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Tackling the Digital Divide

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Abstract

The emergence of an information society has created new social exclusions and aggravated old ones by creating digital exclusion. Many countries have explicit policies about turning themselves into the leaders of such transformations or about catching up with the changes made in other countries. Nevertheless, little is known about their efforts to bridge the gap between the digital 'haves' and the digital 'have-nots'. Governments in East Asia are good examples of those who work on improving their society's digital capabilities. They top most of the related international comparison tables. It is, however, not clear what they have done to bridge the new digital exclusion gap or what the effects of such efforts have been. This paper reviews the digital inclusion strategies put in place by several East Asian countries and discusses a framework for tackling the digital divide, and examines pertinent policies, using Hong Kong as an example. This paper argues that while improvement in information communication technology (ICT) accessibility and knowledge is important, the promotion of community-based ICT user networks for certain disadvantaged groups is crucial to enhance their participation in the information society.

Keywords: Digital divide, digital inclusion, East Asia

Introduction

After nearly two decades of intensive development in the direction of becoming an information society, most developed parts of the world have transformed themselves such that most members of their societies use information communication technology (ICT) extensively in almost every aspect of life. Many developed parts of the world claim that they have become, or have nearly become, societies with ubiquitous access to the electronic information network. Yet, it is obvious that great gaps exist across countries and

regions in terms of both technological adaptations and state of development as an information society (ITU and UNCTD, 2007).

On the other hand, most countries are aware that such transformation also creates a new divide between members of society—a digital divide representing ‘the difference in rates of access to computers and the Internet’ (US Department of Commerce, 2000, p. 2) or, more generally, ‘the gap between information and communications technology (ICT) “haves” and “have-nots”’ (Sciadas, 2002, p. 2).

The second phase of the World Summit on the Information Society (WSIS), a United Nations summit that took place in Tunis, adopted the resolution to:

... promote universal, ubiquitous, equitable and affordable access to ICTs, including universal design and assistive technologies, for all people, especially those with disabilities, everywhere, to ensure that the benefits are more evenly distributed between and within societies, and to bridge the digital divide in order to create digital opportunities for all and benefit from the potential offered by ICTs for development (WSIS, 2006).

Many countries recognize that the divide, though it has been reduced over the years, still persists, and it particularly affects older people, those with lower levels of education, those with lower incomes and those who live in geographically remote areas where infrastructure coverage is limited.

The implications of the digital divide are not limited to whether or not individuals have, or do not have, access to technology. As the information society unfolds, having access and being able to use the new technology, especially the internet, also means being an integral part of society, and being effective citizens (Shelley *et al.*, 2006). People with limited access will be outpaced by those who are ahead in the ability to select and process information (Mason and Hacker, 2003, p. 46). Subsequently, digital exclusion has become a new form of social exclusion.

We further argue that ‘e-citizenship’ is an extension of the idea of social citizenship proposed by T. H. Marshall (1950). Social citizenship encompasses the idea that members of a society should have rights of access to an array of social protections, such as retirement income, health care and housing, in case they cannot adequately provide for themselves.

E-citizenship entails a new form of rights that the states must guarantee, namely the rights and capabilities of its citizens (in terms of knowledge, accessibility and affordability) to take part in the information society enabled by modern ICT. Specifically, members of a society should be able to access the vast and growing body of information on the internet, use cyberspace channels to communicate with friends, express their opinions and engage in transactions with government and business operators. If e-citizenship is a right, the state should have a strong role to play in ensuring that members of society are effective e-citizens. Information technology (IT) literacy should therefore be considered part of general

literacy. Enabling citizens to use major technology and applications should also be accorded a high priority. NGOs in social services have been working as a major force in bridging the digital gap, mainly for two reasons. First, if disadvantaged groups remain as non-e-citizens, they will be further marginalized. Lesser access to service information, for instance, and lack of ability to use ICT tools to gain such access will lead to a reduction in life chances. Second, an enlarged population of ICT-enabled clients would open up opportunities for new service models, leading to an increase in service quality. For example, in Hong Kong, years before the government considered digital inclusion as a major policy objective, NGOs had begun to conduct community-based technology training, and experiment with the use of ICT (at that stage, bulletin boards) to conduct support groups for homebound persons with a disability.

Countries and regions in East Asia have been very effective in transforming themselves into information societies. However, there has been little discussion about their efforts to bridge the digital divide. This paper reviews the digital inclusion strategies followed by several East Asian countries and regions, discusses a framework for tackling the digital divide and examines pertinent policies using Hong Kong as an example.

