version) – a blueprint published in August 2000, aimed at using ICT in making Hong Kong a digital city that enjoys freedom, human rights, rule of law, fair competition, democracy and economic prosperity.

The Information Society is for all. However, presently still many people in Hong Kong are being shut out of the benefits that the Information Society may offer to them because they lack the necessary access and skills to use ICT. Many developed nations have already geared up their effort to close such digital disparity. However, Digital Divide is not received much attention in Hong Kong.

“Bridging the Digital Divide – a Vision for a Digital Inclusive Society”, the first report of its kind in Hong Kong, therefore, aims to

- Identify who the “information have-nots” are in Hong Kong in terms of the use of ICT, what the barriers they face, and why is it important to remove such barriers.
- Review the provisions currently available in addressing Digital Divide.
- Provide a roadmap to increase the uptake of ICT for people who are left behind in the Information Age.

Executive Summary

Introduction

The new digital era is for all. To make Hong Kong a digital city that could enjoy freedom, human rights, rule of law, fair competition, democracy and economic prosperity, we must ensure no one is on the wrong side of the digital revolution.

In this report, we have three objectives:

- To identify who the "information have-nots" are in Hong Kong in terms of the use of ICT, what the barriers they face, and why is it important to remove such barriers.
- To review the provisions currently available in addressing digital divide.
- To provide a roadmap to increase the availability and uptake of ICT for people who are left behind in the Information Age.

The Current Uptake of ICT in Hong Kong

According to our research, characteristics of "information have-nots" in Hong Kong are the people who are:

- Lower economic advantage;
- Lower education attainment;
- Less active in economic activity e.g. the retired people and the home-makers;
- The elderly.

The rate of ICT diffusion is far slower among the disadvantaged group in Hong Kong as compared with other developed countries. The low usage of ICT is particularly striking among the aged population, people with less active in economic activity and with lower education attainment.

The gap between the "information-haves" and "information have-nots" is huge and it is widening in Hong Kong, even though the take-up of PC and Internet in Hong Kong at a moderate pace as compared with other major developed countries.

Digital divide truly exists in Hong Kong. The problem is more complicated and serious than we can imagine and it is simply overlooked by our Administration.

Current Provision

There are a number of initiatives which have already been implemented to address the digital divide in Hong Kong. However, all these programmes are not well coordinated. The Government even does not admit that the digital divide is an issue to Hong Kong as compared with other places. So there is no single clear and comprehensive strategy overseeing how

resources are focused and how different parties can be collaborated.

Vision - A Digital Inclusive Society

A clear vision with specific targets is central to make no one a laggard stagnating on the wrong end of the digital revolution. Governments from around the world have adopted a similar approach.

We propose the Government to set out a vision on building a "Digital Inclusive society" where

- All people are able to access ICT starting from homes, schools, public facilities, workplaces, and then extending to all public and business activities
- All people have the skills and knowledge to access what they need online and to use ICT.

4As Enablers

In this report, we present how the four-A enablers, namely affordability, availability, awareness and adaptation influence the diffusion and uptake of ICT.

Collaboration

Piecemeal efforts will do little to alleviate the complex and extensive digital divide. In this section, we discuss the roles of three main actors, namely the Government, Private Sector and Non-profit Sector. All of them can co-operate and give concerted effort to increase the uptake of technology.

Key Recommendations 1 - Building a Digital Inclusive Society

To strive for the vision for a Digital Inclusive Society, we suggest

- The Government has to establish a working group which comprises of representatives from the relevant government departments, private and non-profit sector to focus on bridging digital divide in Hong Kong.
- We suggest the Government to develop a set of benchmark - Digital Divide Index so as to further review the rate of information literacy and progress of reform against worldwide standard on digital divide.
- A clear policy on digital divide is also needed to ensure that IT policies can be complement well with other relevant policies.

Apart from the above recommendations, we have proposed other general initiatives mainly aim at promoting the universal access, based on four-A enablers for the adoption by all actors in section 6.0.

Key Recommendations 2 - wiring Population Left Behind

In this session, we discuss the unique problems of three vulnerable groups, namely elderly, people with disabilities and women in low-income families who due to their unfavorable economic status, low education attainment and work skills, do not have much opportunity to access ICT. Key recommendations for closing the digital disparity for these disadvantaged population are:

Identify diversified needs with respect to ICT by conducting more research on the needs and problems of different disadvantaged group.

Raise IT awareness among the disadvantaged group by stepping up effort to launch more public awareness campaigns aim at promoting the potential benefits of an information society, with particular emphasis on the ICT needs of underprivileged groups.

Promote the principle of universal design by promoting and applying this design philosophy to all ICT equipment.

Foster the use of assistive technology by addressing the importance of using technologies of using assistive technologies in existing facilities or services so as to encourage the use of ICT by the people with disabilities.

Improve Web accessibility by formulating a long-term web accessibility policy.

Develop suitable content by motivating content service providers to consider the disadvantaged community as a potential user group and develop relevant content for them.

Promote easy-to-use devices by encouraging services providers to create ICT devices that are helpful and simple for the senior community to use.

Improve affordability and access of ICT by increasing numbers of Community Cyberpoints which are equipped with sufficient assistive facilities in most public places easily accessible to the elderly and people with disabilities.

Develop potential of disadvantaged group in using ICT by providing a greater number of general introductory courses on ICT targeting at women with lower education, the elderly people and people with disabilities.

Incorporate ICT into existing social services More innovative programmes need to be developed and integrated into existing social services.

Increase accessibility of e-commerce and financial services by working with business sector, IT professional bodies and non-profit organizations to design a code of practice on e-commerce accessibility and reviewing the impacts of e-commerce on the disadvantaged groups.

There are many ways to close digital divide. The recommendations we propose are only some of the possible ways to tackle this problem. By establishing partnerships among the Government, private and non-profit sector to create more opportunities to the people in need, we look forward to having a digital inclusive society where no one will be left behind.

1.0. What is Digital Divide?

1.1. Introduction

This chapter looks at the definition and key indicators of digital divide. It goes on to examine the importance of bridging digital divide to the development of Hong Kong.

1.2. Definition

The term, digital divide refers to the gap between those who can effectively use new information and communication technology (ICT), and those who cannot due to the lack of the access to digital technologies or the skills to make use of them for a wide variety of activities.

(Digitaldividenetwork, 2000) While those “information-haves” harness the technology to gain better jobs, further educational advancement, and a higher level of community participation, “information have-nots” are at a growing disadvantage in enjoying the gains and the new opportunities rought by an emerging information-based society.

More and more scholars and policy makers acknowledge digital divide as a social problem derived from the intersection between social systems and communication technologies . Such technological disparity lies not only in the access to hardware and software, but also in differences in availability of services, awareness and mastery of new technologies, and the opportunity to learn and use new media.

Past discussions on the subject focused on providing universal access to new technologies in order to close the digital divide. However, more and more companies and government find that mere access is not a sufficient condition for the proper diffusion of technology-utilization. A Gartner research (2000) shows that the American society is now experiencing the second digital divide and the third will be coming in the next few years.

The second digital divide refers to people who, owing to their early on-line history, not only have an access advantage, but also an *experience* advantage. As the Internet is now widely used in daily life, the issue becomes critical because early adopters find it much more easier to access public service which in theory should be available to everyone in an equal manner.

For the third digital divide, the unequal adoption of technology lies in the access speed when more and more of the Internet becomes optimized for high-speed connection.

1.3. Key indicators

Digital divide is generally associated with basic socio-economic or demographic variables, such as income, age, gender, education attainment, etc. matter in the ICT use. According to an earlier survey on digital divide, socioeconomic status (SES) is a good parameter to evaluate one's likelihood to gain access to the Internet and the associated benefits. (Gartner Report, 2000) For example, *Falling through the Net*, an annual official report on Americans' access to ICT tools, gives an objective account of the digital disparities in the United States by adopting a socio-economic analysis.

The following paragraphs will briefly explain key socioeconomic variables related to the emergence of digital divide.

Income

Various research findings show that income correlates positively with ICT adoption. A recent National Public Radio survey in the United States confirms that lower-income Americans are less than half as likely as those with higher income to have an Internet connection at home. (Digitaldividenetwork, 2000)

According to an US national survey on Internet penetration in 2000, 77.7% of households with annual income of US\$75,000 and more have connected to the Internet while the Internet penetration of households with their annual income less than US\$15,000 stands at 12.7% only. (Fall through the Net, 2000) Another survey by Gartner on digital divide in the U.S. indicates that low income, as a key indicator of socioeconomic status, is also a key barrier to Internet access. The report further depicts that people in lower socioeconomic groups are far less likely to go online to shop, perform banking transactions or trading stock. They tend not to access online health or government services as often as their wired upper class counterpart. (Gartner Report, 2000)

In Hong Kong, similar situation have been observed. From the findings of the annual survey on IT usage and penetration in 2000, it is noted that the Internet uptake rate of lower income families is only 7% while that of their higher income counterpart amounts to 70%. (Thematic Household Survey, 2000)

Education

As important as income, education attainment is another significant factor associated with the use of ICT. People with better education are more likely to use computer and Internet. The US

national survey finds that 69.9% of households headed by someone with post-college education have Internet access in 2000. However, the Internet penetration rate of those with their breadwinner educated up to high school is only 11.7%. (Fall through the Net, 2000)

In Hong Kong, only 6.3% of people with their education at primary level or below have used PC and among them, only 3.3% have Internet experience .

Anderson and Melchior (1995) pointed out that lack of proper education is a major obstacle to technology access and adoption. They concluded that access to technology does not make much sense unless people are properly educated in using new technologies. Another recent study by The Stanford University in the United States postulated education as a critical variable to understand the factors affecting the penetration of the Internet. (Digitaldividenetwork, 2000)

Gender

According to some recent researches, there is no significant gender difference on ICT use. In 2000, 44.6% of men and 44.2% of women are Internet users in United States. The ratio between men and women in usage level of the Internet has remained unchanged since 1998. (Fall through the Net, 2000)

Similar situation is found in Hong Kong. In 2000, there are 44.1% of men and 42.0% of women use the Internet .

Age

Age is another variable significantly related to the diffusion of ICT. According to the US national survey in 2000, high Internet usage, not surprisingly, is found in the age groups of 18 to 24 and 25 to 49, reaching 56.8% and 55.4% of the above age groups respectively. Only 29.6% of people aged over 50 use the Internet. However, striking difference is found in this group when labor force participation factor is taken into consideration . The Internet penetration rate for people aged 50 or above who are still in the labor force is 46.6% whereas those who are not in work force was 16.6%, representing only one-third of their working counterparts. It shows that labor force participation is an essential factor in the Internet uptake and even so among people aged 50 and above. (Fall through the Net, 2000)

With regards to Hong Kong, penetration of ICT among the aged population was very limited. Only 3% of people aged 55 or above are the Internet users.

Disability

Internet access for people with disabilities is rarely brought to the attention of researchers. Even in the influential national survey undertaken by the US Department of Commerce, it is not until its fourth report on digital divide issued in 2000 that the Internet penetration rate of people with disabilities was studied.

In Hong Kong, there is not a single research figure on IT usage and penetration of the disabled available in the annual official survey. It may, to some degree, reflect that the interest of people with disabilities is neglected or compromised in the digital economy.

Data abstracted from the US national survey points out that, the rate Internet access and computer usage vary by disability status. People who have one type of disability are only half as likely as those without to have Internet access at home. Nearly 60% of people who have at least one type of disability have never used computer.

Difference in the rate of Internet access over different disability status is also obvious. For example, over 40% of people with learning disabilities gain access to the Internet from home or somewhere else while there are close to 20% of people who are blind or have their vision impaired have Internet access.

In an US report released in July 2000, the Americans with disabilities are less than half as likely as their non-disabled counterparts to own a computer and they are about one-quarter as likely to use the Internet. Their difference in terms of Internet penetration is even more striking. Only 9.9% of people with disabilities are connected to the Internet as compared to almost 38.1% penetration rate of those without disabilities. (Kaye 2000)

1.4. Why is it important to bridge the digital divide?

Narrowing the gap between the rich and poor

The pervasive use of ICT will change all aspects of our society including culture and welfare services. Hong Kong SAR government is putting more and more services online:

- Inland Revenue Department started to accept electronic filing of tax return this year;
- Listed companies will be allowed to posting announcements on the HK Exchange website instead of placing paid advertisements in newspapers in 2002;
- More and more public services have been launched through the Electronic Services Delivery

scheme.

These are just some of the examples. People who do not have access to new technologies, or do not know how to use ICT are bound to be deprived of the essential knowledge for economic advancement and social mobility. While the upper SES groups are tend to access the government service through the Internet, the lower SES groups will continue to lag behind in enjoying benefits of online public services. Unless the lower SES groups are properly served, it will make harder for getting them ahead of socioeconomic advancement .

Maximizing the potential of underprivileged and disabled groups

Findings of a recent research indicates that, low income group, and people with disabilities are highly unlikely to use ICT. To a group of people who are often socially as well as physically isolated, ICT can offer them access to information, social interaction, cultural activities and employment opportunities. As a result, the disadvantaged group will be able to broaden their horizon and become more independent.

Relieving manpower shortage

The shortage of skills and workforce experience deficits together threaten continued economic growth. We are already feeling the pinch of the shortage of experienced workers and young and skilled technology specialists at entry-level.

From the recent manpower projection of Hong Kong, the manpower demand in IT sector is expected to grow at an annual average rate of 11.8% in the next five years.¹ Besides, the demand is projected to grow at a faster pace than the supply. The figures in a Consultancy Study on the Manpower and Training Needs of the IT Sector in Hong Kong show that 85,000 IT professionals will be needed by the year 2005 and the demand will surge to 130 000 by the year 2010².

ICT skills become increasingly important to employees. Many new jobs are created which require IT skills and existing jobs are changing to encompass ICT related activities. Skills and creativity of the whole workforce are indispensable to upkeep Hong Kong's competitiveness in the Information Age. Therefore, increasing the technology experience of the youngster and experienced workers could be a way to mitigate the manpower shortage and benefit our economy as a whole.

¹ HKSAR (November 2000), *Report on Manpower Projection to 2005*.

² Education & Manpower Bureau of HKSAR and PricewaterHouseCoopers (February 2000), *the Consultancy Study on the Manpower and Training Needs of the Information Technology Sector*.

Facilitating development of democracy

The emergence of the Internet transforms society by disseminating information in an efficiently and seamless way. New technologies can be used to facilitate democracy by connecting political groups and organizations across different regions, raising the awareness of our citizen on public issues and eventually making them actively participate in the community. In addition, the electronic delivery of services will help increasing the accessibility and transparency of the government information. This will make our government to work better and more responsively.

1.5. Conclusion

ICT, is clearly the future. Hong Kong SAR government and many organizations are adopting ICT in various aspects of their business processes, such as marketing, financial, operational or corporate communications processes. If all these new processes are made inaccessible to the disadvantaged group, the adoption of ICT will create another barrier to them, hence further marginalizing them in our society.

In next chapter, we will examine the prevalence of digital divide in a global perspective.

2.0 GLOBAL DIGITAL DIVIDE

2.1 Introduction

Following a brief account on the nature of digital divide and importance of solving this problem. We will further on to explore in this chapter, the prevalence of digital divide in the global perspective.

2.2 The United States

In the United States, digital divide was widely recognized and has touched off public debate since 1994. With an aim to connect all Americans to the information infrastructure, the importance of universal access to telephone and computer across the United States was for the first time extensively examined in an official report on digital divide - *Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America*. With its insights on the "information disadvantaged" in America, the report establishes an objective baseline, which enables policymakers to formulate policies to connect all Americans in the nascent Information Age, and to educate them about how the access of technology will transform the economy and their lives.

