Closing the digital divide: who will invest in universal access?

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Abstract

It is estimated that by 2007 the milestone of two billion mobile users will be achieved, with the three billion mark being claimed as a realistic target for 2010. This in turn bodes well for the goal of 50% access to telecommunications by 2015, set by the WSIS initiative. However the barrier appears to be a workable model for connecting these people to the network. The World Bank suggests that 77% of the world's population already lives within range of a mobile network. Whilst most wealthy economic states have already been targeted and serviced, for the next stage to be accomplished growth must take place in other markets.

The push towards three billion users requires more than the supply of cheaper handsets to this emerging market. Such initiatives need to be supported by low-cost service plans as well as low-cost and efficient mobile network infrastructures. This in turn depends upon government cooperation, which is influenced by the basic economic dilemma facing most states - the method by which they may promote the highest value in the industry for the scarce spectrum which is to be allocated.

Introduction

It is estimated that by 2007 the milestone of two billion mobile users will be achieved, with the three billion mark being claimed as a realistic target for 2010.[1] Whether these figures are totally accurate or not, the World Bank[2] supports the belief that mobile is closing the 'digital divide' faster than anyone had previously anticipated. This is turn bodes well for the goal of 50% access to telecommunications (in some form or another) by 2015, set by the UN backed WSIS initiative.

However, this picture omits key data and significant considerations that may very well curb the anticipated growth outlined above. The World Bank suggests that 77% of the world's population, (approximately 5 billion people), already lives within range of a mobile network. The barrier appears to be a workable model for connecting these people to the network. In other words, it is a matter of cost, or rather the ability of certain sections of the global population to afford access to the network.[3]

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[1] Henrik Brogaard, GM of New Growth Markets, Asia-Pacific for Nokia Networks.
[2] Reported in February 2005.
[3] According to analysts such as Michelle de Lussanet (Forrester Research), the per capita GDP in emerging markets such as the Philippines is barely 1/40 of that in most Western states such as the UK or US.

Most wealthy economic states[4] have already been targeted and serviced, resulting in the rapid spurt towards two billion mobile users in recent years. However, for the next stage to be accomplished, (the three billion mark), growth must take place in other markets. These key growth areas have already been identified, but the problem of affordability remains a stumbling block.[5] This relates not only to the cost of the handsets but also to the accompanying service packages.[6]

It is true to say that in recent years several equipment vendors and handset makers have been focused on the development of low cost hardware.[7] In this respect, it appears that Motorola are leading the way with their sub-$40 handset. Whilst this figure appears to be achievable, there are necessarily associated costs – design and functionality being the most prominent of these.[8] Nevertheless, it is believed that the introduction of such an 'emerging markets handset' would enable up to another 1.5 billion people, (predominantly in Africa and India) to buy into the mobile network.

However, as noted above, this is only a part of the picture. The move from two billion users to that of three billion requires more than the supply of cheaper handsets to this emerging market. Such initiatives need to be supported by low-cost service plans as well as low-cost and efficient mobile network infrastructures. This in turn depends upon government (state) cooperation.

It is claimed that service tariffs are already beginning to fall in emerging markets, such as India, which have embraced competition. However, the question remains as to how such a competitive environment may be achieved and subsequently maintained so as to support the aims outlined above. This is perhaps where most people connected with the telecommunications industry will adopt either one standpoint or another.

The basic economic dilemma facing most states is the method by which they may promote the highest value[9] in the industry for the scarce spectrum which is to be allocated, as this will have a significant impact on both the development of telecommunications and society as a whole. There is a growing trend towards deregulation and a greater reliance on market forces in spectrum management. Indeed, many states have started to introduce some form of market-based mechanism in managing spectrum. At one extreme, a few countries such as the US and Australia have

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[4] Consisting of high-end users that are in a position to afford technologically advanced (and as such expensive) handsets.

[5] In other words, the cost of the service packages used by many high-end users amounts to the average income earnt by this group in a 6-month period.

[6] One solution is to develop basic service plans which omit all but the most essential services.