Tackling the digital divide in the 'little dragons'

Hong Kong, Singapore, South Korea and Taiwan are considered the four 'little dragons' of East Asia. We will examine how the governments in these countries and regions have responded to bridge the digital gap, before examining the situation in Hong Kong in greater detail, as an example. All four 'little dragons' became industrialized in the 1960s through manufacturing and exporting low-cost industrial products to Western markets. All have relatively small populations among Asian countries and, in the last two decades, have successfully transformed their economies so that knowledge-intensive industries and financial sectors now dominate, while labour-intensive production has moved almost completely to factories in China and other emerging Asian economies. For example, in 2006, approved investment in the Chinese mainland from Taiwan amounted to US\$7.64 billion, representing a growth of 27 per cent over the previous year (Government Information Office, ROC, 2008).

Each of these countries has outlined plans to bridge the digital gap. At present, over 60 per cent of their populations are internet users but only a small proportion of the members of disadvantaged groups, such as older people, are users. Common major strategies to bridge the gap includes distributing recycled or new computers to school children of low-income families, providing training and promotion programmes for various disadvantaged groups, setting up community centres to provide easy access particularly to low-income and remote communities, and so on.

South Korea

In 2002, 'e-Korea Vision 2006' was launched, and it was followed in 2003 by 'Broadband IT Korea Vision 2007'. From 1998 to 2005, the number of internet users increased substantially from 3 million to 33.01 million people, corresponding to 72.8 per cent of the population. All schools have access to broadband connections and all cities in South Korea are connected by fibre-optic cables. The broadband network has now penetrated rural villages (Hwang and Jun, 2007). The South Korean government drew up the 'u-Korea' strategy, which proposed to construct a society that will enable a ubiquitous communication infrastructure by which people can access information anywhere, anytime (Hwang and Jun, 2007).

To tackle the digital divide, the South Korean government implemented an information-literacy programme in 2005 in which 870,000 persons from various disadvantaged groups were to benefit. Around 23,000 units of personal computers and other information devices were distributed (Dynamic IT Korea, 2008).

Additionally, the South Korean government set up and provides resources to a semi-government organization, the Korean Agency for Digital Opportunity & Promotion (KADO), to promote knowledge and usage. One of the functions of KADO is to provide persons with disabilities, older people, those with literacy problems, farming and fishing villagers and refugees from North Korea with easy and affordable access to information and communication services (KADO, 2008).

Singapore

In June 2006, Singapore launched a ten-year national plan, 'Intelligent Nation 2015' (iN2015). Through this visionary plan, Singapore intends to become an Intelligent Nation and Global City by 2015. This plan also provides for digital inclusiveness to ensure that the disadvantaged can benefit and have opportunities for development (Hiong, 2007).

In 2007, 68 per cent of the population was using the internet. The take-up rate stood at around 12 per cent among older people aged sixty or above (IDA, 2007*b*). To bridge the digital divide, there are programmes targeting older people, children of low-income households and persons with disabilities. For example, the Silver Infocomm Junction (SIJ), which aims at helping older people, was launched in 2007. Under SIJ, senior citizens learned how to make voice calls, meet friends and play computer games online (IDA, 2007*a*).

Starting in 1999, the NEU PC Plus programme has helped more than 25,000 low-income households by offering refurbished computers and/or brand new personal computers (PCs) with a one-year free dial-up internet

subscription. In 2006, the programme was extended to students in low-income households and to persons with disabilities. It included a brand new PC bundled with three years of free broadband access and software worth S\$285 (US\$197 at today's price). In addition, the Infocomm Development Authority of Singapore (IDA) set up an iNSPIRE Fund to assist students from low-income households. In exchange for performing community service, students received a fully paid-for PC (IDA, 2008).

By mid-2008, an Infocomm Accessibility Centre, equipped with an Infocomm Assistive Technology library and vocational training services, will be fully functional. It aims to train 4,000 persons with disabilities over the next three years to help them become self-reliant and increase their job prospects (IDA, 2007a).

IDA and the Society for the Physically Disabled have been working with commercial training providers and Institutes of Higher Learning on IT training courses for persons with disabilities. More than 100 have been trained and those who show potential may join the apprenticeship programme to enhance their employability (IDA, 2007a).

Taiwan

In 2007, Taiwan launched the 'U-Taiwan Programme' (U stands for ubiquitous) with the idea of implementing the 'Next Generation Network' digital convergence technology, with its high-speed, wireless broadband and sensor networks (STAG, 2007b, p. 18). The U-Taiwan Programme envisions the benefits of these new technologies being shared equally by all members of society. It 'will employ both government and private resources to bridge the digital divide and ensure a fair and highly accessible distribution of e-opportunities and services across different regions, ethnic groups and industries' (STAG, 2007b, p. 18).