Published in October 2000, *Falling Through the Net: Toward Digital Inclusion*, the fourth report of its series said that the overall uptake of ICT is increasing in a striking way. The rate of households with Internet access soared from 26.2% in December 1998 to 41.5% in August 2000. Now, more than half of the households (51%) in the U.S. have computers. The rate of individuals using the Internet rose by one-third, from 32.7% in Dec 1998 to 44.4% in Aug 2000. If the growth continues at such rate, it is projected that more than half of the Americans will use the Internet by mid 2001.

However, there are still some sectors of Americans who have not been connected. Digital divide remains due to difference in socio-economic status, for example, in terms of income, education attainment, racial and ethnic group, age, marital status, and level of disabilities.

The Internet penetration rate for households with less than US\$15 000 income is only 12.7%, while more than two-thirds of households earning more than US\$50,000 have Internet connections in 2000.

Better-educated people are more likely to use computer and the Internet. Only 11.7% of people who are below high school level have Internet access. For those who are educated up to high school, the penetration rate is 29.9%.

People aged 50 years or above are among the least likely to be Internet users. The Internet penetration rate for this group is only 29.6%.

For people with disabilities, only half of them have access to the Internet as compared to those without. And while only less than 25% of people without disabilities have never used a personal computer, close to 60% of people with a disability fall into that category. Taking the disability status into account, it is found that the Internet penetration rate of people with different types of disabilities varies. For instance, 15% of people with walking problems have Internet access and, nearly 80% of people with visually impaired have never had the Internet access. However, the rate of Internet access is much higher among people with learning disabilities. It is noticed that over one-third of them have Internet access.

2.3 The United Kingdom

As access to technological resources is increasingly regarded as a critical factor to social and economic development, the UK has begun to examine the nature and extent of digital divide since 1998. The prevalence of digital divide in the UK has been extensively analyzed and findings are published in the PAT 15 Report – “Closing the Digital Divide” in March 2000³.

From the latest OfTel residential survey on the use of Internet, it is indicated that 30% of UK homes connected to the Internet in November 2000⁴. Although the rate of Internet access remained the highest amongst youngsters and middle-aged groups, higher income people and large households, there was a slight shift towards the lower socio-economic status families.

With regards to the gender differences, men appeared to be outpacing women in accessing the Internet. There were 34% of men and 26% of women using the Internet.

The use of computers and the Internet was the highest in 35-45 age group,

³ www.pat15.org.uk

⁴ www.oftel.gov.uk/publications/research/2001/q3intr.htm

representing 40% of the overall Internet penetration rate. Penetration rate is lower among the elderly than the young. Only 13% of people aged 55 or above were the Internet users.

The disparities of Internet penetration in terms of household income are very large. While the higher income households accounted for nearly 60% Internet penetration, their lower income counterpart only stood at 12%.

2.4. Japan

Digital divide is obvious in Japan and Internet penetration seems to be largely determined by income, age and geographic location.

NUA Ltd estimated that there were 27.06 million Internet users in Japan in 2000, representing 21.4% of the total population and ranking Japan the 13th in the world in terms of Internet penetration.⁵ According to Nomura Research Institute, the overall computer ownership was 42% in 1999.⁶

According to a survey on Internet penetration by Nikkei Business Publications, 49.9% of Japanese people with annual income over 10 million yen (USD 93,000) were Internet users in Nov 2000. In contrast, only 11% of those in the 3.5 million yen (USD 32,500) or less income group had web access.⁷

A significant disparity also exists between the rate of Internet access in urban and rural areas. Over 30% of Japan's urban population are online while only, 18% of people living in small towns and villages do.

Gender difference is observed in the use of Internet. Nearly 60% of Internet users are male whereas women only account for 40% of total Internet population.

Over 70% of Internet users are in the age of 20s or 30s and, with the proportions of these two groups to the total are the same. Internet users aged 50-59 and 60 or above account for 22.6% and 10.6% respectively of the total.

To understand the motivation of the senior citizens for using the Internet, the Japanese

⁵ Ministry of Post and Telecommunications of Japan (2000) *IT in the 21st Century: The Expanding Internet and Mobile Telecommunications Frontiers*.

⁶ Nomura Research Institute, May 1999.

⁷ http://www.nua.ie/surveys/?f=VS&art_id=905356162&rel=true

Government has conducted a Senior Internet User Survey. It was reported that the initial impetus of the seniors for using the Internet was “to read about it in a newspaper or magazine” (57.2%). The percentage, is significantly higher than other factors such as “recommended by family member, acquaintance, or colleague” (32.9%) and “needed to use it at work (25.9%).³

Similar surveys were undertaken among the disabled. Survey of the Disabled reported the Internet has improved the lives of disabled people are that it is now easier to gather and send out information” (64.4% of respondents) and that they “have more hobbies and pastimes” (61.1%).³

2.5. Singapore

There has been a rapid IT deployment in Singapore over the last few years. It reflects an encouraging leap towards the attainment of an information society.

Compared with other countries, Singapore has a relatively high ownership of home computers. Computer and Internet penetration has been increasing drastically in the past ten years. Computer ownership rose from 19% in 1990 to 59% in 1999.⁸ The rapid increase in ownership can be attributed to the government efforts in promoting computer and Internet usage among the general public.

Home Internet access has grown rapidly in the past few years, with the availability of public access since 1994. It is revealed that 42% of households in Singapore had Internet access in 1999, making the total number of home Internet users amounted to 764 680. The significant increase in home Internet access over the past years can be attributed to the following factors: low Internet subscription fee offered by the three Internet Service Providers, free Internet account given by schools and high home computer ownership.⁹

In terms of the profile of Internet users, the majority of Internet user are below 40 years old (> 60%) and have tertiary education (> 50%). Those aged over 50 or above only account for 5.3% of the Internet population.

In general, women use the Internet less heavily than men. While there are 56.7% of men are Internet users, women only account for 43.3%. With regards to the

⁸ Information Technology (IT) Household Survey 1999, IDA of Singapore

⁹ Ibid.

employment status, however, only 7% of housewives/retirees and unemployed go online.

2.6. Korea

Taking into account the growing importance of an information-based economy, the government of Korea paid much effort to promote the adoption of telecommunication and information technology in 1999.

As of June 2000, the number of Internet users in Korea was about 16 million. In other words, 34% of the population now regularly surfs the Net, representing a 100% increase as compared with the figure of 1999.¹⁰ At the end of 2000, the eTForecasts rated Korea as the 7th highest country in the world in terms of the number of Internet users as Korea has, nearly 4% of the total Internet population in the world.¹¹

Computer usage and Internet access are highly stratified in terms of education, occupation, age and income.

In Korea, computer usage and Internet access are far lower among people of high school level or below, the elderly over and fishermen. Individuals aged over 50 only account for 4.3% of the total number of Internet users. The computer usage rate of the disabled is 20%.¹²

2.7. Taiwan

To promote universal access of Internet is one of the key objectives of the National Information Infrastructure Development in Taiwan. Hence, the Taiwanese government has set a target of "achieving 3 million Internet users by 1999". The target was achieved in Dec 1998, nine months ahead of schedule.¹³

According to the latest statistics on the Internet usage in Taiwan provided by FIND Center of Institute for Information Industry, the total number of Internet users in Taiwan reached, 5.57 million and the online penetration rate was 25% as of June 2000, representing an increase of 770,000 Internet users or 16% growth as compared with the 4.8 million online population in December 1999.¹⁴ The growth of online population as

¹⁰ Korea Network Information Center (June, 2000)

¹¹ www.efforecasts.com

¹² Ministry of Information & Communication, Korea (2001)

¹³ www.nii.gov.tw

¹⁴ Figures from FIND Center of Institute for Information Industry, Taiwan (June, 2000) www.isoc.org.tw

well as Internet usage in Taiwan has remained stable growth over the past few years. It is mainly attributed to the implementation of National Information Infrastructure (NII) project. Besides, many government and private organizations have paid much effort in promoting the development and usage of Internet in Taiwan.

Both female and male in Taiwan are regular net users. Majority of regular net users are those who are young or well educated. It is found that most of the people who have not used the Internet mostly are those with lower education attainment, i.e., below high school education (22%), lower income as well as the senior citizens (10%).

With regards to the barriers for the non-Internet users in the adoption of ICT, interestingly, cost is of least concern (8.1%). More than one-third of them expressed that lack of interest or need to the Internet is the main cause.

2.8. Conclusion

From the overseas experience above, it proves that digital divide is a problem impacting every country with the advent of information revolution. The next chapter will look into how these countries worked together to tackle this problem.

3.0. GLOBAL INITIATIVES

3.1. Introduction

As discussed in the last chapter, digital divide is a global phenomenon. This chapter examines how this problem is being solved by these countries. Some of the key initiatives undertaken by the governments, non-profit organizations and private sector will also be outlined. (More details are found in the Appendix)

3.2. The United States

Since 1994, the United States has been taking a pro-active approach to combat the digital divide. Closing the digital divide was particularly given a top priority under the Clinton's administration. The objectives are to ensure that ICT access is available to all school children and, digital opportunities can be extended to all American families and everyone in the community. Considerable cross-department initiatives are now up and running to address the issue. To echo with the Government's initiatives, private and non-profit organizations have taken numerous measures to make information age available to all American citizens. Key programmes are as follows.

- **The Universal Service Fund (E-rate)** - a FCC program to provide all K-12 schools and public libraries up to US\$2.25 billion a year in discounts for telecommunications services.
- **Neighborhood Networks** - a community-based initiative of the US Department of Housing and Urban Development (HUD) which encourages the development of resource and computer learning center in privately owned or HUD-assisted and/or insured housing.
- **ClickStart** – a program launched in partnership with private sector to place Internet-ready PC in households and provide them with, computer training.
- **“Net Days”** – local firms install Internet equipment in schools in return for recognition.
- **Lifeline¹⁵ / Link Up Program¹⁶**– monthly reductions on telecommunications service charges and initial connection charges for low-income consumers.

In addition, the US government also intends to extend the access of ICT to people with disabilities. For example, FCC helps ensure that telecommunication equipment such as cellular phones is designed to be accessible by people with disabilities.

¹⁵ The Federal Lifeline program provides between US\$3.5 and US\$7 per month to providers to enable them to reduce eligible consumers' monthly telecommunications services charges.

¹⁶ The Federal Link Up offers eligible low-income consumers: 1) a reduction in the local telephone company's charges for starting telephone service (the reduction is one-half of the telephone company's charge or \$30

Besides, there are a number of non-profit and private organizations providing ICT access and services to the disadvantaged population. Some of the initiatives are as follows:

- **Computers in Our Future (CIOF)** – a five year model program that seeks to strengthen the health of Californians by increasing access to computer technology, training and jobs for young people in low-income communities.
- **Computers for Youth** – a campaign for high-level recycled computer and donate them to inner-city households along with low-cost access and extensive training.
- **Computers for Homebound and Isolated Persons(CHIPs)** - a non-profit project aimed at reducing the social isolation of people who are homebound by providing a computer and free Internet access.
- **Ford Motor Co. and Delta Airlines** - offered home PCs and Internet access to 72000 workers at US\$12 a month.
- **Cisco** partners with US Department of Housing and Urban Development's (HUD's) and Communities in Schools (CIS) via Networking Academy Program to provide jobs and economic opportunities in underprivileged communities.
- **Microsoft, Compaq, Dell, Gateway and others** – initiated laptop programs that enable students to take computers home.

3.3. The United Kingdom

Under the UKonline campaign, the UK government aims to 1) guarantee Internet access to those who desire such services by 2005, 2) ensure that all Government services are online by the same year and 3) transform Britain to be one of the world's leading knowledge economies. The UK has been launching a number of key programmes, in which the government, business and non-profits sectors harness ICT to help create a better and more digital inclusive society. Key programmes are described as below.¹⁷

- **BBCWebwise and Computer Don't Bite** – a basic introduction to computers and Webwise is the follow-up campaign focused on improving awareness on the Internet.
- **IT for All** – focuses on providing beginners with an opportunity to try out computers, the Internet, e-mail and so on in 3000 centres across the UK.
- **Information Society Initiative (ISI)** – promotes the take-up of ICT among UK firms, particularly SMEs by providing practical advice, ready access to and awareness of technology.
- **City Learning Centres** – 85 City Learning Centres provide local ICT facilities with an aim to enhance education standards and skills levels, thereby promoting employment opportunities.
- **Get On-line: "Get into the Internet"** – a plan to offer low cost computers to 100,000 low-income

¹⁷ www.pat15.org.uk

families.

- **Loans for Teachers' ICT** - pilot schemes to equip teachers with high-power multimedia portable computers and Internet access to demonstrate the positive benefits to teaching and learning. The scheme will help teachers adopt ICT at lower cost.
- **Computer Gym** – a mobile computer classroom, workshop and library using up-to-date Internet enabled and multimedia computers, the latest software courseware and curriculum obtained from all over the world.
- **Newham Training and Education Centre (NEWTEC)** – provides computer courses from introductory to degree level to unemployed women.

In the UK, a wide range of local non-profit organizations is striving to bring the benefits of ICT to the underprivileged community. In view of the importance of partnerships with the private sector, some of these organizations have worked successfully together with the private sector to bring ICT access and training to the disadvantaged groups. Some examples of these programmes are as below.

- **Landport Web** – a ten-week pilot project aimed at increasing interest in formal IT training. It offered free use of computers on two evenings per week to help overcome fear of ICT.
- **Barton IT Hub** – a six-year scheme jointly organized by public, private and community companies which aims at enhancing the employment prospects, education and technology skills of the young and the disadvantaged.
- **TS2K** – an organization which helps young people develop their creative ICT skills and experience. Young people are offered opportunities to work with professionals in the areas of new media and technologies.
- **Synergy Project** – an accredited learning project for disadvantaged young people through the CyberSkills programme.
- **FI Group** – provide specialist IT, business and financial support to regional community organizations.

3.4. Japan

Japan has embarked on comprehensive measures to eradicate the digital divide. It strives to enhance information literacy and establishing an information barrier-free environment to ensure all people can fully enjoy the benefits and opportunities of information technology. The Ministry of Post and Telecommunications (MPT) is the key department to tackle the digital divide issue. The following examples are some of the key initiatives in Japan that help to create a “digital opportunity society”.

- All teachers in schools and students in every grade can use computers during classes by 2005.

- Provide preferential tax treatment for companies' internal training on information literacy, as well as for developing user-friendly technology and devices to the aging and disabled population.
- IT Basic Bill is passed in Japan' s Lower House to call for revision of regulations hindering the growth of e-commerce and Web access. It also encourages the promotion of an online government to streamline the government processes.
- Support private R&D for the Telecommunications Access Council to examine concrete plans for creating telecommunications equipment that meets everyone' s needs.
- Enforce and adopt the Telecommunications Accessibility Guidelines in all related industries.
- Establish telework centers and provide tax reductions for telework and SOHOs in order to increase the community participation of the aged, the disabled and homemakers.
- Develop voice recognition, automated translation and other similar technologies to allow non-English speaking peoples to use the Internet easily.
- Broadcast Programming for the Visually and Hearing Impaired – the MPT is devising measure to encourage TV programme producers and broadcasters to include closed-captioning, spoken explanations, and sign language interpretation in their programme to ensure that the visually and hearing impaired can fully enjoy TV programme.

