

## ***Bridging the Digital Divide: - A Myth or Reality ?***

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**Abstract:** Researchers have been documenting about the digital divide between developing countries and developed countries since 1970's. Some experts in areas like Public Policy, Communications, Business Management and Economics have also addressed the phenomenon of digital divide since the 1990's. We are in the 21<sup>st</sup> century and still there is the same old talk of digital divide amongst these researchers. One wonders whether digital divide will continue forever and whether we will ever achieve a Technology that closes this gap. This paper attempts to investigate ways to bridge the digital divide between Developing and Developed Countries and explore facts about Digital Divide that might be of some interest to the reader. The contribution of this paper is in the way this digital divide can be perceived as a reality or a myth given the number of years that have elapsed since this term was first coined by Lloyd Morrisett<sup>[6]</sup>.

**Keywords:** Digital Divide, ICT, Wireless Network, Mobile Technology, WiMax

### **1. INTRODUCTION**

The digital divide has become a topic of academic interest amongst researchers. The digital divide is a major concern to the corporate business world, government officials throughout the world and it has been generating a lot of discussions in educational institutions, government agencies, non-governmental organizations, corporate boardrooms, small scale organizations at the grass root levels and sometimes in social places. What is Digital divide? [1] defines digital divide *as the gap between the Information Communication Technologies (ICT) "have" and "have-nots"*. [5] also defines the digital divide *as the difference between users and non-users in accessibility, and usage of ICT*.

The "have-nots" are the disadvantaged groups that have less opportunity to enjoy the use of ICT. This can be seen in groups such as those with low economic power, low formal education, senior citizens (ages 65 and above), housewives – women especially in low income groups, gardeners –men in low income groups, people with disabilities. These groups of people can mostly be found in the continents of Asia, Africa, Americas with Africa and Asia leading the pack. On the other hand, the "haves" are privileged groups mainly in developed countries, the so called first world. In [12] the World Summit on Information Society (WSIS) also defines the digital divide *as the unequal access to information and communication technologies*.

It should also be noted that while we might be interested in the digital divide between developed and developing countries, in developed countries or developing countries, there still exist the digital divide between the cities and rural areas.

The paper is organized as follows; Section 2 discusses the background about digital divide, Section 3 deals with related work on digital divide, section 4 looks at cases where attempts have been made to bridge the digital divide, section 5 Bridging the digital divide Section 6 deals with Discussion and Conclusions and finally section 7 References.

### **2. DIGITAL DIVIDE BACKGROUND**

An The digital divide refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access Information and Communications Technologies (ICTs) and to their use of the Internet for a wide variety of their activities [3]. A study carried out by ITU – International Telecommunications Union is represented in a graphical format below:

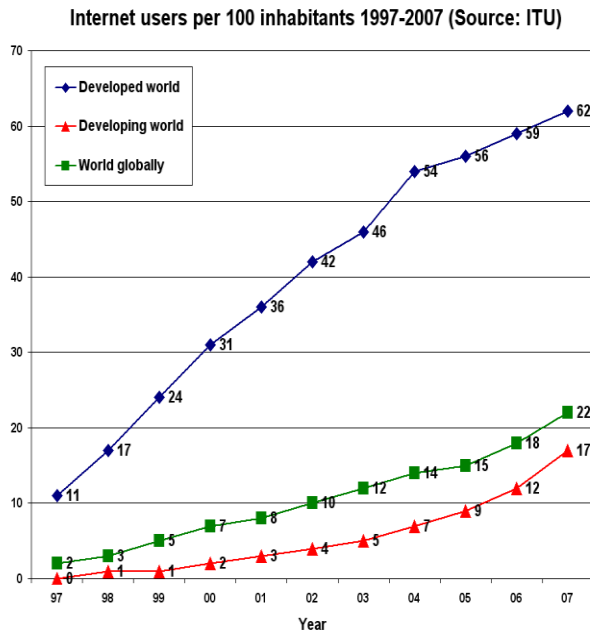
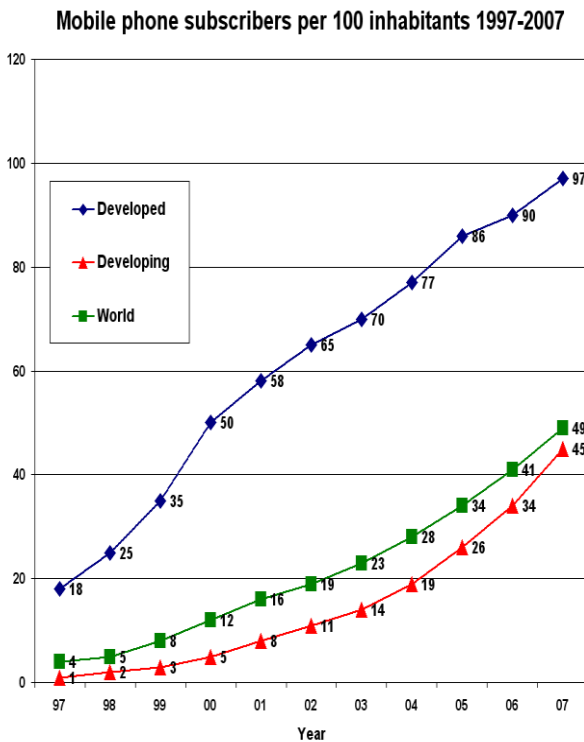