Since the mid-1990s, in order to bridge the digital divide, central and local governments have been promoting computer and Web usage through local administrations and community networks among disadvantaged groups and those living in remote rural areas. Many local communities began to adopt digital networks as a virtual world to implement public administration and policy promotions. Some communities even used this virtual world as a platform to promote local cultural characteristics and expand commercial networks. The government and NGOs co-operated to form local 'community universities' in order to build a sustainable social support network through digital training and the promotion of community culture and civil society (Graduate School of Social Informatics, 2007).

The Taiwan government has established 113 Digital Opportunity Centres (DOC) and forty-three Tribal Outreach Computer Centres (TOCC). Additionally, 140 public internet access points have been set up in 168 remote rural areas in Taiwan. Private donations of computer software,

hardware, books and broadcasting systems worth around NT\$280 million (US\$ 8.7 million at today's rate) were raised for use with DOCs, which service aboriginal schools and low-income earners in disaster reconstruction areas (STAG, 2007a, p. 2). The overall percentage of internet users had increased to 65.6 per cent by 2007, but the take-up rate for older people has been low (6.6 per cent for those aged sixty-five or above). For those who live in very remote areas, the take-up rate was 50.3 per cent (STAG, 2007a).

Tackling the digital divide: the case of Hong Kong

In 1998, the Hong Kong government introduced its 'Digital 21 Strategy'. Its vision was to put Hong Kong in the leading position in building a knowledge-based economy. The aim of the strategy was to 'enhance and promote Hong Kong's information infrastructure and services so as to make Hong Kong a leading digital city in the globally connected world of the 21st century' (ITBB, 1998, p. 10). The Digital 21 Strategy has been updated three times, in 2001, 2004 and 2008. The latest, 2008 edition of the strategy presents a vision of moving towards a digitally inclusive society: 'The vision is an ultimate information society, under which everyone can create, access, utilize, and share information and knowledge, thereby empowering individuals and enterprises to achieve their full potential and improve their quality of life' (OGCIO, 2007, p. 7).

As is the case with the other 'little dragons', older people aged sixty-five or above in Hong Kong have the lowest ICT take-up rate (5.8 per cent) across all age groups (C&SD, 2007, p. 77) while the percentage is 64.8 per cent for the total population aged ten and above (C&SD, 2007, p. 8). The internet take-up rates were much lower than those for older people in the USA, where 33 per cent of those aged sixty-five and above were internet users in 2006 as compared to the take-up rate for all adults (aged eighteen and above), which was, by then, 70 per cent (US Census Bureau, 2008).

The major projects to promote digital inclusion in recent years include the following initiatives: (i) *Digital Bridge project*—In 2001, the government spent HK\$ 200 million (US\$ 25.7 million) to deliver 21,000 new PCs (including notebooks) to 450 secondary schools for students in need who do not have a computer at home. The utilization rate was reported to be 70 per cent (Legislative Council, 2005, pp. 8, 9); (ii) *Computer recycling projects*—Several local NGOs have been active in providing refurbished computers to disadvantaged groups. The most recent programme was launched between 2005 and 2007 by the Education Bureau (EB) and by the Hong Kong Council of Social Services—the co-ordinating body for NGOs providing social services in Hong Kong. It distributed either refurbished computers or one year of free broadband internet connection, or both, to 8,200 children from low-income families, who did not have a computer at home

and made the application through schools and social workers (EB, 2008); (iii) *Digital Solidarity Fund* (www.hkcss.org.hk/dsf)—In 2004, the government started to support a community initiative to establish the Fund to help finance digital inclusion programmes. The Fund was aimed at promoting tripartite co-operation between the commercial sector, the government and NGOs to form a platform from which longer-term strategies to tackle the digital divide could be discussed and conducted; (iv) *ICT plans for persons with disabilities*—In the 2007 rehabilitation programme plan, a specific chapter was devoted to the application of ICT for rehabilitation purposes (LWB, 2007). The long-term objective of the plan was to bridge the digital divide by supporting research and the development of computer software and assistive devices so persons with disabilities could use IT. A number of projects were introduced, such as the ‘Central Fund for Personal Computers’, to assist a specific group of persons with disabilities who take part in supported employment or are self-employed at home to acquire appropriate computer equipment. By March 2007, the Fund had granted a total of HK\$3.7 million (US\$474,000) to 281 applicants (SWD, 2007).