3.5. Singapore

To turn Singapore into a global infocomm center and world-wide digital hub, the Singapore government has been playing a catalytic role to bridge the digital divide through the implementation of Inforcomm21 Masterplan. The ultimate goal is to develop Singapore as one of the top five information societies in the world. Infocomm Development Authority of Singapore (IDA), as the main responsible department to address the digital divide issue, has “dot-com” the People sector in order to encourage Singaporean to go online. Most of the measures are either cross-departmental or carried out in collaboration with community organizations. Some key areas of work are summarized as follows.

- **"Dot.com" the People Sector** " - a movement costs S\$25 million which involves community groups and local government, industry and unions, institutions and civic organizations, volunteer welfare groups and the media to enable every citizen to reap the benefits of an enhanced e-lifestyle. This nation-wide effort centres on 5 thrusts: 1) improve access for all, 2) change mindsets, 3) promote online culture, 4) nurture e-Ambassadors and spawn e-Communities, and 6) develop multilingual Internet content.
- **"Dotcom the Public Sector"** - a S\$1.5 billion project to transform the government into a leading E-Government to better serve Singaporeans in the new online knowledge-based economy.

- **e-Celebrations Singapore** - a month long public outreach programme, aims to get everyone to go online.
- **Singapore@Work 2000** - an integrated awareness and educational TV programme that involves IDA, PSB, nine companies, eight chambers of commerce and infocomm associations to showcase the benefits of e-businesses, targeting at local enterprises to encourage EC adoption.
- **PC Reuse Scheme and the Easy PC Plan** – a public-private partnership campaign ranging from the donation of hardware (such as used or new PCs, printers, etc.) and software, to the provision of Internet access and support services. Tax incentives will be provided to vendors and e-service providers
- Offer special training through partner organizations, with an aim to encourage people to try out online services and applications such as e-shopping, e-auctioning, emails, e-filing of income tax, e-banking and e-learning.
- Work with other government agencies such as the Housing Development Board (HDB) and private property developers to facilitate the deployment of public infrastructure for Internet access.
- **TRUSTe** - an online privacy seal programme which gives out industry 'trustmark' seal to build up consumer's confidence on online shopping.
- **"e-ambassadors"** - a special group of 2,500 people will act as advisors of their peers to motivate the non-ICT users to embrace an e-lifestyle.
- Community Development Councils (CDCs) organizes Internet training programs for senior citizens as well as homemakers.
- Working with industry and community groups to develop content in different languages to cater to different population segments.

Apart from the above programmes, the Singapore government has initiated a series of projects and invited the participation of private sector. Here are some examples.

Intel donates used PCs and new processors (S\$500,000).

SingTel provides internet access with sponsored toll-charges to 2,500 needy families - 6 months access [max. 15 hours / month / line]; Additional lines for future projects - 6 months access [max. 100 hrs / month / line] (S\$500,000).

Speednames provides 2,500 e-Ambassadors with personal domain names at a sponsored cost (over three years) (S\$75,000).

Lexmark collects and refurbishes old printers, and donates new printers to voluntary welfare organizations / charities; Sponsorship of additional color printers for future projects (S\$30,000).

SGNIC Partial sponsorship for 2,500 e-Ambassadors to apply for personal domain names (S\$12,500).

3.6. Korea

Cyber Korea 21 is the master plan that the Korea government implemented to make Korea a top 5 knowledge-based country in Asia. Like other countries, the Korea government believes that the widening gap between the Internet users and the non-Internet users will be one of obstacles to the digitization of Korea. In order to close the digital disparity, various measures initiated by the Ministry of Information and Communication (MIC) are now running at full steam. Some of the key programmes are shown as below.

- Computer classes are mandatory for primary school students.
- Provide about 50,000 students in the low-income households with PCs and Internet subscription coupons for five years of free access. Second-hand PCs are collected and sent to social welfare institutions.
- Increase the supply of PCs across the nation by giving tax incentives to companies who donate PCs.
- Set up a translation company to turn high-quality contents into English so that those content can penetrate into the larger market of English users.
- Build websites to help farmers and the handicapped access a wide array of information
- Organize subsidized Internet training programs to the housewives together with designated private computer training institutes under the theme of "**Computer Training to One Million Housewives**"
- Establish computer laboratories to conduct computer training to over 100,000 senior citizens in collaboration with locally-based universities.
- Support the R&D for voice-control web browsers, touch screen computers and so on, so that disabled people can readily access information at their disposal.

3.7. Taiwan

National Information Infrastructure (NII) is the major plan to enable Taiwan to reap the opportunities and benefits of the digital era. To achieve this goal, extensive measures are implemented to ensure that no one is excluded in the transformation to digital society. Some of the measures are shown below.

- All middle and primary schools in Taiwan have computer classrooms connected to the Internet through ADSL facilities in July 1999.
- 46 teaching centers for education via the Internet have been established.
- Subsidize all facilities in need and promote the universal standardization of content design, and build information websites that is accessible to the handicapped.
- For the handicapped, the underprivileged, and people of remote residence, the concept of equal access to web content is emphasized. Major plans of promotion includes: developing electronic and network government, promoting Internet commerce, developing electronic /network libraries, and utilizing Internet for better

medical care and social welfare.

3.8. Conclusion

This chapter looks at how the other developed countries combat the digital divide problem. As the issue is gaining importance, governments worldwide regard it as a top priority issue. With the support of the private and non-profit sectors, different initiatives for closing such technological disparity have already been put into action. In the next few chapters, we will go on examining how prevalent digital divide is in Hong Kong and what measures have been taken to solve the problem.

4.0 Digital Divide in Hong Kong

4.1 Introduction

Since 1999, the Census and Statistics Department (C&SD) has started to conduct an annual Thematic Household Survey (THS) on IT usage and penetration in Hong Kong. Information on the penetration of personal computer (PC), Internet and Chinese software in households as well as the utilization of PC, Internet service, Chinese input methods and electronic business services amongst household members are collected to formulate a baseline for the IT policy. This section provides a brief summary on the overall uptake of computer, Internet and electronic business services in Hong Kong in 2000.

4.2 Current uptake of ICT in Hong Kong

The 2000 THS on IT Usage and Penetration¹⁸ found that 49.7% of households in Hong Kong have PCs at home and 73.3% of them indicated that their PCs are connected to Internet, representing 36.4% of total wired households in Hong Kong. Breakdown on the usage of computer and the Internet as well as the adoption of e-commerce is provided below.

Usage of personal computer

- 43.1% of people aged 10 or above use PC.
- 75.7% of them use PC at home. Some 54.8% use PC at their workplace and 22.1% at place of study.

Usage of Internet

- The rate of using Internet service was 30.3% among all persons aged 10 or above.
- 76.2% of them use Internet services at home. Some 36.9% use Internet service at their workplace, 19.3% at place of study and 18.3% at other places.
- The most popular use of Internet is “for communication with others” (73.2%) which is followed by “browsing the web pages” (72.1%).
- 10.3% people who have PCs at home have connected to the Internet but have never use it. 38.4% of them expressed that there is “no specific application”, and 28.6% and 25.0% of

¹⁸ Census and Statistics Department - HKSAR (Nov 2000), *Thematic Household Survey Report No. 2 – Information Technology Usage and*

people indicated that they do not have the skills and the time to use the Internet respectively.

Usage of electronic business services¹⁹

- Eighty-four per cent (84%) of people aged 15 or above have used one kind of electronic business services or more for personal matters.
- Octopus card is the most popular type of electronic business service, 78.9% of people have used it. The other commonly used services followed are “withdrawing/depositing/transferring money or checking account balance via ATM” (64.3%); “using e-cash/EPS” (34.6%) and “using telephone to settle payment by PPS” (19.5%).

The above data shows that Hong Kong people are more and more used to ICT, particularly in the application on e-business services. As envisaged, the electronic way of doing business will soon replace or transform most of the traditional business activity in Hong Kong.

4.3 Who are at disadvantage?

To have a better understanding on the diffusion of ICT to the disadvantaged group, more detailed analysis covering the demographic profile, needs, attitudes and difficulties towards ICT will be needed. However, data available on disadvantaged group is very limited in Hong Kong. We, therefore, can only rely on the data of THS to postulate a general picture on their current situation on the use of ICT.

Age – Elderly are less likely to use ICT.

- Lower rate in using PC is recorded among the elderly. Only 6.6% and 0.6% of people aged 55-64 and aged 65 or above have used PC respectively.
- The rate of using Internet services is even lower in the two groups above. The rate for people aged 55-64 and 65 or above have used Internet is 3.2% and 0.2% respectively.
- A relatively higher usage of electronic business services is found among people aged 55-64 (69.9%) and aged 65 or above (43.9%), even though these two groups still have the lowest usage when compared with the younger groups.

Gender – Slight gender differences are identified in the use of ICT.

- Men are at a higher rate of having used computer, Internet and electronic business services

Penetration.

¹⁹ The electronic business services included using/settling payment/shopping of Automatic Teller Machine (ATM), Payment by Phone Service (PPS), Easy Pay System (EPS), phone banking services, Octopus card, Interactive Voice Response System (IVRS), online financial information,

than women, but the difference is very small. For instance, 44.1% of men and 42.0% of women have used PC; 32% of men and 28.5% of women have used Internet services; 87.1% of men and 82.8% of women have used electronic business services.

Educational attainment – The use of ICT is less common among people with lower education or illiterate.

- People with primary or lower education attainment have the lowest rate of using all forms of ICT.
- While 6.3% of people with primary or lower education attainment have used PC, only 3.3% of them have used Internet.
- ∞ The rate of using electronic business services is relatively higher in this group. 63.3% people with primary education or below have electronic business service, which is much lower than those with higher education. The rate is 93.9% for those with secondary/matriculation education and 98.5% for those with tertiary educational attainment.

Household income – Lower income group are much less likely to access ICT than their higher income counterpart.

- The median household income with PC and to Internet access at home are \$27,500.
- While 82.8% of people with monthly household income at \$50,000 or above have a PC at home, only 15.3% of those with monthly household income less than \$10,000 do .
- ∞ Only 7.7% of people with monthly household income less than \$10,000 have a PC connected to the Internet, making a huge difference when compared with the highest income group (71.5%).
- ∞ Similar results are obtained from another survey targeted at the youth.²⁰ More than 60% of respondents whose fathers are professional or semi-professional are more likely to have a PC connected with Internet while it is, only 40% for those whose fathers are manufacturing workers.

Occupation – Home-makers and retired people tended to be the late ICT adopters.

- The rate of using PC is lower among home-makers and the retired persons, standing at

job vacancies online, trading stock online, booking tickets online, auction service online, cyber-banking, etc.

²⁰ 香港青年協會 (1999), <青少年問題研究系列(十九) – 資訊科技教育與中學生學習的研究>。(A Survey conducted by The Hong Kong Federation of Youth Groups)

12.4% and 1.6 % respectively.

- The same situation is found in terms of using Internet services. Only 6.8% of home-makers and 0.7% of retired persons are the Internet users.
- Majorities of people who have used electronic business services are economically active. Among the lowest usage group, 14.5% are home makers, followed by students (8.7%) and retired persons (8.2%).

People with disability

No data is available on the prevalence of ICT in the disabled community. Even in the THS, there is no specific information on this aspect. Lack of research in this area leads to an urgent need for comprehensive data to be collected from this population segment so that a clearer picture on the overall penetration of ICT in Hong Kong can be obtained.

Who are at risk?

Based on the above data, the ICT laggards in Hong Kong has the following characteristics

- Lower economic advantage; and/or
- Lower education attainment; and/or
- Less active in economic activity, e.g. the retired people and the home-makers; and/or
- The elderly.

4.4 Where do we stand at?

According to the latest ITU PC and Internet indicators²¹, Hong Kong is among top 20 in terms of the penetration of PC and Internet. (Fig. 4.1) Hong Kong, with 34.72% PC penetration, is ranked the 16th, following the U.S. (58.52%) and Singapore (48.31%) and it is slightly higher than the UK (33.78%) and Japan (31.52%), and far better than Taiwan (22.46%) Korea (19.03%).

Rank for the Internet diffusion of Hong Kong is even higher at the 14th, representing 29.42% of penetration rate. (Fig 4.1)

Fig.4.1 A Cross-country Comparison on PC and Internet Penetration

Nation	Penetration of PC	Penetration of Internet
Hong Kong	34.72%	29.42%
Japan	31.52%	30.44%
Korea	19.03%	40.25%
Singapore	48.31%	29.86%
Taiwan	22.46%	22.46%

²¹ ITU, April 2001

United Kingdom	33.78%	25.76%
United States	58.52%	34.65%

Source: ITU (April 2001) PC and Internet indicators

From a global perspective, the take-up of PC and Internet in Hong Kong at a moderate pace as compared with other major developed countries in Asia. In this case, it seems that digital divide between Hong Kong and other countries does not warrant imperative concerns. However, such inference might be unsound when we take a look at the disparity in the use of PC and Internet in Hong Kong.

In section 4.3, the profile of the disadvantaged group in terms of the use of ICT is depicted. Ostensibly, Hong Kong's "information have-nots" possess similar characteristics as the other countries. However, one major difference is that the rate of ICT diffusion is far slower among the disadvantaged group in Hong Kong as compared with those in the other countries. (Fig. 4.2)

With regards to people with lower education attainment, only 3.3% of them are the Internet users while there is 22% in Taiwan, 11% in the U.S. and 4.5% in Singapore.

As for the Internet penetration of the people with inactive economic activity, again, Hong Kong has the lowest at 7.5%, following Singapore (7.8%), the UK (17%) and the U.S. (45.3% for the unemployed 29.0% for those who are not in the labor force).

The low usage of ICT among the aged population is most striking. Only 3.4% of Hong Kong's elderly have used the Internet, representing a huge difference when compared with Japan (33.2%), the U.S. (29.6%), the UK (13.0%), Taiwan (10.0%) and Singapore (5.3%).

Nevertheless, Hong Kong has the highest penetration rate among the lower income group (15.3%), although. The difference is very modest when compared with the U.S. (12.7%), the UK (12%) and Japan (11%).

**Fig. 4.2 A Cross-country Comparison on the Internet Penetration Rate –
Profile of the Disadvantaged Group**

Nation	Overall	People with lower income	People with lower education attainment	People with disability	People with inactive economic activity (such as home makers and the retired people)	The elderly ²²
Hong Kong	36.4%	15.3%	3.3%	-	7.5%	3.4% ²³
Japan	21.4% ²⁴	11% ²⁵	-	-	-	33.2%
Korea ²⁶	34.0%	-	-	20.0%	-	4.3%
Singapore ²⁷	42.0%	-	4.5%	-	7.8%	5.3%
Taiwan	25.0%	-	22.0%	-	-	10.0%
UK	30.0% ²⁸	12.0%	-	-	17.0%	13.0% ²⁹
US ³⁰	44.4%	12.7%	11.7%	21.6%	45.3% ³¹ / 29.0% ³²	29.6%

4.5 Conclusion

From the limited information we have, it clearly proves that **the gap between the “information-haves” and “information have-nots” is huge and it is widening.** Some of us might have already been aware that the gap between the poor and rich becomes more and more critical in Hong Kong. Digital divide is actually an “economic divide” and, we believe that **the digital divide problem truly exists in Hong Kong.** The problem has never been what our Administration said to be, i.e., “less than an issue to Hong Kong as compared with other places”³³. Rather, we believe the problem is more complicated and serious than we can imagine and it is simply overlooked by our Administration.

²² Refers to those people aged 50 or above

²³ Refers those people aged over 55 or above

²⁴ NUA Ltd.

²⁵ Nikkei Business Publications

²⁶ Korea Network Information Center (June 2000)

²⁷ IDA of Singapore, Information Technology (IT) Household Survey 1999

²⁸ OFTEL of UK, Q3 Nov 2000.