Figure 1 : Internet users across the world

The table above (Table 1) shows that from 1997 up to 2007 and now, the developing countries are lagging behind the developed nations in terms of the usage of the Internet. Although in all cases there seems to be an upward trend the growth rate for the developed countries far outpaced that of the developing countries. One wonders if this gap will ever be reached. The situation is no different when it comes to Mobile phone usage, as can be found in Table 2 below.



According to [4], digital divide can be described as:

- ◆ Those who have computers and Internet access vs. those who don't have
- ◆ Those who are able to use digital contents vs. those who aren't
- ◆ Those who are able to produce digital contents vs. those who aren't

From the evidence above, in 2007, 62% of Internet users per 100 inhabitants were connected to the Internet in developed countries compared to only 17% from developing countries. For mobile subscribers, in 2007, 97% came from developed countries compared to only 45% from developing countries. This show how a digital divide is a technological inequality separating the “haves” and the “have-nots”.

In general, the wealthy people or developed countries are the ones seen as being capable of affording technology purchase and acquire skills necessary to use the same technology while the poor or developing countries are restricted by barriers like poverty, technology illiteracy, wars and this is actually the baseline for the digital divide concept.

[7] argues that in order to bridge the digital divide, we must do something about two things:

- (i) Technology and
- (ii) Users/people involved.

Technology will bring information to the people, that are the users of the technology and the Users/people must be enlightened, educated and brought to be abreast with time to know how to use the technology that will bring them to access the information. In other words, the two are intertwined. Some of the technology that can bring the information to the people include but not limited to the following: ICT, Radio, Television, Mobile Telephony, Computers, etc. via media such as CDs, DVDs, SVCD, MP3, MP4, USB Flashes, etc.

For the people, we must find the type of information that they need most, some which are the following: social networking such as Facebook, Flickr, Twitter, Tumblr, LinkedIn, Instagram, Skype, among others. These social networking platforms are popular among the youth, and newspapers, sports, weather, health; travel, weather etc. are popular among the older citizens. They further argued that to bridge the digital divide, information access must benefit the whole community. In [13], they argue that satellite communications can also be used to bridge the digital divide, especially where wired cables are difficult to extend to; as in mountainous and very rough terrains. They also revealed that certain factors inhibit the bridging of the digital divide. Such factors include, but not limited to the high cost of broadband access, lack of technical know-how, economical challenges in upgrading age-old infrastructure and starting up new ones. This leads us to discuss the main challenges facing the bridging of the digital divide.

### 3. CHALLENGES FACING THE DIGITAL DIVIDE

#### 3.1 Technical and social challenges

The ICTs are creating the so called “Information Society” that is characterized by rapid technological advances, this leads to increased usage of ICT in all sectors of the economy [2]. This new dispensation has provided the developing countries with enormous opportunities to improve their wellbeing and to “leap-frog” into the Information Society. As much as it is envisaged that there will be a lot of benefits accrued to the use of ICT in developing countries, it is feared that the increase in importance of ICT in all walks of life might contribute to the economic disparities between technology-rich first world and technology-poor third world. This can still spill over even in developing countries where we have the technology-rich towns and the technology-poor rural areas. It might be argued that to bridge the gap, we need to put the technology infrastructure in the rural areas as well; in case of developing countries. There are many examples of well-funded rural areas initiatives in Africa, but have failed to provide the benefits to the local communities involved. This shows that this matter is very complex and there are many social and technical challenges that need to be addressed. According to [2] about six challenges were identified.