[7] Note the 'emerging market handset' tender to Motorola in February 2005 by the GSM Association. In addition, China Unicorn has recently adopted a low cost handset mission which is aimed at boosting its CDMA business – though price still appears to be a problem.

[8] Allen Burnes (Motorola's high growth markets VP) states that applications such as WAP and MP3 will be omitted from such handsets so as to keep costs to a bare minimum.

[9] The meaning of this term will be examined later on in this paper.

deregulated spectrum management by permitting the market-based allocation of spectrum use. By contrast, many states have retained some degree of centralised control over functions such as spectrum allocation while introducing market-based mechanisms, such as auctions, to assign spectrum. Should the concept of "highest value" include factors other than economic concerns such as addressing shortcoming with respect to universal access, bridging the digital divide and expanding to the provision of service in developing markets to supplement economic growth and the elimination of poverty?

The paper will examine these considerations and offer thoughts and experiences on this increasingly important issue of spectrum regulation. Can spectrum regulation be used as a tool for furtherance of social policy? While it is undeniable that competition must be encouraged and that service provision must be as efficient and cost-effective as possible, do other concerns inform the regulation of spectrum. In other words, can spectrum policy engender universal access so as to reach the next one-billion mobile users?

Is this achievable through simple competition, or will the next one billion users only be provided with access through government intervention? Or will governments impose operating costs on mobile phone network providers to bear the cost of universal access for the poorest in society? Should government impose a universal right to mobile phone access? What is the role of the ITU in this controversy? Is the mobile phone no longer a luxury item but rather an essential component to link individuals who live in places where no fixed line services are available?

Thus, this paper will balance both technical and societal issues with regulatory and economic questions.

Digital Divide Controversy: Laptops vs Mobile Phones

In the developing world, technology requires careful analysis and preparation on a country-by-country basis in order to succeed. For example, in countries with levels of low literacy, the introduction of the Internet, however cheap, is unlikely to have a significant social or economic impact. Instead, 'simpler' solutions should be regarded as the preferred way forward in these areas. In this respect, the provision of basic telephony services over mobile or fixed networks, are likely to deliver the most immediate and practical benefits. In other words, technologies that foster basic communication and inter-communication, such as SMS, email or VoIP, will generally be far more effective than PC-based technologies such as word processors, databases and spreadsheets.

As Craig Ehrlich[10] points out, the solution to the digital divide is not the $100 laptop but rather the mobile phone:

> "….Low-cost computers are only a small-part of the solution to the digital divide. Even $100 laptops are going to be too expensive for the 2.5bn people worldwide living on less than $2 a day….But there is a much

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[10] Chairman of the GSM Association Board.

cheaper high-tech tool that is becoming increasingly affordable for ordinary people in the developing world: the mobile phone."[11]

Ehrlich's assertion is based on his appreciation of the fact that whilst mobile phones do not possess the complete range of features found in a laptop, they are nevertheless capable of delivering services, (i.e. voice calls, text messages and, increasingly access to e-mail and the Internet), that meet the needs of the hundreds of millions of people that make up these communities; farmers, fishermen and other small business people as opposed to those who characterise the markets of the more developed regions of the world:

> "Hundred-dollar laptops attract headlines in rich countries accustomed to computers costing five times that figure. But it is going to take ultra low cost initiatives, such as mobile payphones, to close the digital divide."[12]

Consequently, for these people, who have never previously had access to telecommunications, the device they utilise is far less important than whether it is connected to the wider world. In much the same way that a laptop computer can quickly link buyers and sellers, co-ordinate vaccination programmes, help the unemployed find jobs, transfer electronic payments and perform all kinds of other important tasks that normally require a lengthy journey, via an Internet connection, so too mobile phones may accomplish this task though in a far more user friendly and grounded manner. In this respect, Dave Tansley of Deloitte, feels that the issue of the digital divide may only be engaged effectively once the social and economic context is taken on board:

> "Efforts to bridge the digital divide in the developing world will probably fail to address underlying problems and the deep economic and political issues."[13]

Consequently, whilst there may be high profile success stories where the introduction of technology has helped a particular village or enabled a specific community to manage a problem, these stories will be isolated in nature and in most cases the solutions required will need a more profound approach. This in turn requires us to consider the economic backdrop against which such approaches are to be applied:

> "The overall fundamental problem remains the economic gap between rich and poor, between working class and middle class. The digital divide is just one of many symptoms that must be addressed. For example, providing

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[11] Craig Ehrlich, "Let private enterprise bridge the divide", Financial Times, 13 February 2006, FT Digital Business 3GSM Preview, p. 2.
[12] Ibid.
[13] Dave Tansley, "Mind the Gap: 2006 will witness the deepening of the digital divide", Financial Times, 13 February 2006, FT Digital Business 3GSM Preview, at 2.