²⁹ Refers to those aged over 55 or above

³⁰ Figures from the US Department of Commerce (October 2000), *Falling Through the Net: Toward Digital Inclusion*.

³¹ Refers to those not employed persons.

³² Refers to those not in the labor force.

³³ ITBB of HKSAR (2001), *Digital 21 (Revised edition)*

5.0 Current Measure to Bridge the Digital Divide

5.1 Introduction

In the previous chapter, we have already examined the current uptake of ICT and the magnitude of digital divide in Hong Kong. In this chapter, we will move on to explore what measures have been taken by the Government, the non-profit and the private sector to help people grasp the opportunities in the Information Era.

5.2 Government Initiative

Under the “Digital 21” IT strategy, a number of programmes have been suggested and some of them are already being implemented. Key programmes are as follows.

Survey on IT Usage and Penetration

Since 2000, the Government has started to conduct regular survey on IT usage, collecting data related to Internet use and IT penetration in business sectors and local households. The data becomes a baseline to assess the overall progress in Hong Kong’s IT development and help to formulate appropriate IT policies.

Community Cyberpoint Project

To increase public access to online services, Home Affairs Department (HAD) has launched the “Community Cyberpoint” project since June 1999. Over 2200 computers are installed in convenient locations including community centres, post offices, public libraries and other public facilities around the territory for public use free-of-charge.

28 computers with additional special software and hardware including screen enlarging software, voice synthesizer software, power Braille hardware and large-size flat LCD monitor have been installed in dedicated Community Cyberpoints and public libraries to cater for the needs of the blind and the visually impaired and encourage usage.

ICT Training in Schools

Under the 5-year plan on “Information Technology for Learning in a New Era” launched in

November 1998³⁴, the Government has initiated numerous programmes to provide training to our next generation.

One of the initiatives is to ensure that all school teachers possess basic ICT competency. Up to March 2001, more than 38,000 teachers have completed the “basic” level training. It is expected that all teachers in Hong Kong will acquire at least the “basic” level of ICT competency, and all pre-service teachers will reach the “upper-intermediate” level. By the 2002-03 school year, about 75%, 25% and 6% of teachers will have gained at least “intermediate”, “upper-intermediate” and “advanced” level of ICT competency respectively.

To enhance the capability of our next generation to process information effectively and efficiently, the Government also aims to deliver 25% of the school curriculum with the assistance of ICT by the 2002-03 school year.

Computer Access for Needy Students

A total of HK\$200 million from the Quality Education Fund has been allocated to provide funding to secondary schools for purchase of portable computers equipped with free Internet access for loan to needy students. Moreover, incentive grant has been provided to schools to encourage them to open their computer rooms and ICT facilities to students after the school.

Life-long ICT Training Programme

The Vocational Training Council (VTC) has offered about 10,000 places in its IT skills enhancement courses for in-service personnels and IT conversion courses for non-IT university graduates. Moreover, it has also provided 1,000 training places for the IT modules in 2000-01 through the Youth Pre-employment Training Programme.

Apart from the IT courses provided by the VTC, the Employees Retraining Board (ERB) is providing over 40,000 short-term basic IT skills training places each year to help trainees continue their employment in a knowledge-based society. Another 200 training places under the IT Technical Assistants Programme are also offered to trainees for taking up low-end IT jobs.

Code of Practice on the Provision of Telecommunications Services for the Elderly and People with Disabilities

Code of Practice on the Provision of Telecommunications Services for the Elderly and People

³⁴ Education and Manpower Bureau of Hong Kong (1998), *5-Year Plan on “Information Technology for Learning in a New Era”*.

with Disabilities was introduced in March 2001. It aims to govern the Fixed Telecommunication Network Services (FTNS) operators, Payphone Service Providers (PSPs), mobile telephone operators, paging operators and Internet service providers to provide special services such as billing to the elderly and the people with disabilities. Obligatory and recommended requirements are listed out. All the above-mentioned operators should be complied with the obligatory requirements, while the latter will be for their reference if they intend to provide enhanced facilities to the elderly and people with disabilities. The Code of Practice has entered into force in April 2001. It will be applicable to the mobile telephone operators, paging operators and Internet service operator with effect from April 2, 2002.

Web Accessibility Guideline

The Home Affairs Bureau (HAB), Information Services Department (ISD), Information and Broadcasting Bureau (ITBB) and Information Technology Services Department (ITSD) conducted a review on the Guidelines for Setting Up Home Pages (the Guidelines) early 1999. The Guidelines was further revised in Nov 2000 incorporating suggestions from the Hong Kong Blind Union. Guidelines were then issued to all bureaus and government departments.

As a result, 25 bureaus and departments have already revamped their web sites. 67 bureaus and departments will complete the exercise by 2001 and the remaining four departments in 2002.

A capital commitment of HK\$4.5million has been created to provide funding to those bureaus or departments which need financial assistance for their revamping of web sites.

Similar measures have been also carried out in public bodies and Government subsidized organizations. They have been asked to revamp their web sites to cater the needs of different users by end April 2001.

Web Accessibility Promotion Programme

A seminar was held in May 2000 for webmasters of all Government web sites to enhance the awareness and understanding on the importance of usability and accessibility of web sites to people with disabilities.

Similar awareness programmes were organized for the IT industry. Various seminars were held between December 2000 to January 2001 to enhance their understanding on auxiliary technologies and design considerations to facilitate access to web sites by people with disabilities.

Tips for improving accessibility of web pages with special emphasis on the needs of users who have impaired vision or hearing is also posted in “Digital 21” web site.

Electronic Services Delivery (ESD)

ESD web site is a scheme by the government to promote online public services in the community. The web site is designed in conformity with international standard, providing text-only version for the blind and the visually impaired. The interface and navigation path of the web site have passed the Bobby Test and are conformed with the internal “Web Content Accessibility Guidelines”. Community Cyberpoints have been set up at different locations to provide the public with free access to ESD services and other information on the Internet through public computers. Some of these facilities have been designed to cater to the needs of people who are wheelchair-bound or visually impaired.

IT Hong Kong

ITB, HAD and ITSD have jointly organized a campaign named “IT Hong Kong” to promote IT awareness in the community, particularly among those who do not have much opportunity to use IT in their daily lives, such as the elderly, the disabled and housewives.

In December 2000, a TV show “IT Hong Kong Night” and a series of TV programmes introducing the “IT Hong Kong” campaign, “Digital 21” and “ESD” Life were broadcast.

Social Welfare Department (SWD), HAD, ITBB and ITSD have jointly organized an IT Awareness Course for the elderly, housewives, new-immigrants, people with disabilities and those who are at a disadvantage to use and learn IT skills. The training programmes include basic IT knowledge such as the basic operations of a personal computer, how to browsing the Internet, send and receiving e-mails. The total of HK\$3.4 million has been spent on the IT Awareness Programme.

Working Group on Web-enabling Women.

A working group formed by the HAD in 2000, aims to promote IT usage among the female population in collaboration with non-profit organizations and the private sector. A number of ICT training and activities for women have been initiated by this working group.

Opportunity for the Elderly Project

In 2000, the Social Welfare Department provided a financial subsidy of \$0.3 million to welfare

sector to launch 43 ICT-related projects including basic training on the use of Octopus cards and ATM as well as web surfing. There are 13,600 senior citizens benefited from the projects.

5.3 Public bodies/Non-profits Organization

Apart from the Government, many public bodies and non-profits organizations have already been aware of the impact of technology on the community, particularly to those disadvantaged groups. A number of projects have been taking place. Here are some of the examples.

Cybersenior Network Development Association Limited

Established in January 2001 by a group of people who are committed to serve the elderly in Hong Kong, this non-profit organization aims at promoting the effective use of IT among the aged population. Services available include an information web site, which provides useful resources such as elderly residential information, health tips and an online aged community.

Equal Opportunity Commission (EOC)

EOC, a statutory body aiming at eliminating all kinds of discrimination in Hong Kong, has released a report in December 2000 on web accessibility for people with disabilities³⁵. Among 163 homepages identified from the Government Information Center (GIC) directory for testing using Bobby Test in November 2000, nearly 80% of them fail to pass the test. The results have exerted much pressure on the Government to speed up its measures to provide universal access to all Government web sites.

Other programmes initiated by EOC include liaison with the Hong Kong Association of Banks for universal access of online banking service; providing suggestions on the computerization of library service in order to achieve equal access for the people with visual impairment; an IT Task Force to discuss IT development in Hong Kong.

Hong Kong Blind Union

The Hong Kong Blind Union is an independent organization formed by visually impaired people to voice out their views on policies and practices affecting their daily lives. It is the first organization to promote computer literacy in Hong Kong. As a partner organization of the World Wide Web Consortium on Web Accessibility Initiative, HKBU have co-operated with HAB for a

³⁵ Equal Opportunity Commission of HK (December 2000), *Report on Web Accessibility of Public Service Homepages in Hong Kong*.

comprehensive policy on web accessibility.

HKBU has also set up a group of users who themselves are IT professionals with visually impairment to monitor on web accessibility. In January 2001, the HKBU also launched a Consultative Services on Web Accessibility to the public. Free advice and suggestions on web accessibility will be provided upon request.

Hong Kong Seniors IT Advocates

Another non-profit organization to promote IT use among the aged population. Established in November 2000, the membership of the organization reaches 500. It is now running many basics IT training courses and, awareness programmes for the aged community. A permanent IT center for the elderly will soon be open this year.

Oxfam Hong Kong

Oxfam is a well-known non-profit organization dealing with poverty issues. Oxfam Hong Kong had launched a info@people.fairer.world to raise people's awareness on IT development. An info@people.fairer.world Forum was held in March 2000 to call for a more affirmative IT policy in Hong Kong people.

Pegasus

Pegasus Social Service Christian Organization is a non-profit making organization promoting comprehensive IT education for all the people in Hong Kong. Since 1997, the organization has already been providing IT education and IT training course to the community. The Pegasus Truck is one of its key measures to eliminate IT illiteracy through the provision of IT access and education in a mobile facility. More than 66 000 participants have joined this program. Pegasus also works with other organizations to run IT promotional programmes to enhance the community's IT awareness and help other organizations install computer facilities and provide them with expert advice and consultant services.

Webmasters (Hong Kong) Association

Webmasters (Hong Kong) Association was formed in November 1999 by a group of Hong Kong Internet and web professionals. With regards to the possible threats brought by the rapid IT development to some disadvantaged communities, a Web Care Special Task Force was established in February 2001 to create a barrier-free IT environment. A series of educational and promotional campaigns focusing on public

interests and, web accessibility standard and ICT have been initiated. These include reference booklets & guidebooks on web accessibility issue, Web Care Award Campaign, IT Volunteer Recruitment Campaign and Unify Internet Training Program, Train the Trainer Program.

5.4 Private sector

Realizing the impact of digital divide to the overall IT development of Hong Kong, a number of private companies have successfully worked with the government and non-profit organizations to provide IT related facilities, equipment, training and other services to the disadvantaged community. Some of their initiatives are as below.

MingPao and HKNet

- **PC recycled campaign**—organized by MingPao and HKNet since 1999. It aims to collect the second-hand PCs and donate them to the disadvantaged community.

Microsoft (Hong Kong)

- **Microsoft Hospital Visit Program** – to introduce IT to young patients in local hospitals. The program aims at using edutainment software and digital devices to build up young patients' confidence to fight against and deal with their illnesses.
- **Cyber Action Program** – to recruit volunteers who are willing to share their IT knowledge with thousand of underprivileged Hong Kong youngsters, teaching them the computer skills that are vital to their development.
- **Microsoft Charity Open Licensing Program** – aims at providing charitable organizations with a simple and cost effective way to access Microsoft software, so that their beneficial can access the latest technologies and gain up-to-date IT skills.
- **Project CompuAid** - a local computer donation campaign since 1998. The campaign aims at helping disadvantaged students to acquire a computer and relevant computer skills. Companies and individuals are invited to contribute their unused personal computers. Together with software donated by Microsoft Hong Kong, these unused computers will be donated to students who cannot afford a computer. "Project CompuAid" encourages the use of genuine software and advanced technology in education.

PCCW- HKT (previous Hong Kong Telecom)

- **Hong Kong Sheng Kung Hui PCCW - Cyber World for the Senior Citizen** – a HK\$600 000 sponsorship for Hong Kong Sheng Kung Hui Welfare Council to help Hong Kong' s senior citizens pursue their lifetime education. The centre is equipped with 20 computers, up-to-date course materials for a series of computer courses, and free Internet access.
- **Cable & Wireless HKT Information Age Development Scheme** – the company have spent

HK\$10 million to increase public interest in IT applications. The scheme include “60min IntroNet Course” held in different parts of Hong Kong, IT Teaching & Learning Centre, PCCW Mobile IT Centre and Family Life Education on the Net, etc.

5.5 Conclusion

In this chapter, we have identified a number of programmes to remove the barriers that prevent people in disadvantaged community from accessing and learning ICT skills. However, all these initiatives are by only piece-meal and by no means sufficient to bridge the digital divide. Based on the information in the previous chapter, we must admit that digital divide does exist in Hong Kong and it is becoming more and more serious. A more pro-active approach will be needed to ensure everyone is enjoying the benefits of the information revolution. Recommendations to bridge digital divide will be provided in the next two chapters.

6.0. Promoting Universal Access

6.1 Introduction

Building on the current practice identified in Chapter 5, we will go on to examine in this chapter the key enablers, influential actors as well as a list of recommendations for bridging digital divide.

6.2. A Vision for A Digital Inclusive Society

A Digital Inclusive Society is a place where everyone

- are able to explore the potential and benefits of new technologies.
- can access and share information and services freely.
- can participate in the community more effectively.

In the lead up to this new digital era, we have to ensure no one becomes laggard stagnating on the wrong side of the digital revolution. A clear vision with specific targets is central to the realization of a Digital Inclusive Society. Governments around the world have adopted similar vision which is manifested through their public policies.

In the United States, the Clinton administration committed to wire “every classroom, library, community center, clinic and hospital to a national information highway by 2000”. Recently, the administration has determined to make access to computers and the Internet as common as connection to residential telephone service.³⁶ The United Kingdom is also gearing up to tackle digital divide. Prime Minister Blair stated his goal to have achieved nation-wide penetration of the Internet by 2005.

The Singapore Government has committed to offer “most public services over the Internet by 2001” and will take an aggressive approach to help Singaporeans go online by 2003. South Korea and Japan have also adopted a similar approach to combat the digital divide.

The Hong Kong administration formulated its second “Digital 21 Strategy” in May 2001 with a grandiose objective of creating a leading e-business community and digital city in the globally connected world. However, it is sad to accept that the administration only regards “Digital Divide as less an issue to Hong Kong as compared with other places”.³⁷ With such an insensible attitude and a tunnel vision, it is not surprise to see that the administration has never formulated a

³⁶ The Clinton-Gore Administration: From Digital Divide to Digital Opportunity, Press Release (February 2, 2000)

³⁷ HKSAR, ITBB (May 2001), *Digital 21 Hong Kong*.

comprehensive strategy on the ride of digital divide in Hong Kong.

Can we rely on market force to solve the digital divide problem?

We understand that there are some absurd views, mainly from the market determinists, stating that Government plays no role in narrowing disparity between information-rich and information-poor. The best thing to resolve the problem is to allow the market forces to be the determinants. From the economic point of views, we agree that market forces are required for economic growth. However, such principle should not be applied equally to the formulation of public policies.