*Challenge 1:* Reconciling the tension between technology push and local development needs; the local developers setting up of ICT infrastructure in the rural areas without adequate consultation with the local communities input usually leads to a failure; related to this is what is termed as the technology dump. This is usually a method where donations of computers to rural areas are usually old obsolete computers without any implementation plans. So we have old computers without any technical support.

*Challenge 2:* the lack of electricity in some rural areas; especially many rural areas in Africa do not have electricity, i.e. not yet connected to the national grid. So for ICT to be implemented successfully, there must be an electric power source, with the absence of the power source, this proves to be a challenge.

*Challenge 3:* The lack of supporting communication infrastructure; the telecommunication infrastructure has been poor in rural areas, fixed land lines are associated with government institutions which in most cases are not spread evenly in rural areas. This problem can be addressed by the use of wireless and satellite, but on the other hand, there are cases of vandalism in rural areas that complicates the matter even

further. Wireless technology can be used to connect key government institutions in the rural areas; this can assist other users to just tap in as it becomes cheaper to connect all schools or even private individuals.

*Challenge 4:* The lack of PC related skills in rural areas; in most African countries computer literacy is rare in rural areas, so any initiative that involve ICT has to be met with lack of literacy, so there is need for the African governments to introduce computer literacy in the primary curriculum.

*Challenge 5:* The lack of PC related applications and sustainable career path opportunities in rural areas

*Challenge 6:* other social challenges like use of local language and culture as lack of English proficiency among local community members may hinder the use of web and other ICT applications. This may also pose a problem if the training might influence the community power structure.

[12] also delved into some of the challenges facing governments and stakeholders in bridging the digital divide. Some of these problems are as follows:

- Availability of Internet services, which may be due to myriad issues ranging from erratic electricity to poor infrastructure all the way to lack of qualified technical know-how to man the service
- Poor or no public infrastructure such as no national backbone to carry data or using copper wires that were laid in the 1960s.
- Government policies that sometimes go against the exact aim of bridging the digital divide.
- Low IT literacy amongst the populace.
- Cost of signing on and recurring charges for the use of the system
- Users not seeing the benefits of Internet or something to be afraid of in the worst case.

### 4. RELATED WORK ON DIGITAL DIVIDE

A number of researchers have done related work on Digital Divide, ranging from the factors that are hampering the bridging of the divide to proffering solutions to how to bridge the divide[8,9]. For instance in [8], the authors discussed the current status of broadband in the United states and went on to state that not only is

digital divide found between rich nations and developing nations, but it also exists within rich nations. They argue that the telecommunications companies prefer to put communication towers in areas where the population is dense that they can reap their profit in good time. This leads the rural or sparsely populated areas within the country not connected to the *broadband bandwagon* (national grid).

Ours is the first of its kind that attempt to pose an open discussion question on whether this *bridging of the Digital Divide* is really a myth or a reality. We shall leave this questions unanswered and entreat the reader to make his own judgment.

In [9,14], they also suggested that a Mobile Telephony could be an alternative technology to bridge the digital divide. This means browsing or accessing the Internet via hand-held devices such as PDS – Personal Digital Assistant, mobile phones including Palmtops such as iPads and Android smart phones, Smart Phones and Laptops. They have also suggested that in order to bridge the digital divide, 3 issues must be considered: the accessibility, availability and affordability of services of applications and that the adoption of mobile Internet depends on people's social-economic factors. That is middle income people who are able to afford Smart Phones are easily able to use mobile Internet. Those in the lower rank of the socio-economic ladder are mostly left behind. It is clear that if we are to bridge the digital divide, then we must address people's social-economic status. Once people have well-paying jobs, they will be more than willing to afford smart phones and other mobile /portable devices to go onto the Internet. They also argued that what will drive the Mobile Internet usage and adoption will be the price of mobile Internet services, availability of fixed telephony, age of users, living area; people living in the cities and urban areas are more likely to adopt mobile Internet compared to those who live in rural or remote areas, and the Mobile Operators themselves.