> free WiFi coverage to everyone is laudable, but it is unlikely to have much impact unless combined with subsidized equipment and training."[14]

Returning to the issue of technology, a considerable proportion of the debate relating to the digital divide centres on finding ways and means of getting computers into the hands of budding digital citizens in developing countries.[15] However, there are a growing number of individuals who are looking to existing mobile phone technologies as the way to connect the world. As Tom Phillips[16] notes, "everyone is talking about the digital divide, but the real issue is getting phones in everyone's hand".

This view has gained support from less predictable sources. According to Craig J. Mundie, Microsoft's vice president and chief technology officer, Bill Gates believes that mobile technology is a more effective way of bringing computing to the masses in developing nations,[17] if only for the simple fact that he believes that "everyone is going to have a cellphone."[18]

However, as Phillips notes, "the core message is simple; [at present] 80% of the world has mobile coverage yet only 25% is accessing it."[19] Therefore, it is clear that the economic backdrop plays a key role in any discussion relating to addressing the digital divide and it would appear that one or two industry players have started to address this problem. As Ehrlich recently pointed out, the GSM Association has led an industry wide initiative that has cut the wholesale cost of entry-level mobile handsets, with vastly improved battery life, from about $100 to below $30 within 18 months:

> "Falling prices are having a massive impact. The global mobile industry is now connecting more than 1 million people a day, up from 600,000 a day three years ago. Within a few years, the mobile industry will have more customers in the developing world than the developed. What's more, they are being connected without the financial support of government or charities."[20]

Yet, Ehrlich believes that the domestic governmental policies of many of these developing countries impede the growth of public access to mobile phone networks. He feels that government intervention inflates the cost of mobile services to end-users, which in turn holds back societies which are in desperate need of more effective communication systems. Therefore, if governments are committed to narrowing the digital divide they

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[14] Dave Tansley, "Mind the Gap: 2006 will witness the deepening of the digital divide", Financial Times, 13 February 2006, FT Digital Business 3GSM Preview, at 2.

[15] Jo Twist, "Pocket answer to digital divide", 11 November 2005, BBC News, available at: http://news.bbc.co.uk/go/pr/fr/-/1/hi/technology/4446966.stm

[16] Head of GSM Association's policy unit.

[17] John Markoff, "Putting the Poor Online: Laptops or Cellphones?, The New York Times, 11 February 2006, p. 6.

[18] Ibid.

[19] *Supra*, n 14

[20] Ehrlich, op cit.

should initially focus on issues such as these. However, as noted earlier, this is only one part of the picture. Entrepreneurship and competition go a long way towards the growth and maturity of a society's telecommunications network, which it turn may promote the highest value[21] in the industry for the scarce spectrum which is to be allocated, and as such have the most significant impact on both the development of telecommunications and society as a whole. To this end, Ehrlich notes:

> "…even with the aid of governments, the GSMA believes the mobile phone, never mind the laptop, will remain too expensive for more than 1bn of the world's poorest people for the foreseeable future. To provide telecommunications to these people, the GSMA is co-ordinating projects designed to encourage entrepreneurs in the developing world to set up mobile payphone businesses."[22]

What is the essence of the mobile payphone service that the GSMA believes will close the digital divide?

> "Equipped with specially adapted handsets, these entrepreneurs can rent airtime to local people who need to contact someone, but do not have a phone. The increasing availability of ultra-low-cost handsets means entrepreneurs can set up mobile payphone services without a big capital outlay."