Digital divide is basically an “Economic Divide”. Because of poverty, underclass is impeded in gaining access, fluency and motivation of using ICT. In return, their employment prospects, potential income levels as well as opportunity to have a fulfilling life will all be denied because they lack skills and tools to participate in a knowledge-based economy. This is a downward spiral. Poverty causes digital impoverishment, leading to continued poverty.³⁸

The solution to the problem will not be from the market. The problem itself is indeed partly created by market forces. Imagine, there is no market for food in areas where people are starving simply because the food cannot be profitably sold.³ So there will be no market for the disadvantaged people – a group who are always ignored and marginalized in our society.

We are not the utopians calling for everyone to be “equal”. Social differences somehow exist. However, if the digital disparity persists, we are all losers. In the previous chapter, we have already outlined the impacts of this problem on Hong Kong. As the information-poor becomes poorer, they can hardly be the skilled workers or potential customers who are vital to the sustainable development of a knowledge driven economy. Is it a scenario we desire during the digital revolution?

The role of the Government in eliminating social differences during the digital revolution is critical. From the experience of the UK in achieving universal Internet access, market forces and current initiatives will bring the UK to around 60% penetration by 2003. The overall penetration will further increase to 70% when initiatives from the government are taken into account with 55-60% of the unemployed and 40-55% of the retired population using the Internet.³⁹

The above statistics suggested that to achieve success in a knowledge driven economy, direct intervention from the Government is required to create an environment for economic growth and

³⁸ Don Tapscott (1998), *Growing Up Digital – the Rise of the Net Generation*, NY: McGraw-Hill

³⁹ *Achieving Universal Access* (March 2000), Booz.Allen & Hamilton, London

increase in the Internet uptake rate.

We believe that it is the top priority for the Government to solve the problem, just like the other nations envisioning to build a “**Digital Inclusive Society**” where

- all people are able to access ICT first from schools, public facilities, homes, workplaces, and then extend the adoption of ICT to all public and business activities.
- all people have the skills and knowledge to access what they need online and to use ICT.

6.3 Four - As’ Enablers

Past experience shows that it may take several decades for a new technology to be fully incorporated into a culture. But once people are convinced that a new technology is useful and affordable to them, wide adoption can take place rather quickly.⁴⁰ Everett Rogers mentioned that the success of any new form of communication is also dependent upon how comfortably and easily its fits into people’ s lives.⁴¹ Therefore, the diffusion rate does not only depend on the advances and functionality of technology, but also relate to the changes in our mindset and perception as well.

We have identified four enablers that affect diffusion and uptake of ICT, namely affordability, awareness, availability and attractiveness.

6.3.1 Affordability

Affordability is an important contributing factor of digital divide. People with lower income or social status do not have the resources to acquire ICT, making them inevitably shut out in a knowledge-driven economy. The cost of ICT and the subscription fees, for example, can directly affect the rate of adoption.

The keen competition in Hong Kong’ s mobile market has resulted in tremendous price-cut in mobile phones and service charges, encouraging subscription of mobile services. Hence, Hong Kong now has the highest mobile phone penetration of 78% in the world.⁴² Thus, public policies to promote competition, which in turn lowers prices and improves services, is prerequisite to increase the ICT diffusion rate.

⁴⁰ Paul Saffo and the 30-Year Rule, *Design World*, 24 (1992): 18.

⁴¹ Roger Fidler (1997), *MediaMorphosis – Understanding New Media*, California: Pine Forge

⁴² HKSAR, ITBB (May 2001), *Digital 21 Hong Kong*.

As “price” is an important factor to affect the uptake rate, it is therefore necessary to recognize that the “financing” of the market when the cost of ICT is not affordable to the disadvantaged group. In other words, it is a question on how all or some the final price can be borne or “indirect financing” by public subsidies, by subsidies from industry, or by other sources.

6.3.2 Availability

Availability refers to the necessary and fundamental technological and services infrastructure. It depends on the availability of telecommunications facilities, equipment and access, security services, assistive technology and other relevant services. Without these basic elements, people can hardly utilize the application, leading to low take-up of ICT.

6.3.3 Awareness

This is the degree to which ICT is made known and visible to people. The more the people are seen using ICT and are perceived to be benefiting from it, the more likely the other people around them will form or change their attitude about their own need to adopt the technology. The greater the perceived advantage, the faster the rate of adoption.

Availability of equipment and access is just one of the factors which helps close the information-gap. Many information have-nots remain very passive because they either lack encouragement or motivation and hence are technophobia – a fear of learning new technology. People’s attitude is the key issue.

Therefore, uptake rate will soar through interaction with other communications channels such as early adopters, interpersonal networks; observations of people are seen actually using the technology; information levels towards ICT and marketing strategy used by the industry.

6.3.4 Adaptation

This refers to the evolution and the complexity of ICT. More complicated technology will be adopted more slowly. The rate of adaptations depends on the compatibility of technology with the existing technology, services and people’s daily activities and how people acquire sufficient skills and knowledge to adapt to the ever-changing technology development. So accessibility is one of the key issues to facilitate people’s adaptation to the technology.

6.4 Collaboration

The lack of co-ordination, co-operation or sharing of knowledge among different sectors of the society usually means that resources are not being effectively allocated. Piecemeal efforts will do little to alleviate the complex and extensive digital divide problem. By creating a better-coordinated environment, collaboration among the public, private and the non-profit sector can be achieved to offer to demonstrate the benefit of ICT in an effective and efficient manner.

In this section, we will discuss about the role of three main actors - **the government, private and non-profit sector**, on how they can exert their influence on the diffusion of technology.

The Government

The government can influence the diffusion of technology through:

- formulating and implementing relevant policies;
- providing financial investment for various initiatives and infrastructure;
- leading partnership programs to initiate and maintain dialogues among the other actors.

The Private Sector

The private sector can influence the uptake of technology through:

- sponsoring and providing financial investment to various initiatives that help resolve the digital divide problem;
- evaluating and formulating relevant strategies to overcome barriers that impede the universal access of ICT.

The Non-profit Sector

The Non-profit sector can influence the uptake of technology through:

- developing their awareness and expertise in the use of ICT;
- communicating to the Government, private sector, other relevant agencies and to their members their needs and barriers in adopting ICT.

Summary

To enable all people to go wired and reap the benefits of information technology, we suggest that the Government should not only formulate a policy on digital divide with a clear vision; but also to devise strategies based on the four-As' enablers with the concerted effort of influential parties. Only when all people are able to value ICT that we can get closer to the digital inclusive future.

6.5 Recommendations on the Universal Access in Hong Kong

With the elements presented in the section 6.4, we will then be able to propose some general initiatives based on the four-As' enablers for adoption by all actors. The initiatives aim at implementing universal access in Hong Kong. We will look into more closely in next chapter the specific recommendations targeted to resolve the digital divide problem to disadvantaged group.

6.5.1 In General

The Government

- Digital Divide is a problem affecting every facets of our society. Because of its complexity, a **working group which comprises of representatives from the Government, private and non-profit sector** should be formed to develop a more “collaborative” approach to tackle the problem. An example is that ITBB now has in place a Advisory Committee working on IT (IIAC). It is convened by the Government, with members from Legislative Council, IT professional bodies, academia and relevant government departments. A similar approach can be adopted in order to solicit concerted effort from different parties to solve the digital divide.
- The Government has for the first time conducted Thematic Household Survey Report No.2 to understand the penetration and use of ICT in Hong Kong. We would suggest the Government to develop a set of benchmark - **Digital Divide Index** so as to further review the information literacy and the progress of measure to tackle digital divide against worldwide standard. .
- A clear policy on the issue of digital divide needs to be formulated as soon as possible. The use of ICT is not included into the existing social and welfare policies. The Government has to take the lead to ensure that IT polices go well together with other relevant policies in order to support, secure and structure a balanced development in both fields.
- In Hong Kong, there is a lack of information about the ICT adoption and usage among the disadvantaged group. We recommend the Government to conduct studies to evaluate the social impact and in particular the needs of adopting and using ICT among the disadvantaged group in order to tailor-made programmes for them.

Private Sector

- The needs of niche market are often overlooked by the private sector. For example, people from the low-income families or the elderly are unable to connect Internet at home because the ISPs in Hong Kong only accept credit card payment. Owing to their underprivileged economic situation, the private sector might not be aware that most of the disadvantaged groups are having difficulties in having a credit card. Therefore, we hope the private sector might recognize the importance of the market of the disadvantaged group and carry out more

market research to understand their needs, hence devising flexible marketing strategies for different sectors of people.

Non-profit Sector

- As presented in previous chapters, many non-profit agencies have been aware of the challenges from the information revolution. Given their expertise and understanding of the needs of disadvantaged group, we hope that they will keep on identifying and communicating the relevant issues related to digital divide to the Government and to the service providers. In the public hearing of Legco Panel in ITB in May 2000, a number of non-profit organizations have pro-actively reflected their views on the digital divide. Concerted effort can continue to build up a momentum for creation of a digital inclusive environment in long run.
- It is obvious that partnership among non-profit agencies and private sector can be one of the effective ways to enhance the ability of the disadvantaged group in participating in an information-based society. The partnership programme initiated by the Hong Kong Seniors IT Advocates and Microsoft Inc. is a good example. We recommend the non-profit agencies to seek opportunities to co-operate with the private sector to provide partnership programme in removing the challenges faced by the disadvantaged groups.

6.5.2 Affordability

Recent studies demonstrate that the cost of hardware, software and telecommunications services is seen as a major barrier to the use of ICT by those living in the deprived community. To overcome this barrier, a number of initiatives should be considered including

The Government

- Provide tax credits for vendors who donate equipment, provide free Internet access and professional ICT training to the community.
- Offer tax incentives to encourage employers to provide computer and Internet access to employees at home.
- Offer bonus, discounts or priority service for those who use online public services, such as filing tax return, paying bills, performing driving license registration, etc.
- Provide tax credits to companies for designing products and services catered to the disadvantaged group, such as elderly and people with disabilities.
- Social Welfare Department (SWD) should consider giving out additional allowance to subsidize families receiving Comprehensive Social Security Assistance Scheme (CSSA) for the purchase of computer-related equipment or payment of Internet services charges. In addition, the SWD might consider partnering with non-profit agencies and the private sector to provide low-income group with a used PC bundled with free Internet access and basic training.

- Allocate additional funding for projects promoting online automated translation, speech recognition technology and other technologies to allow non-English speaking people or illiterate to use the Internet easily.
- Allocate funding for tech-education researches so as to achieve the target of the Education and Manpower Bureau (EMB) to deliver 25% of the school curriculum with the assistance of ICT as soon as possible.
- Promote the use of ICT in the public and non-profit sector by providing grants to develop ICT infrastructure and services which are accessible to all.

The Private Sector

- Develop flexible and creative pricing strategies to meet the needs of different sectors of people. Services providers are encouraged to offer a wide range of pricing options to ensure that no one will be rejected when applying for services.
- Consider providing more rental or leasing services packages such as computer and Internet access services to the needy population.
- Allocate funding to projects that will increase the Internet penetration of the community, such as donate equipment, provide free Internet access and professional training to the community.
- Offer free access and basic level ICT courses to disadvantaged group, such as unemployed, housewives from low-income families (e.g. families receiving CSSA) and the retired people.
- Offer free training course, technical and maintenance services to all schools and non-profit agencies.
- Work with the Housing Department (HD) to facilitate the deployment of public infrastructure for Internet access in all future public housing estate projects.

The Non-profit Sector

- Lobby and communicate with the Government and private sector the importance of flexible pricing strategies and sponsorship opportunity.

6.5.3 Awareness

One of the key factors in promoting the ICT uptake is to convince the target audience to be aware of and then understand the potentials of ICT. Initiatives that target at people who feel alienated or have few opportunities to use ICT should be encouraged, including

The Government

- Co-opt with schools to run “**eFamily**” programs. Nowadays, while children are having more opportunities to try new technologies in schools, parents with low education attainment are worrying about having greater and greater generation gap with their children. “eFamily”

program is to recruit children to train their parents and family. Weekend training sessions led by teachers and student helpers are held in schools. Parents, through interactive training, are expected not only to acquaint with basic computer skills, but also to learn about the online safety and to bridge their gap between their children and themselves.

- Develop forum to encourage public debate and discussion on Digital Inclusive Society and the benefits of utilizing technology in everyday life.
- Extend the existing “IT-ambassadors” programme to encourage early ICT adopters to guide the others to use online services. We suggest the HAD to recruit volunteers from different segments to train late adopters. Initiate tapping can be targeted to volunteers group of large corporation, self-help groups and social services agencies.
- Various government departments such as ITBB, HAD, ITSD, SWD can partner with private sector to organize events such as “IT Awareness Campaign” to build awareness on the value of the Internet. It aims at motivating people through active participation and make them understand the advantages brought by new technologies, enhancing their interest on new technologies so that they will eventually go online.

The Private Sector

- Invest more in advertising and marketing, and actively disseminate information and carry out programs to increase awareness on the opportunities provided by ICT.
- Establish volunteer teams to provide basic computer training to schools, non-profit agencies and the disadvantaged groups in need.

The Non-profit Sector

- Develop information and expertise that is essential to support the lobbying work in the area of digital divide. A good example is the work done by the Hong Kong Blind Union (HKBU) on the web accessibility.
- Facilitate public discussions on the use of ICT and its impacts on our society.
- Monitor the social implications of diffusion of ICT on the disadvantaged group.
- Disseminate relevant information and raise awareness amongst policy makers, the private sector and the wider public on the digital divide issue.

6.5.4 Availability

Appropriate hardware, software and access to facilities are the prerequisite for the people to gain experience in using ICT. A range of provisions includes:

The Government

- ITBB, ITSD, SWD and HAD work together on Recycled PC Scheme and Reused PC Clearinghouse to centralize all the donations from the corporation and allocate them to the

people in need.

- ITBB and ITSD adopt security-rating system to help users understand security level of e-commerce sites.
- HAD and ITSD should extend the existing plan of Community Cyberpoints by increasing the numbers of terminals to all community centers, shopping malls, in public housing estates and all public facilities.
- Leisure and Cultural Services Department turns all public libraries into e-libraries to provide Internet access to people.
- Accelerate the development of e-government to demonstrate that ICT is a very effective tool to increase the efficiency of government and provide easy access of government information.

The Private Sector

- Speed up the provision of broadband services to all residential users as quickly as possible.
- Participate Recycled PC scheme actively by donating reused PC and other related facilities.
- Develop better contacts with non-profit agencies and co-operate with them to develop appropriate on-line services and technical support services for the disadvantaged groups. Such services include advice on equipment purchase, method of physical networking, training programmes, installation and maintenance services.

The Non-profit Sector

- Lobby the private sector to speed up the provision of broadband services to all non-profit agencies as quickly as possible.
- Co-operate with the private sector to provide comprehensive technical support services to the disadvantaged groups.

6.5.5 Adaptation

Even if hardware, software and access to facilities are available, people in disadvantaged community are less likely to learn to use ICT. Relevant measures should therefore be implemented to enhance their ICT capability and adaptation to the new technology. These include:

The Government

- Implement comprehensive anti-discriminatory guidelines to deal with all aspects of telecommunications and ICT services accessibility.
- Learn from other nations, such as Netherlands and Australia which develop standardized web guidelines on usability and navigation for all government web sites. The guidelines generate common interface for users.
- HAD turns all community centers into e-learning centers by providing free access and

Internet training sessions to all people.

- EMB has to accelerate the overhaul of the existing structure and curriculum to encompass emerging education tools and new teaching methods. Digital media should be used and cyber civic education should be integrated into curriculum in order to promote a proper online culture. Besides, it should also promote the development of a local online education and training content market through public funded projects.