Measuring the digital divide

The authors also conducted a study to measure the digital divide between certain disadvantaged groups and the mainstream. The measurement, which is referred to as the Digital Inclusion Index, captures not only the actual usage of computer technology, but also the opportunities for using it, including household computers and internet access, knowledge of the technology and household income. In computing the Index, information regarding these aspects was collected from six disadvantaged groups (as listed in Table 1) through a household survey. The results were compared with those in mainstream society. The overall index was expressed as a decimal value between 0 and 1. A value of 0 represents a complete divide, in which the disadvantaged group has no ICT home access, knowledge or usage. A value of 1 indicates that the disadvantaged group is no different from those in the mainstream. The index enables the researchers

Table 1 Digital Inclusion Index (DII) scores for the major disadvantaged groups

Sub-indexes	Older people	New immigrants	Single parents	Female homemakers	Children (low income)	Persons with disabilities and/or chronic illnesses
Accessibility	0.50	0.70	0.71	0.75	0.72	0.53
Usage	0.04	0.50	0.19	0.06	0.88	0.17
Knowledge	0.04	0.52	0.41	0.05	0.92	0.14
Affordability	0.50	0.71	0.48	0.62	0.00	0.54
DII	0.27	0.61	0.45	0.37	0.63	0.35

to ascertain the size of the digital gap between the disadvantaged and mainstream users (for details, see Wong *et al.*, in press). It also helps to identify which disadvantaged groups suffer from a larger gap, relative to which area. Subsequently, the government can set priorities and direct its resources to bridge the digital gap. Table 1 presents results using the Digital Inclusion Index.

The government measured the digital divide again in 2008. The data collection is completed and 2,511 individuals are interviewed. The results will help to better identify whether the digital gap is closing and for whom. It has decided to make it a regular measure in addition to its annual household survey on ICT usage in the community.

Barriers to adoption: views of disadvantaged groups

In 2007, the authors conducted a study among six disadvantaged groups, to identify what they thought were the barriers that prevented them from using technology. The study adopted a general qualitative orientation with a holistic concern over the issue and getting insight into the barriers. A total of 346 ICT users, nonusers and trainers, as well as those who had stopped using ICT (drop-outs), were interviewed in separate focus groups for each disadvantaged group to ensure a good coverage of persons with different experience in using ICT. Table 2 displays the numbers of participants in each category.

A series of forty focus group meetings was organized among the disadvantaged groups within an eight-month period with the help of the Hong Kong Council of Social Service. Forty-eight NGOs were contacted to recruit participants for the interviews. The group sizes ranged from eight to twelve persons and the interviews were conducted at the NGOs where the participants usually joined activities, or at places convenient to them. During the meetings, they were asked why they used and/or did not use ICT, and suggestions about public facilities and ICT applications

Table 2 Distribution of focus groups participants

Disadvantaged group	Users	Drop-outs	Non-users	Service providers	Total
Older people	12	13	10	8	43
Persons with disabilities and/or chronic illnesses	58	40	48	36	182
Female homemakers	12	3	11	8	34
Single parents	9	12	11	9	41
New arrivals	9	7	8	7	31
Children (low income)	14	8	10	1	33
Total	114	83	98	69	364 ^a

^a55% females and 45% males.

and content were also solicited. All focus group discussions were audio-recorded and transcribed. The transcriptions were coded, conceptualized and categorized into several main factors constituting barriers to ICT by the authors. The transcriptions of the interviews with the older people, female homemakers and persons with visual impairment were independently coded and categorized by another researcher. Their findings confirmed our interpretation. Although we tried to involve interviewees with different experiences in using ICT, they were selected and invited by the collaborating NGOs according to the set criteria. We were not able to interview non-members, who might experience different barriers in using ICT.

The results indicated that free public access, though available in the community, was still not convenient or friendly enough for disadvantaged people to become regular ICT users. Queuing to use the limited numbers of machines is still common; support is still limited when they encounter difficulties:

The computers in the library are all right. . . . We are always put on the waiting list and there is a one-hour time limit. We simply have no time to do our homework (Two children from low-income families).

The learning curve to master computer technology, though at a basic level, is still steep, especially for those with limited general literacy. Some did have a computer and internet access at home, but it was mainly for the use of other family members. They seldom used it, for fear that they might damage the machine or files inside:

. . . we don't know how to input Chinese characters. . . . I tend to forget after the instructor leaves . . . but when he's there, I would know. . . . I simply give up (An older person).

Although they may have received computers through a recycling programme, the computers were likely to be old. These machines tend to need more repair and maintenance than others. It was not uncommon for some users to wait for several weeks for the free maintenance service from volunteers, and they would simply give up using the equipment as a result. Technical support was also difficult to come by, and it frustrated their efforts to continue their usage:

It costs me a lot to have it fixed by commercial repairers . . . so I don't dare to use it anymore (A female homemaker).