The "Home Grown" Solution: Mobile Payphone Services

Mobile payphone services have been the subject of recent interest in the UK. In a recent BBC News feature, Roland Buerk explored the way in which the digital divide is being addressed on a 'cottage industry' basis within Bangladesh and the way in which 'telephone ladies' has become a central, if unplanned and certainly unintended, part of enabling Bangladesh to bridge the gap.[23]

The problem faced by Bangladesh, as with any other developing country, is how to get mobile phones into the hands of the rural poor who live in areas with no landline penetration. However, the concept of the 'telephone lady' appears to have partially addressed this problem. Buerk outlines the experience of Roshinara Begum who lives in Kalimajani and who made the rather unusual, though as it turns out, very wise decision to take out a loan in order to purchase a mobile telephone. This now forms the basis of her living, which she makes by renting out her mobile phone to people who wish to use it:

> "Kalimajani is a typical Bangladeshi village. It is surrounded by paddy fields and the only way to get here is by walking along pathways...Like

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[21] The meaning of this term will be examined later on in this paper.

[22] Ibid.

[23] Roland Buerk, "'Telephone ladies' connect Bangladesh", BBC News, 26 November 2005 available at: http://news.bbc.co.uk/go/pr/fr/-/1/hi/world/south_asia/4471348.stm

much of rural Bangladesh there's no fixed line telephone service. In fact, the country has one of the world's least developed networks. So Kalimajani was largely cut off from the world. Until, that is, Roshinara Begum got her mobile phone. She was helped to buy it by Grameen Bank. It has long been a leader in micro credit, giving small loans to help the poor set up businesses. Now it is bringing technology to rural areas. Roshinara Begum sells calls. She's become one of Bangladesh's telephone ladies."[24]

Initially, this appears to be quite an unusual concept; that is until anyone in the developed world reflects back to the advent of the fixed line telephone service whereby friends and neighbours would pay to use the facility due to its limited coverage. The same simple, co-operative principle applies to the concept of the telephone ladies. Customers use the service to maintain contact with loved ones who have left such rural areas in order to gain work in the cities or to service their business needs. As one customer notes: "If the phone wasn't here then I'd have to travel to Dhaka. It's a very long and unpleasant journey. Now I can use the phone I am saving time and it makes my business more competitive."[25]

More importantly, the banking sector in these developing countries has identified the attractiveness of this model and the need to support investment. To date, Grameen Bank in Bangladesh has granted loans to over 180,000 telephone ladies, with a further 10,000 such individuals being signed up each month. This in turn generates a monthly revenue stream of around $10m for the bank. As Dipal Chandra Barua[26] notes:

> "This is a good business for Grameen and a good business for the rural women…At the same time customers are also benefiting because, even though they don't have a phone, they are getting a phone service at cost price, at a market price. So this is good - a win-win situation for the broader customer, our telephone ladies and Grameen."

Broader Themes Underlying the "Home Grown" Solution

So what can explain the rapid growth of low-cost private initiative universal access schemes such as the telephone ladies of Kalimajani?

An obvious reason is cost. When one compares the cost of building a fixed line infrastructure which can also offer access to the Internet, it becomes clear that mobile networks are more cost efficient. Twist attributes the success of mobile networks - over Internet access centres - with their ease of use and ability to conveniently overcome language and literacy issues.[27] He goes on to note: "Net access in the traditional sense,

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[24] Ibid.
[25] Ibid.
[26] Deputy managing director of Grameen Bank
[27] Twist, op cit.

via a computer, still needs some level of know-how, such as typing and reading skills.
[However] the mobile, in its simplest form, requires voice only."[28]

Indeed, this simplicity in both the use and form of the mobile has meant that mobile
technology is being extensively used for e-learning, e-commerce, and e-government in
many developing countries such as Bangladesh. Local communities there are working on
making more local content available via mobile networks.[29]

However, government policy and regulation in many developing nations actually works
to impede the closing of the digital divide. Taxation and regulation policies also need to
be tackled in developing nations to ensure fair and cheap access.[30] As Mr Phillips of the
GSM Association notes, numerous countries impose taxes on text messaging as well as
on the actual mobile handsets. In addition to this, 3G licences are still far too expensive in
comparison to the economic benefit which they offer to licensees.[31] At the heart of the
mobile revolution is the continued rollout of third generation networks (3G) in
developing nations. Harmonising the spectrum and technology standards are keys to this
process as well as convincing government to resist the temptation to hold costly auctions
for 3G operator licences.