The Private Sector

- Accept and encourage technical accessibility standard, which ensure the existing products and services are accessible to all people.
- Ensure that concept of accessibility should be part of industry design, development, marketing and customer support and the methods for policing and enforcing adherence to the accessibility guidelines.
- Develop better co-ordination across the industry and the value-chain to ensure products and services are accessible to all people.
- Invest more resources and efforts on R&D for applications, which cater to the needs of different people.

The Non-profit Sector

- Examine the technical standard of all ICT to see if they are accessible to all people.
- Work with the Government for a comprehensive accessibility guideline. The Webmasters (HK) Association is paying much effort to co-operate with the Government and other social services agencies to promote web accessibility for all. It is also a good example to demonstrate how IT professionals can help to address the accessibility problem in the community.
- Incorporate and promote the use of ICT in the existing social services.
- Lobby the Government and private sector on the importance of making all ICT equipment and services accessible to all.
- Initiate partnership with the Government and private sector to provide training to the disadvantaged groups.

6.6 Conclusion

In this chapter, we have proposed some initiatives which should be carried out in a collaborative manner to closing the digital disparity in our society. These initiatives aim at motivating ICT usage and increasing the overall penetration. Since some disadvantaged groups are now facing specific problems in using the ICT, we will examine these barriers and provide recommendations on how these barriers can be removed in the next chapter.

7.0 Wiring Population Left Behind

7.1 Introduction

In this chapter, we will discuss how technologies bring enormous challenges and opportunities to the three vulnerable groups, namely **elderly, people with disabilities and women in low-income families**. Due to their unfavorable economic status, poor education attainment and work skills, most of them usually have less opportunities to access ICT. In Chapter 4, we have already depicted a clear picture that these three groups are being polarized in the digital society. In the following section, our discussion will focus on the unique problem faced by each of these groups, followed by some particular recommendations aimed at bridging the digital disparity for these disadvantaged population.

7.2 Elderly

The real IT generation isn't the youngsters.

The promise of technology is to unite every population segments to build a fairer society. We are wrong if we leave the elderly further behind as they grow older and older. When ICT is become an important part of our lives, it will be increasingly crucial to address the impact of technology on the well being of the elderly.

Where are the barriers from?

As we presented in the Chapter 4, only 6.6% of people aged 55-64 use PCs in Hong Kong. For people aged 65 or above, only 0.6% of them are computer users. The situation is even worse in the use of Internet. Only 3.4% of person aged 55 or above are Internet users. So why are they so hesitated to use ICT? What are the obstacles they are now facing? Where are these barriers from?

- **The absence of gerontological community, from most policy discussions about information technology**, is a major obstacle for the elderly to take part in the information driven society. The Government barely includes ICT on their agenda when formulating social and welfare policies, putting the elderly in an isolated position in learning and adopting ICT. Inclusion of policies catering to the need of the elderly in future ICT policy is essential for the success and widespread use of ICT.

- **Stereotypes about the ability and willingness of the elderly** to learn intellectually challenging tasks are also the hurdles. With such impression, they might fear that they are incapable of learning computing-related skills and hence dare not to do so. Many researches demonstrate that with suitable applications and training, the elderly can also be an energetic and enthusiastic computer users like the youngsters⁴³.
- **For elderly with limited income, cost of ICT equipment and on-line access** are the luxury items. As shown by the research of Oftel and the Policy Studies Institute in the UK, income is the single most significant barrier to the ownership of ICT. The financial situation of older people is therefore an important consideration when examining their barriers in accessing ICT.⁴⁴
- **Language and literacy** are the other hurdles. The majority of services as well as the language used in computer are English, prohibit many elderly with poor low education background from using ICT.
- **Lack of sufficient information** may be the other reason which make the elderly hesitant about using and purchasing ICT even though they are economically capable to do so. Old people need to be well informed about the benefits of the new services. A consumer survey by CREDOC⁴⁵ in France shows that only a few old people recognize the usefulness of the Internet and over 18% of the elderly said they did not know how the use of the Internet can benefit them.

How do the Elderly benefit from using ICT?

ICT can help foster **independence** among the elderly. For the elderly who can't travel as they do before, for instance, the Web brings the world to them and provide them with information, convenience, entertainment and connection to their family. Using the Internet everyday would promote a sense of self-efficacy among the elderly so that they will be less dependent on others.

Constructive use of leisure time can provide the elderly with opportunities to develop their skills and abilities, expand social network, and feel good about themselves. An increase use of Internet and technology might give them more choice of leisure activities and create the **feeling of satisfaction, competency and self-esteem** among them.

⁴³ Phil Shapiro (1995), Computers Use and the Elderly, *Washington Apple Pi Journal*

⁴⁴ Oftel Market Research (1994). *Households without a telephone*, London; Policy Studies Institute (1995). *To telephone ownership*.

⁴⁵ French country report <http://www.ispo.cec.be/q7/>

Technological advancement also presents so much potentials for lifelong learning to the elderly. Much evidence in the gerontological literature suggests that the elderly are both interested in and capable of continued learning. Learning and mastering computer-related skills will contribute to their well being by allowing them to maintain a **sense of integrity and continuity** with their past.

Therapeutic uses of ICT are recognized as a valuable contribution to the lives of elderly. The elderly can obtain rehabilitative benefits by utilizing fine and gross hand-motor movements when working on the keyboard. Computer program also stimulates cognitive abilities including reading, comprehending, auditive memory and information processing. Some studies even prove that video games help improve significantly a variety of perceptual-motor and self-esteem of elderly. (Drew, B. & Waters, J; McGuire, F.A.)

7.3 Women

As computer, Internet, e-mail and e-commerce are soon becoming household words, providing women with access to information technologies is emerging as a priority. In the Platform for Action of the Fourth World Conference on Women, it states that women can be empowered by information technology by increasing access of ICT and participating of women in the field of information technology and eliminate negative stereotypes of women in our society.⁴⁶

While the digital revolution clearly introduces new opportunities to woman, the gap between the information-haves and have-nots still exists, especially among those female new immigrants with low income and limited education.

Where are the barriers from?

From the findings of THS, there are only slight gender differences in the use of ICT. However, the penetration of ICT is obviously low among the housewives. While we assume and believe that most of the home-makers in Hong Kong are women, there are only 6.8% of home-makers are Internet users. The use of ICT among housewives is relatively low in Hong Kong. So where are the barriers from?

- **Economic hardship** suffered by women in low income group makes them impossible to pay school fees as well as the basic necessities, while at the same time saving money to buy computer hardware and software and attend computer courses for themselves. This problem is particularly acute among those women who are new immigrants. A recent

⁴⁶ Sophia Huyer (1997), *Supporting Women's Use of Information Technologies for Sustainable Development*. A Paper submitted to the Gender and Sustainable Development Unit, IDRC

study⁴⁷, indicates that about half of them are living with a monthly income below \$9000. 71% of them are not participating in labour market due to various reasons. Low family income and limited opportunities in entering the labour market can be major hurdles for them to learn and know about ICT.

- **Language and education** are the other obstacles as most of the Internet content and computer language are in English. The issue is intensified especially among those women from the Mainland and those who are in middle age with low proficiency of English and education attainment. The same study also mentions that only 14% of women from the Mainland have high school education or above. In other words, most of them have not received much education or are even illiterate, further hindering the acquisition of ICT knowledge.
- **Psychological barrier** is another reason that makes women far lag behind in using new technologies. Traditionally, women, especially the housewives, engage solely in domestic activities that require a lower level of technological skills. Women profoundly seem to stay aloof from the technology. Such misconception somehow affect women's attitudes toward ICT. Some of them may have “fear and embarrassment” when dealing with ICT and some even believe that dealing with ICT would cause them discomfort.

How do Women benefit from using ICT?

The development of ICT provides an alternative mode of communication, empowering women in a way that they are encouraged to **voice out their concerns** through electronic communication. ICT allows the exchange of views, opinions and news. It helps women develop confidence and experience in expressing their viewpoint publicly and enable them to find allies and moral support across communities and regions.

ICT can benefit women in some other ways. It can facilitate community participation among women in different sectors and in different regions. The active participation of women in the society also helps **strengthen their confidence and break through certain portrayals and stereotypes of women.**

Another advantage of ICT for women is that ICT can provide the information that women need to **improve their own well being** as well as that of their families, personal and professional development.

⁴⁷ 香港婦女中心協會 (2000) 新來港婦女的需要與現行相關政策及服務的疏漏 (Hong Kong Federation of Women's Centres)

Women's roles and responsibilities in family are pivotal. ICT encourages mothers and children to learn, collaborate and discover together. It provides mothers with **a medium to educate, to understand and to communicate with their children** and hence bringing families closer together.

7.4 People with Disabilities

Imagine one day when you find that you have little or no ability to move your fingers. Have you ever considered ICT a barrier to you? It is because you simply cannot use the keyboard anymore. You are now unable to use the computer to type your work, to communicate with the others via email, to browse the Internet for more public services or information. Finally, you will then be shut out of the mainstream where the ICT is the major mode of communication in every facet of daily life.

Where are the barriers from?

To understand the difficulties experienced by people with disabilities, here are few examples that most of us might not be aware of:

For people with visually impairments (such as low vision, tunnel vision, colorblindness or severe case of astigmatism) – multimedia presentations, small type faces, poorly contrasting color schemes and small icons can deny many visually impaired users to use web services and information because of the accessibility problem.

For people with physically impairments (such as multiple sclerosis, palsy or various forms of arthritis) – the task of manipulating a mouse, typing and using mouse/key combinations can be all the more difficult to many physically impaired users in web navigation.

For people with hearing impairments – they may not be able to use distinguishing audible computer prompts or make use of online video if assisted auditory technology is not equipped.

From the above examples, we realize that people with disabilities not only have similar problems in using ICT (such as literacy, language, psychological barriers and so on) as the other vulnerable groups, but also they need to face severe **inaccessibility problem** and some other hurdles.

But do you think that the barrier is really with the technology per se? The technology is just a manageable tool creating an environment, products and services we desire. The real barrier comes from **the insensibility and lack of awareness among** the individuals, the corporations

and the governments who develop and apply the technologies. When such awareness on the needs of disabled groups is not present in the mind of the experts involved in IT development, not as a major priority in the Government agenda, how can we believe that there will be full participation of every one in the digital society?

How do people with disabilities benefit from using ICT?

The stretch of technology is to maximize human potential. For people with disabilities, ICT is about the creation of plentiful opportunities **that can enhance their accessibility to information, communication skills, learning ability, employment and quality of life**. Let me give you some real life examples.

For a blind user, electronic communication makes it possible for him or her to deal with personal matters involving the government by himself without the assistance from the others.

For a person with physical disabilities, accessing the Internet to get public information is possible even though the premises where information is provided are not physically accessible.

For a deaf user, they can use e-mail to eliminate the barriers of communication through telephone or other voice-based technologies.

Electronic publication also offers vision impaired students the opportunities to access textbooks and course materials their classmates without waiting for transcription and tapes which are already really available to them.⁴⁸

These are only some of the examples showing how ICT can re-vitalize the life of the disabled community. The challenge now for us is how to establish a community in which the disadvantaged groups can be supported and better integrated through the use of ICT, improving the quality of their lives.

7.5. Building a Digital Inclusive Society for the Disadvantaged Group

Identifying the diversified needs in to ICT

To eliminate technology inequality in the digital world, the first thing we need to do is to fully understand the needs and problems of different disadvantaged group in the use of ICT. More

⁴⁸ Human Rights and Equal Opportunity Commission (2000), *Accessibility of electronic commerce and new service and information technology for older Australians and people with a disability*, Australia.

research will be needed to understand their expectations, fears, difficulties, benefits, requirements from technology, and prejudices they may encounter in learning and using technology.

Raising IT awareness among the disadvantaged group

There is a need for public campaigns to promote the potential benefits of an information society and the opportunities available for learning ICT. We understand that the Government has launched some promotional activities in the past, like “IT Hong Kong”, in an attempt to raise public awareness on ICT issues.

To enhance people’s consciousness and acceptance towards the use of ICT, we hope the Government will step up its effort to raise IT awareness, with particular emphasis on the underprivileged groups. The purpose of these campaigns is to make the underprivileged group gradually understand the benefits of ICT to their daily life; to be aware of the importance of ICT to the development of our society; to overcome their psychological barriers to the new technologies.

Promoting the principle of universal design

Universal Design has been defined as

“ the design of different products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The intent of the universal design concept is to simplify life for everyone by making products, communications, and built an environment usable by more people at little or no extra cost. The universal design concept targets at people of all ages, sizes and abilities”⁴⁹

This design philosophy endeavors to design software and equipment in a way that can accommodate a wider range of users. It is relatively inexpensive at the outset, when compared with the potentially huge expense involved in post-production software redevelopment, extensive reformatting or inputting information again.

Customized approaches are often very costly. When a product is designed from the outset to satisfy the needs of a much wider group of users, it will be much cheaper than the customized version. As a result, public sector expenditure for special facilities would be reduced, leaving more funding for assistive technologies when universal design cannot solve a particular

⁴⁹ Accessible E-Commerce in Australia: A Discussion Paper About the Effects of Electronic Commerce Developments on People with Disabilities

problem.⁵⁰

In short term, we believe much efforts should be devoted to raising the wider use of assistive technology when universal design is not pervasive in Hong Kong. But in a long run , we urge the Government

- To take the lead and set the requirements for using universal design principle on the quality and accessibility of the ICT services and products;
- To invite IT and assistive equipment industry to launch R&D and other projects aimed at demonstrating the advantage of universal design.

Fostering the Use of Assistive Technology

Assistive technology is about the inclusion of people with disabilities and elderly in every aspect of society and how technology can facilitate this process, in schools, at home, in the workplace, and in the community. The assistive technology is particularly important when the concept of universal design is not prevalent in Hong Kong.

To achieve this goal, we urge the Government to

- Acknowledge the importance of using of assistive technologies in existing facilities, such as developing electronic books on the existing curriculum, modifying keyboards/speech technologies in the community cyberpoint terminals, etc.
- Allocate additional funding to schools, corporations and relevant organizations such as Vocational Training Council to train the trainers for the learners with disabilities.
- Provide additional subsidy or loan for people with disabilities to purchase assistive equipment and software.
- Offer tax deduction to corporations which adopt relevant assistive technology for their employees with disability.
- Encourage the IT industry and the academia to carry out research and development on customized software and assistive technology for people with disability.

Improving Web Accessibility

There are a variety of approaches undertaken by different governments to establish detailed requirements for web accessibility. Some governments have referenced WAI guidelines generally while some formulate their own Web accessibility guidelines and incorporate them with general usability or best practice guidelines.

Our Government has already been paying serious attention to this issue. ITBB, ITSD, HAD

⁵⁰ Danish Ministry of Research and Information Technology (August 1996), *Freedom to Choose – Action Plan for IT Use by People with Disabilities*.

have taken the lead to formulate a set of web page accessibility guidelines and revamp the Government web sites. We urge the Administration not only to accelerate this exercise but also to step up efforts to ensure web accessibility for all by

- Formulating a long-term web accessibility policy to ensure that ICT services and equipment are designed to be accessible to older people and people with disabilities. Where it is not possible to ensure that the design of ICT services and equipment are accessible, otherwise, special services and equipment are needed to achieve this objective
- Emphasizing the importance of accessibility issues and providing accessibility guidelines to all government departments and private sectors once they are defined.
- Encouraging the public and the private sector to adopt “senior friendly” web design for senior users. Simple, easy-to-understand presentation and user-friendly interfaces are all important considerations that web designers and marketers need to take into account.
- Promoting other mode of access, such as alt-text, textual description of pictures and graphics and sufficient color contrast for low vision users, instead of limiting text-only version.
- Allocating resources to set up a support team in ITSD to provide advice and technical support to private companies when difficulties on web accessibility arise.
- Establishing regular monitoring mechanism for the public web sites.
- Encouraging the private sector, especially those major corporations to adopt web accessibility guidelines.