Some respondents did not think that the internet had anything useful or interesting enough for them. They considered that using IT would have little impact on their lifestyle, especially when most of their friends/peers are nonusers. The lack of interest is a complicated issue. It relates partly to the availability of useful content and applications, partly to the lack of user-friendly equipment. Simply providing access and training courses is not enough to make using computers attractive:

... the newly-arrived women immigrants *[mostly from the Chinese mainland who have married a low-income older resident]* pay close attention to the school website, and we teach them about life-related sites like the year planner, and they find it very interesting (An IT trainer for new arrivals).

Better ways to tackle the digital divide

The experience in Hong Kong and other East Asian countries and regions indicates that, despite positive results from promoting the use of new technology among the general public, the take-up rate among certain disadvantaged groups is both low and seems difficult to improve. In fact, few statistics are available showing to what extent these plans have reduced the digital gap, except to indicate the number of people benefitting from the programmes. Besides, it is not clear how various disadvantaged groups have obtained better government or social services through the use of ICT.

The strategy to bridge the digital gap should go beyond offering public access and training. Given the rapid development of the information society, it has become more urgent to develop better strategies so that no one will be excluded from being effective members of their society and, thereby, become marginalized. The following are some suggestions for promoting better digital inclusion based on the experiences of Hong Kong and other East Asian countries.

Hardware and software support in addition to accessibility

Given the significant drop in the cost of computing technology, more families can afford to install the equipment and have an internet connection at home. Thanks to various computer recycling and donation programmes, many members of disadvantaged groups have also been able to use PCs at home, some with low-cost or even free temporary internet connections. Additionally, there are a growing number of access points in public, community facilities. Nevertheless, disadvantaged groups need hardware and software support as well as affordable repair and maintenance services. Without this, many stop using the equipment when they encounter problems and cannot get help. In fact, there are many volunteers in the community who would like to help solve these problems. However, better mobilization and co-ordination are needed.

Better design, more relevant content and applications

The disadvantaged might need different designs, content and applications that suit their needs and skills. However, they do not constitute a strong market force to attract commercial firms to produce products tailored for

their requirements and purchasing power. In this respect, government interventions in terms of direct provision, subsidies and regulation are important. Many governments have made their websites barrier-free for persons with visual impairment and have provided computing aids for some persons with disabilities. Greater effort needs to be made in these areas.

Training and organizing

Training programmes are important. However, they are still in short supply in terms of fitting the schedules of disadvantaged people. It is difficult to attract those who still do not see the relevance of the technology to their lives. Social workers can help organize and mobilize leaders and users among the disadvantaged at the community level. If a critical mass of users can be established, it will be easier to attract others to use the technology in ways that relate to their ways of living and interacting with their peers. Organizing might additionally involve mobilizing disadvantaged groups to express their needs for better designs and applications, and more relevant content.

Monitoring results through programme evaluation and digital divide measurement

Regular monitoring of the state of digital inclusiveness in a society is important so that observations can be made to determine whether progress has been made in key areas and among targeted disadvantaged groups. In addition, programmes designed to bridge the digital divide should include better evaluative designs so that their impact can be ascertained with due consideration given to changes that might result from cohort or other effects.

Leveraging the input from commercial enterprises

Either in cash or in kind, vendors, especially those in the ICT sector, have been making donations to help bridge the gap. It is also believed that overall service statistics, generated by such an alliance and presented in a standardized format, could be used to demonstrate the effectiveness and the impact of donations and would therefore be helpful in lobbying for more donations.

Conclusion

Rapid development in computer technology, infrastructure, content and applications has placed ubiquitous access to the internet within reach.

However, as great strides are made in the development of the information society, the effects of exclusion and marginalization are becoming more aggravated for those who still do not know how to use the new technology and who cannot, therefore, become effective e-citizens. Some aspects of the digital divide can be bridged by providing free access to the public, particularly to disadvantaged individuals. All four East Asian 'little dragons' have developed plans to promote technology usage among children because they consider these efforts to be an important investment in human capital, and they have been very successful. Younger people, even among those in the low-income category, have an above-average level of knowledge and usage as compared to the general population in their regions. However, the barriers preventing older people, persons with disabilities and people with lower levels of education from taking part in the information society are still high. Our suggestions for improvement are as follows: improved designs for content and applications; better support; better organizing at the community level to mobilize volunteers, peers and leaders and match them with those who need IT support to promote digital inclusion among them. A multiple-stakeholder approach that includes the efforts of the government in collaboration with civil society and the private sector is important in promoting a truly digitally inclusive society for everyone.

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