In [10, 15], they argued that specific skills, education and resources are the precursors for benefiting from the digital age. [15] further suggests that the digital divide can be broken down into 3 levels.

- i. The *Global divide* → which may refer to the divergence of Internet access between industrialized and the developing countries
- ii. The *Social divide* → which is the examination of the gap between the

information rich and poor in each country and

- iii. The *Demographics divide* → which highlights between those who do and those who do not use digital resources to 'engage, mobilize and participate in public life'

In [11], the authors cited numerous instances in China, in which the authorities have managed to extend fixed telephone lines to rural areas to help reduce the digital gap. According to the authors the Chinese government has managed, for those rural areas under considerations, to have extended 99.5% of such rural areas to the national grid in these Chinese villages. This has boosted their accessibility to the Internet.

## 5. BRIDGING THE DIGITAL DIVIDE

From the above discussions, it can be inferred that a number of issues must be addressed:

- a. Role of Internet – the Internet must be the prime technology for people to access digital information. This means both governments and the private sectors must be involved. [12] has suggested that to bridge the digital divide, government must take the initiative to provide the infrastructure such as Fiber optics cables, ADSL and other broadband technology.
- b. Affordable computers cost and Smart phones – the price of devices that can be used to access the Internet and other digital bandwagon must be easily affordable by nearly all, otherwise the digital divide will not have been bridged. Since the majority of people in the developing world live on less than a dollar a day, this remains the single most important issue to be tackled if the digital divide is to be bridged or 'closed'. Who is to provide the means for this huge people who through no fault of theirs are unable to access the Internet, even if the technology is provided to them.
- c. Wireless network – this according to some of the authors from the related work above, promises to be the future technology whereby most of the people in the remotest regions would be able to get hooked onto the broadband bandwagon, especially in terrains where fixed lines will be almost impossible or nearly impossible to install. For instance, Indonesia has over 3000 islands. Installing fixed lines across all these islands will be a daunting task. Meanwhile a wireless technology will be able to cover the whole area with few cell towers. With high wireless broadband access, multimedia, sound and other media can be carried to millions of people, and not only that, they will be able to interact with the system through their mobile devices,

assuming such are affordable to them, considering the fact that most of these people earn less than a dollar a day.

- d. Wi-max – [16] defines WiMax as a technology standard for long-range wireless networking. WiMAX equipment exists in two basic forms - base stations, installed by service providers to deploy the technology in a coverage area, and receivers, installed in clients. WiMAX, also known as 4G, is incredibly fast, running anywhere between 4 to 10 times the speed of 3G. Imagine a world where most of us would be downloading and uploading at such a fantastic speed? For this to happen we must still go back to the basis, affordability.
- e. Training of People – the users must be enlightened to accept or embrace this technology and to use them to their advantage. This means social barriers will have to be broken, taboos will have to be thrown away [12]. For example in Tanzania, cultural issues are a barrier that must be broken to bridge the digital divide [12]. A lot of people see the Internet as a Western creation to dominate their lives and therefore shun it. There is therefore the need to break this cultural barrier. This is not going to be easy.
- f. Government to take initiative → to bridge the digital divide various governments in various countries must take initiatives in their own countries, then invite individuals, non-governmental organizations and other stakeholders onboard. With all on board, it will be easier to find solutions to some of the numerous problems mentioned in this paper.
- g. Institution reform → these are issues that mediate all of the above such as economic, political, and social life, which include bodies that enable and support the initiatives to bring the Internet access to communities.

The first four points above (a. – d.) borders on Technology: - which means connectivity and availability of these physical access points technologies must be easily obtainable if we are to bridge the digital divide.

## 6. DISCUSSION AND CONCLUSIONS

We have discussed what is Digital Divide, factors affecting the adoption of digital divide, and bridging the digital divide. We have realized that to bridge the digital divide a number of factors must be taken into consideration: Internet must be brought to the doorsteps of the people, Computers, smart phones and other hand-held devices must be affordable to almost everyone who wants to get on board the digital

bandwagon. This includes even people earning as low as \$1.00 per day, provision of wireless technology, and embracing 4G/WiMAX technology. More importantly, people will have to change the way they do things, the way they view technology and to embrace and accept this new technologies to their advantage, assuming that they are able to afford it. Is this possible? So we ask the question ‘is bridging the digital divide a reality or a myth?’

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