Developing suitable content

Content is crucial in motivating older people and housewives to learn how to use ICT, and in getting and keeping them online. Some specific services are particularly attractive and practical to them, such as information on health care, financial and investment plans, pensions and retirement. Content service providers should consider old people and housewives as a potential user group and develop relevant ICT services for them. They also need to make content more interesting and easy to understand for these target groups.

Promoting the adoption of easy-to-use devices

One of the limitations for the elderly to use computers is that the hardware and software are not user-friendly to them. Some specific adaptations of hardware and software which would make applications more suitable to the elderly might further increase usage. Modification like magnifying screens, more color contrast, modified keyboards, and voice entry systems would be of specific benefit to individuals with visual or movement problems. To do so, the Government has to nurture an entrepreneurial spirit among service providers to create devices that are useful to the senior community.

Improving affordability and access of ICT

The number of Community Cyberpoints which are equipped with sufficient assistive facilities, need to be increased in most public places, such as community center, libraries, government offices and hospital, and so on. so that the elderly and people with disabilities can easily access these facilities.

More public-private partnerships are need for more donations of computer-related facilities, hence bringing Internet access to the homes of elderly and people with disabilities. Industry has been actively partnering with the public sector to bring Internet access to schools. The same can be done for elderly center and old aged home.

For the connection charges, the industry may consider reducing access fees or providing special service package to the elderly and disabled groups.

Developing potential of disadvantaged group in using ICT

The Government needs to create an environment that encourages disadvantaged group to become involved in the application, development and deployment of technologies.

For women with low education, the Government has to earmark more resources and to re-evaluate if the existing computer-related vocational and retraining courses fit them. Basic training is the first step, but not the last. The training courses must train them up for careers at all levels of the IT sector, supporting their participation in the community and their workplace.

There is a need for even more introductory courses and inter-generational project on ICT for the elderly and people with disabilities. We suggest that the learning environment, course content and materials of all these programs should be adapted and tailor-made to their specific needs.

Lack of resources and professional trainers are the most obvious problem to many non-profit organizations, especially those for the elderly and people with disabilities to make expansion of training course. Public funding or public-private partnership is required to subsidize train-the-trainers programmes that are essential for service expansion.

Incorporating ICT into existing services

Evidence shows that computer assistance program can extend life expectancy, promising a better lifestyle for the aging and disabled community. However, the existing elderly and rehabilitative services have yet to start using information technologies.

To improve the quality of life of the elderly and people with disabilities, more innovative programs

need to be developed and integrated into existing programs in order to keep this population healthy and productive. Computer programs can be developed to offer health education on a diverse range of topics, such as uses and misuses of prescription, nutrition, physical exercises, ways to and feelings of social isolation. The Hospital Authority therefore needs to incorporate the use of ICT in the existing rehabilitative programmes.

Enhancing accessibility of e-commerce and financial services

E-commerce is becoming a way of life. A variety of e-commerce-related activities can now be undertaken via the web including buying and selling stocks, auctions, banking services. The following paragraphs will cite examples of these e-commerce activities and look into how these new ways of communication will create difficulties as well as opportunities to the underprivileged groups.

Banking

The use of ICT in banking and financial areas offers many advantages to people with disabilities and the elderly. People who are homebound can conduct banking without physically getting to the branch. People who are deaf can independently perform banking transactions and access their account details. Nevertheless, some of the banking services available in the market are not accessible to all of them.

For people who are deaf or have their hearing impaired, audio-based telephone banking services bring serious problems due to their auditory mode of operation. Besides, very few banks in Hong Kong have made their Automatic Teller Machines (ATMs) accessible to people who are blind or vision impaired. Most of these machines use touch-screen or have no Braille function keys. People with physical disabilities may not be able to access the keypad, or the cash dispenser as they are installed high from the ground.

Internet banking, as emerging banking services in Hong Kong, is usually very aesthetic in design which, however, create much inconvenience to people with visual impairment. The World Wide Web Consortium (W3C) on web accessibility is rarely adopted by the banks in Hong Kong.

Shopping

Shopping is indispensable to everyone in our community. Very Often, the elderly or people with disabilities, find it is quite difficult to do it independently. New ways of shopping (e-shopping) are poised to provide much more convenience and ease to the disabled groups as compared with traditional ways of shopping.

For example, if online supermarket shopping site is well-designed and accessible to all, it offers lots of benefits to people who have difficulties in moving around or to bringing goods back home because they can purchase goods through the Internet and enjoy the home-delivery services.

Regrettably, few companies have designed its Internet shopping site to be accessible to all. Most companies use heavily visual presentation, complicated interfaces or which require the use of devices or software that is inaccessible to the disabled groups. Without providing alternative input options, these shopping sites create barriers, instead of benefits to them.

ESD Life

To promote online public and commercial services, the Government introduced ESD Life last year. Public kiosks are installed in high-traffic locations throughout the territory to allow people to access public information conveniently.

The problem of accessibility to information kiosks is widespread. To people who are blind or visually impaired, touch screens prevent them from enjoying the benefits of this new facilities. People with physical disabilities may not be able to access the public kiosk keypad, due to its height from the ground or other physical barriers. Not all the public kiosks are equipped with assistive facilities, such as handrail, speech/Braille display and keyboard. As a result, the access to such services for people with disabilities are denied.

The above examples are only some of the hurdles faced by the disabled communities when conducting e-commerce. To turn all the barriers into advantages and made e-commerce services available to all people, we suggest the Government to

- Review the accessibility of e-banking facilities and services together with Hong Kong Monetary Authority so that access to people with disabilities and the elderly will not be denied.
- Conduct a comprehensive review on implications and barriers of e-commerce to the elderly and people with disabilities. Governments in other nations, such as Australia and Denmark have conducted in depth review in this aspect. Our government should therefore take similar initiative to review the implications of e-commerce to the disadvantaged groups.

- Work with the business sector, IT professional bodies and the disabled groups to formulate a code of practice on e-commerce accessibility.
- Provide tax incentives to companies who design its web site to be fully accessible for all people.
- Establish Quality Mark Scheme to encourage the business sector to adopt accessibility guidelines when designing their web sites. One of the ways is to request the web site owners to incorporate accessibility principles in their e-commerce marketing strategy.
- Install appropriate assistive equipment and facilities in all ESD information kiosks so as to increase the accessibility of ESD services to the elderly and people with disabilities.

7.6. Conclusion

In this chapter, we have reviewed the barriers and the opportunities of ICT to three disadvantaged communities. As these are poor, unemployed, and their education level is low, they are in a even more disadvantageous position than the other population segments. To meet their specific needs, some recommendations have been provided in this chapter. Most of them require the co-operation among the Government, the private sector, the non-profit sector and the underprivileged communities. By establishing partnership to create more opportunities to the people in need, we look forward to having a digital inclusive society where no one will be neglected.

Appendix

Global Initiatives

The United States

National Goal	<ul style="list-style-type: none"> ■ Ensuring Access to 21st Century Learning Tools for Every Child in Every School and ■ Expanding Digital Opportunity for Every American Family and Community
Responsible Government Dept	<ul style="list-style-type: none"> ■ Involve members of the Cabinet (including Secretaries of Commerce, Agriculture, Justice, Education, Health and Human Services, Housing and Urban Development and Labor) to take specific steps to address the issue.
Government's Initiatives: (General)	<p style="text-align: center;"><u>Training and Education</u></p> <ul style="list-style-type: none"> ■ Tech for America – a national service program to provide training in basic computer literacy for youth, youth adults, workers and teachers. Technology teachers were assigned to work at community technology centers, schools, colleges, and training programs run at nonprofit organizations. The program would seek to forge public/private partnerships with corporations willing to donate computers, software, expertise, and other resources. ■ ClickStart – a program partnership with private sector to place Internet-ready PC, computer training for households. ■ US\$150 million to help train all new teachers entering the workforce to use technology effectively; ■ US\$100 million to create 1000 Community Technology Center in low-income urban and rural neighborhoods; <p style="text-align: center;"><u>Accessibility</u></p> <ul style="list-style-type: none"> ■ The Universal Service Fund (E-rate) - a FCC program to provide all K-12 schools and public libraries up to US\$2.25 billion a year in discounts for telecommunications services. Typically eligible services range from basic local and long-distance phone services and Internet access services, to the acquisition and installation of equipment to provide network wiring within school and library buildings. ■ Technology Opportunity Program (TOP) promotes widespread use of advanced telecommunications and information technologies in the public and non-profit sectors and provides matching demonstration grants to state and local governments, health care providers, school districts, libraries, social services organizations, public safety services and other non-profit entities to help them develop information infrastructures and services that are accessible to all citizens in rural as well as urban areas. ■ Neighborhood Networks - a community-based initiative of the US department of Housing and Urban Development (HUD) that encourages the development of resource and computer learning center in privately owned HUD-assisted and/or –insured housing. Typically, a Neighborhood Networks center is a room or series of rooms filled with computers and located on-site or near a HUD-assisted and/or –insured housing development. Centers usually offer computer access, staff assistance and a range of training resource to housing residents. Center programs may include computer training, Internet access, job readiness support, etc. The mission is to foster economic opportunity and encourage life-long learning for the needs of lower-income families and seniors where they live. ■ “Net Days” – local firms install Internet equipment in schools in return

Government's Initiatives: (Specific to the Disadvantaged group)
Non-Profit Sector/partnership with private sector Initiatives

- for recognition.
- US\$2 billion in tax incentives over 10 years to encourage private sector donations of computer, sponsorship of community technology centers and technology training for workers.
- US\$25 million to accelerate private sector deployment of broadband networks in under-served urban and rural communities – using grants and local guarantees.
- Interactive voice response (IVR) has been incorporated into e-government strategies in Fairfax County, so that citizens can access web-based government services over the telephone.

Affordability

- **Lifeline Program** – provides monthly reductions in telecommunications services charges and in initial connection charges to low-income consumers. The Federal Lifeline program provides between US\$3.5 and US\$7 per month to providers to enable them to reduce eligible consumers' monthly telecommunications services charges.
- **Link Up Program** - The Federal Link Up offers eligible low-income consumers: 1) a reduction in the local telephone company's charges for starting telephone service (the reduction is one-half of the telephone company's charge or US\$30.
- US\$50 million for a public/private partnership to expand home access to computers and the Internet for low-income families, such as parental involvement in education, high-tech companies to provide discounts on computers and access, libraries offering training on "information literacy", government agencies at all level seeking to save taxpayer dollars through the electronic delivery of government services.

- Expand access to technology for people with disabilities, for example, FCC help to ensure that telecommunications equipment, such as cellular phones, is designed to be accessible for people with disabilities.

- **Markle Foundation** - US\$1 million to encourage the development of online content that can serve best the needs of low-income Americans.
- **Computers in Our Future (CIOF)** – a five year model program that seeks to strengthen the health of Californians by increasing access to computer technology, training and jobs for young people in low-income communities. US\$6 million grant from the California Wellness Foundation is used to support all these programs.
- **Computers for Youth** – a campaign for high-level recycled computer and contribute them to inner-city households along with low-cost access and extensive training.
- **Benton foundation** - an organization for research, policy analysis and print, video and on-line publishing as well as an outreach organization to non-profits and foundations. It has updates on communications policy and event, a forum for discussion and working papers in related to digital divide issues.
- **Computers for Homebound and Isolated Persons (CHIPS)** - a non-profit project aimed at reducing the social isolation of people who are homebound by providing a computer and free Internet access through KORRnet, who manages the project. The primary participants in this project are persons who are elderly or caregivers, although some recipients are also disabled and homebound. Volunteer mentors visit the CHIPS Participants once per week to provide basic instruction on how to use email and the Internet. This instruction results in the participant's ability to use email to contact families and friends, meet other homebound and isolated persons through the CHIPS mailing list, and

Private Sector Initiatives

use the internet for purposes such as research on medications or health concerns. CHIPS also offers free computer and internet access at the KORRnet Community Access Lab.

- **FirstGov for Seniors** - FirstGov for Seniors empowers senior citizens by helping them obtain valuable health information and services. The site is one of several projects created at the direction of the National Partnership for Reinventing Government (NPRG). The Social Security Administration hosts and maintains the site.

Training and Education

- **America Online and New Line Cinema** seeded the HEAVEN – encourage youths to learn leadership through acquiring multi-media skills.
- Launched technology-in-education initiatives aimed at teachers, including **Bertelsmann's** Media Workshop (helps educators integrate new media into schools); [AOL@School](#) (extensive lesson plans and free access programs); **Intel's** "Teach to the Future".

Accessibility

- **Cisco** - partnership with US Dept of Housing and Urban Development's (HUD's) and Communities in Schools (CIS) via Networking Academy Program to promote jobs and economic opportunities in underserved communities.
- **Oracle's Promise** – to provide network computers to economically challenged, disenfranchised public schools. Announced US\$100 million donations to be used for providing network computer access to every school child in America.

Affordability

- **Microsoft** - supplied computers and software to more than 11000 cyberchallenged institutions since 1997.
- **Ford Motor Co. and Delta Airlines** - offered home PCs and Internet access to 72,000 workers for US\$12 a month.
- **Microsoft, Compaq, Dell, Gateway and others** – initiated laptop programs that enable students to take computers home.

Others

- The entrepreneurs in the private sector are addressing the lack of black and Hispanic-oriented online content by creating websites such as Quepasa.com, NetNoir.com, and BlackPlanet.com, which provide online services that are likely to broaden Internet use among minority populations.
- **iCan** - bring the information, products, services and resources to the disability community.

The United Kingdom

National Goal	<ul style="list-style-type: none"> Under the UKonline campaign, the aim is 1) to ensure everyone who desires to use ICT has access to the internet by 2005; 2) all Government services are online by that date; 3) to make Britain one of the world leading knowledge economies.
Responsible Government Dept Government's Initiatives: (General)	<ul style="list-style-type: none"> Cross Government initiatives Social Exclusion Unit (SEU) with collaboration with other government departments, such as Cabinet Office, DfEE, etc. <p><u>Training and Education</u></p> <ul style="list-style-type: none"> BBCWebwise and Computer Don't Bite – a basic introduction to computers and Webwise is the follow-on campaign focused on improving awareness of the Internet. ICT Learning Centres – aim to establish 700 centres in disadvantaged communities by March 2000. City Learning Centres – 85 City Learning Centres are providing local ICT facilities with the aim of improving education standards and skills levels, thereby promoting employment opportunities. University for Industry (Ufi) – providing learning packages to help people and companies to learn ICT. Library Network – a network of libraries with trained staff and access to content developed for lifelong learning. IT for All – focuses on providing beginners an opportunity to try out computers, the Internet, e-mail and so on via 3000 centres across the UK. Information Society Initiative (ISI) – promotes the take-up of ICT among UK firms, particularly SMEs by providing neutral advice, hands-on access to and awareness of technology. A national network of Local Support Centers has been set up to act as 'one-stop-shop' sources of advice and support on ICT. £20m funding to train 20,000 library staff. This aims to train all library staff to a standard so they can support the use of DfEE National Grid for Learning and other library IT services. The New Opportunities Fund and the Community Access to Lifelong Learning Programme - aims to encourage more adults into learning and so contribute to the achievement of the national target for adult participation in learning. The NOF has £230m for training school teacher in the curriculum use of ICT in the classroom. The aim is to ensure that teachers feel confident and are competent to teach using ICT within the curriculum. National Grid for Learning (NGfL) - The Grid is the national focal point for learning on the Internet. It is both an architecture of educationally valuable content on the Internet and a programme for developing the means to access that content in schools, libraries, colleges, universities, workplaces, homes and elsewhere. £555m from the Standards Fund has been set aside for the Grid. Learning Workbank -This involves the development of an Internet portal to job vacancy, careers, work-related learning and training opportunities information and advice. <p><u>Affordability</u></p> <ul style="list-style-type: none"> Get On-line: Get into the Internet' – a plan to offer low cost computers to 100 000 low-income families. Loans for Teachers' ICT - Pilot schemes equipping teachers with state of the art multimedia portable computers and Internet access have shown positive benefits for teaching and learning. This scheme will help teachers acquire ICT at lower than normal cost. <p><u>Others</u></p> <ul style="list-style-type: none"> E-Government by 2002, the public will be able to do

**Non- Profit
Sector/partnership
with private sector
Initiatives**

a quarter of its dealings with government electronically through their television, telephone or computer.

Training and Education

- **Landport Web** – a ten week pilot project aimed at raising interest in formal IT training. It offered free use of computers on two evenings per week to help overcome fear of ICT.
- **Barton IT Hub** – a six year scheme combining public, private and community companies which aims to enhance the employment prospects, education and skills of young and those at a disadvantage. 7500 half hour IT taster sessions are held at the Barton IT Hub.
- **TS2K** – an organization to help young people develop their creative ICT skills and experience. Young people are offered opportunities to work with professionals in the areas of creative art, new media and technologies through its Creative Enterprise centers. Since 1997, 18000 young people have benefited from TS2K activities. 800 young people have entered work.
- **Synergy Project** – an accredited learning project for disadvantaged young people through the CyberSkills programme. With the support of local enterprises, 6500 workshop places are offered.
- **Computer Gym** – a mobile computer classroom, workshop and library using up-to-date Internet enabled, multimedia computers and the latest software courseware and curriculum sourced from all over the world. Their target audiences ranged from the children, parents and unemployed people.
- **IT for Terrified** – an organization provides an introduction to IT, teaching basics of word-processing, spreadsheets and access to the Internet, including e-mail. The trainers are volunteers who start to learn IT.

■
Accessibility

- **The Manchester Community Information Network (MCIN)** – a non-profit making charity to improve public access to community information by providing an Online Community Information. The MCIN web site is accessible at computer terminals, computer kiosks and on the Internet generally. It offers a comprehensive source of community information on a wide range of topics from health and education to community advice and information.

Affordability

- **RECOMMIT** – a service provided by CHG Environmental Ltd to collect IT equipment from various locations and audit, sanitize and redeploys the machines to community, schools, charities, libraries, and some government departments. Activities undertaken by the RECOMMIT include full audit trail, electrical testing, secure collection of re-used IT devices, loading of various software packages, sanitizing of data and fix, physical cleansing, secure collection of IT waste for environmentally sound disposal.

Others

- **FI Group** – provide specialist IT, business and financial support to ten regional community organizations.

National Goal	To create a “digital opportunity society” in which the full benefits of IT can be realized.
Responsible Government Dept	Ministry of Post and Telecommunications (MPT)
Government's Initiatives: (General)	<ul style="list-style-type: none"> ■ Provide Internet access for every public school by 2001. ■ Every teacher and student in every school and grade can make use of a computer in class by 2005. ■ Establish “IT Literacy Centers” and equip city halls, post offices, and other regional public facilities with Internet access. ■ Provide preferential tax treatment for companies training internally for information literacy. ■ IT Basic Bill is passed by Japan's Lower House to call for revision of regulations blocking the growth of e-commerce and Web access. It also encourages the promotion of an online government to streamline the activities of bureaucracy.
Government's Initiatives: (Specific to the Disadvantaged group)	<ul style="list-style-type: none"> ■ Support private R&D for the development of user friendly technology and devices to the aging and disabled population; sign-language recognition to allow disabled people to use the Internet easily. ■ Conduct R&D into Broadcast Programming for the Visually and Hearing Impaired – the MPT is devising means of encouraging TV programming producers and broadcasters to include more closed-captioning, spoken explanations, and sign language interpretation in their programming to ensure that the visually and hearing impaired can better enjoy TV. During fiscal 1999 the MPT significantly expanded its budget for these activities to encompass support for closed-captioning, explanatory programming, and programs with sign language interpretation. ■ Develop voice recognition, automated translation and other technologies to allow non-English speaking peoples to use the Internet easily. ■ The Telecommunications Access Council examined concrete plans to create telecommunications equipment that meets everyone's needs. ■ Enforce and adopt the Telecommunications Accessibility Guidelines to all related industries. ■ Construct telework centers and provide tax reductions for telework and SOHOs in order to facilitate the community participation of the aged, disabled and homemakers.

Singapore

National Goal	<ul style="list-style-type: none"> ■ To develop Singapore as one of the top five information societies in the world. (Infocomm21)
Responsible Government Dept Government's Initiatives: (General)	<ul style="list-style-type: none"> ■ Infocomm Development Authority of Singapore (IDA) <hr/> <ul style="list-style-type: none"> ■ "Dot.com" the People Sector - a movement costs S\$25 million which involves community groups and local government, industry and unions, institutions and civic organizations, volunteer welfare groups and the media to enable every citizen to reap the benefits of an enhanced e-lifestyle. This nation-wide effort centres on 5 thrusts: improve access for all, change mindsets, promote online culture, nurture e-Ambassadors and spawn e-Communities, and develop multilingual Internet content. ■ "Dotcom the Public Sector" - put S\$1.5 billion to transform itself into a leading E-Government to better serve Singaporeans in the new online knowledge-based economy. <p>Training and Education</p> <ul style="list-style-type: none"> ■ Provide training to 30,000 parents who are keen on learning the Internet and who are also concerned about their children do in the Internet. ■ Offer special training through partner organizations, with an aim to encourage people to try out services and applications such as e-shopping, e-auctioning, e-mailing, e-filing of income tax, e-banking and e-learning. <p>Awareness</p> <ul style="list-style-type: none"> ■ e-Celebrations Singapore - a month-long public outreach programme, aims to get everyone to go online. The interactive and experiential activities will raise awareness of how infocomm technology can change people's lifestyles and prepare Singaporeans for the technological challenges ahead. ■ Singapore@Work 2000 - an integrated awareness and educational TV programmes that involves IDA, PSB, nine companies and eight chambers of commerce and infocomm associations to showcase e-businesses, targeting at local enterprises to encourage EC adoption. <p>Affordability</p> <ul style="list-style-type: none"> ■ PC Reuse Scheme and the Easy PC Plan – a public-private partnership campaign range from the donation of hardware (such as used or new PCs, printers, etc.) and software, to the provision of Internet access and support services. Tax incentives will be sought for vendors and e-service providers <p>Accessibility</p> <ul style="list-style-type: none"> ■ Give 30,000 households used computers with free Internet access and will also provide basic training. ■ All Singaporeans will also have free broadband access at public Internet kiosks, community centers and clubs. ■ Give every citizen over the age of 5 a free personal email address and web site. ■ Work with other government agencies such as the Housing Development Board (HDB) and private sector property developers to facilitate the deployment of public infrastructure for Internet access, for example, Internet kiosks; and infrastructure that supports e-Commerce fulfillment, for example, locked boxes to hold deliveries. <p>Others</p> <ul style="list-style-type: none"> ■ Work with companies on projects that involve innovation or significant improvement and develop new capabilities within the e-learning

	<p>industry. Such as the Innovation Development Scheme (IDS) and Education Local Industry Upgrading Programme (Education LIUP).</p> <ul style="list-style-type: none"> ■ Promote definition and standard of e-learning by setting a special committee to achieve interoperability and reusability of e-learning resources. ■ Initiate virtual shopping malls where online shoppers can buy basic necessities like groceries, lifestyle items such as music, movies and games, and services like on-line tuition. The aim is to attract 200,000 shoppers to shop online. ■ TRUSTe – an online privacy seal programme will be made an industry 'trustmark' seal to build up consumer's confidence towards online shopping.
<p>Government /partnership with non-profit sector's Initiatives: (Specific to the Disadvantaged group)</p>	<ul style="list-style-type: none"> ■ "e-ambassadors" - Under a formal training and qualification programme, a special group of 2500 people will act as counselors to their peers to motivate the non-ICT users among them to embrace an e-lifestyle. The government agency is expected to tap groups like the People's Association's Youth Movement, the Retired and Senior Volunteer Programme, and the Parents Advisory Group for the Internet (PAGI). ■ Community Development Councils (CDCs) to organize Internet training programs for senior citizens as well as homemakers. ■ Work with industry and community groups to develop relevant content in different languages to cater to different population segments. Incentives are provided for the development of useful applications and relevant content to bridge the language barrier and generate interest in infocomm among all Singaporeans.
<p>Private Sector Initiatives</p>	<p>Accessibility</p> <ul style="list-style-type: none"> ■ SingTel provide internet access with sponsored toll-charges for 2,500 needy families - 6 months access [max. 15 hours / month / line]; Additional lines for future projects - 6 months access [max. 100 hrs / month / line] (S\$500,000) ■ Speednames provide 2,500 e-Ambassadors with personal domain names at a sponsored cost (over three years) (S\$75,000). ■ SGNIC Partial sponsorship for 2,500 e-Ambassadors to subscribe to personal domain names (S\$12,500) ■ Ezihub Inc, a Singapore portal company has ambitious plans to bridge the digital divide across Singapore, with the launch of its TownOnline Programme. Along with partners such as Pacific Internet, StarHub and Sun Microsystems, it aims to help all households in Singapore get online by providing affordable hardware, Net access and technical support, backed by a comprehensive lifestyle portal. <p>■</p> <p>Availability</p> <ul style="list-style-type: none"> ■ Microsoft Singapore sponsoring a range of software (mainly consumer OS & productivity applications) (S\$2 million) ■ Intel donate used PCs and new processors (S\$500,000) ■ Lexmark collect and refurbish old printers, and donating new printers to voluntary welfare organizations/charities; Sponsorship of additional color printers for future projects (S\$30,000) <p>Training and Education</p> <ul style="list-style-type: none"> ■ CISCO collaborate with the Nanyang Technological University and to establish Singapore as an e-learning hub for CISCO networking training.

Korea

National Goal	Cyber Korea 21, with the objective of establishing a nation based on creative knowledge.
Responsible Government Dept	The Ministry of Information and Communication (MIC)
Government's Initiatives: (General)	<p><i>Training and Education</i></p> <ul style="list-style-type: none">■ Earmark 7.3 billion won as fund for information education.■ Allocate 3.5 trillion won to open 4,000 job training courses that will benefit 220,000 unemployed people.■ Computer classes are made mandatory for primary school students.■ Nurture ten thousand teachers who are capable of teaching computer classes.■ Set up 500 free education centers by 2003.■ Provide computer training through remote-education systems and broadcast media including terrestrial TV, CATV and satellite broadcast. For instance, civil servants who sometimes can not afford to attend computer courses will be trained on line through the remote-education system. <p><i>Accessibility</i></p> <ul style="list-style-type: none">■ Provide a high-speed online connection to 196 small towns and local areas.■ Internet plazas where citizens can access the Internet will be installed at post offices, town halls and local libraries.■ Operate the "Internet Information Center" at public places such as post offices and ward offices for those who don't have their own personal computer at home.■ Elementary, junior and senior high schools in Korea are equipped with LAN and computer labs.■ Build hundred computer labs in the rural and mid-sized cities to further boost the computer literacy of the local residents. <p><i>Availability</i></p> <ul style="list-style-type: none">■ Provide about 50,000 students in the low-income bracket with PCs and an Internet subscription coupon for five years free access while second-handed PCs will be collected and provided to social welfare institutions.■ Promote the supply of PCs across the nation by giving tax incentives to companies who donate PCs.■ In the case of remote areas including islands where physically laying a high-speed network is not cost-effective and difficult, around a hundred satellite-based Internet Plazas are set up at local post offices and government-run healthcare centers.■ Provide software related training to students from low-income and no-income households so as to expand their career opportunities and to provide financial security. <p><i>Awareness</i></p> <ul style="list-style-type: none">■ Launch public campaigns to raise public awareness on on-line ethics come up with the legal framework to penalize on-line criminals and infringement of human rights. <p><i>Others</i></p> <ul style="list-style-type: none">■ Set up a translation company to translate high-quality contents into English so that those contents can penetrate into the larger market of English users.

Highlights of the Government's Initiatives: (Specific to the Disadvantaged group)	<ul style="list-style-type: none"> ■ A new hardware design, voice recognition technology, closed captioning and screen keyboards will be developed to help the handicapped use PCs more conveniently. ■ Establish web sites to help farmers and the handicapped use a wide array of information. ■ Offer information classes to local residents, the handicapped and senior citizens. ■ Provide subsidized Internet training program for the housewives under the theme of "Computer Training to One Million Housewives" with designated private computer training institutes. ■ Initiate computer labs to conduct computer training to over 100,000 senior citizens by collaborating with locally-based universities. ■ Support the R&D of voice-oriented web browsers, touch screen computers and etc, through which disabled people can readily access information at their disposal.
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Taiwan

National Goal	-
Responsible Government Dept	National Information Infrastructure Unit (NII)
Government's Initiatives: (General)	<ul style="list-style-type: none"> ■ All middle and primary schools in Taiwan have computer classrooms connected to the Internet through ADSL facilities in July 1999. ■ Teachers have been trained intensively to acquire knowledge in information technology and Internet. ■ 46 teaching material centers for education via Internet have been established.
Government's Initiatives: (Specific to the Disadvantaged group)	<ul style="list-style-type: none"> ■ For people of the handicapped, the underprivileged, and of remote residence, the concept of equal access to web content is emphasized. The major applications to promote include: developing electronic and network government, promoting Internet commerce, developing electronic /network libraries, creating digitized culture wealth, and utilizing Internet for better medical care and social welfare. ■ To assist the handicapped to access the Internet, the government is subsidizing all special facilities needed, promoting the universal adoption for special rules of content design, and establishing websites with information importation to the handicapped.

Epilogue

One of my childhood memories was watching the first people landing on the moon. Despite being a little boy, I can still remember the intense excitement I had of watching this historic event and, the hope and optimism that was set alight from the technology. I realize that technology can be harnessed to improve the quality of life of all who live on the planet.

It is indisputable that technology has transformed people's everyday lives at an exponential rate. Technological advancement is expanding the human potential into new frontier by offering new solution to the many critical problems threatening our future. While "information-haves" are amidst the fanfare to celebrate the powerful of new technology, we almost lose our sight that "information have-nots" are at real danger from being segregated in the Information Society, instead of integrating them.

Today, I strongly believe that the use of technology can truly bring advantage to our society if, we are wise enough to maximize the opportunity that it possesses. None of us can anticipate exactly what the next technology will be or how it might be used. However, when I dream about the future, about new forms of technology, I also dream about a world where it facilitates opportunities and connectivity for all, where there will be more promise and excitement for expanding the potential of all, and where "information haves" will stretch out their hands to help "information have-nots" to embrace the new digital era.

The scale of this dream may appear daunting. But with the concerted effort of our government, private sector and non-profit organizations, this dream is not unattainable.

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The Infocomm Development Authority of Singapore (IDA) www.ida.gov.sg
The National Office for the Information Economy of Australia www.noie.gov.au
The World Wide Web Consortium on Web Accessibility Initiative www.w3c.org/wai
U.S. Department of Housing and Urban Development (HUD) www.hud.gov
Webmasters (Hong Kong) Association www.hkwebmasters.com