Another potential distraction is Intel's Wimax technology: some experts believe that
Wimax's unproven potential in the future could lure some developing nations from
delivering 3G services over existing mobile networks.[32]

Other Examples of Mobile Technology Bridging the Digital Divide

The real opportunities for mobile technologies lie in its ability to work with other existing
infrastructures that are in place already in vast expanses of countries were poles and wires
cannot reach.[33]

One project by Nokia, called BridgeIT, demonstrates the way in which satellite and
mobile technologies may be married to provide vital interactive e-learning for people in
the Philippines. Initiated in 2001, the project has, to date, been rolled out to more than
200 schools which are completely cut off from fixed net access. The project provides
schools with Nokia set-top boxes carrying 80GB of storage on board, a GSM mobile, a
Sim card, and a guide to interactive maths and science lessons. Through local
partnerships, the Sim card is prepaid, the mobiles are under $30 and the boxes cost an
initial $250. When teachers want to access lessons, they text a unique code and the
interactive material is downloaded at off-peak times to the box. Teachers then access that
material in their lessons via a TV. The video clips are three to four minutes long, and use
Mpeg4 encoding which compresses files efficiently. As Simo Hoikka notes: "We could

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[28] Ibid.
[29] Ibid.
[30] Ibid.
[31] Ibid.
[32] Ibid.
[33] Ibid.

add anything to the teaching modules…It can develop all the time." Parents were also recognising that the lessons could be relevant for them too and were coming into the trial schools in the evening to do the lessons too. Mr Hoikka is confident that the project will interest a lot of developing nation governments, judging by the success the pilot projects.[34]

Among other initiatives, the ITU supports the idea of establishing telecentres in countries of need to provide community access to information and communication technologies ("ICTs").[35] It is hoped that these telecentres will act as a catalyst in creating awareness, in developing ICT skills and in providing cost-effective facilities and services. In addition to basic voice services, telecentres serve as an educational centre for children and for teacher training.[36] They also provide ICT-based tools and services such as medical information, radio programmes and web-based multimedia content and training and education.[37] The objective is twofold; to stimulate the development and growth of local businesses as well as to develop ICT skills among the local population.[38]

Examples of ITU telecentre success stories are as follows. In Ginnack, a remote island village on the Gambia River, nurses when faced with an unusual medical case, they take pictures and download them to a PC in a nearby telecentre and e-mail them for examination by a doctor in a distant city. If that physician needs further evaluation of the images, they are sent over the Internet to the UK where they are then forwarded to specialists from around the world for a diagnosis.

In a small village near Chincheros in Peru, a Peruvian Internet Service Provider, NGOs and the Peruvian Ministry of Agriculture hooked up the village to the Internet as a pilot project. The local Council took the opportunity of the Internet to establish an online partnership with an international export company to market their produce. In less than two years, the 50 families living in the village went from an annual income of US$ 300 a month to approximately 1500 US$ per month after Chincheros' vegetables began to be sold in the New York market.[39]

These examples - amongst others - show the benefit of bridging the digital divide.

Yet, on a much broader level can spectrum policy itself be used to assist to eliminate the digital divide? The answer is yes, but only if an appropriate nurturing environment is encouraged and developed.

If spectrum is regulated wisely and governments do not impose a "top-down" solution upon their markets, there is the possibility that a sufficiently flexible and responsive spectrum policy could be implemented so as to assist the organic growth of mobile

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[34] Ibid.

[35] www.itu.int newsroom regarding international day of charity.

[36] Ibid.

[37] Ibid.

[38] Ibid.

[39] Ibid.

services in the developing world. Unfortunately, all too often the temptation exists within these environments to emulate developed practices such as spectrum auctions, licensing fees, etc., none of which necessarily produce the best result for an economy that lacks entrepreneurial maturity and capital resources to respond the same. So, clearly, what works in the UK or the US may not be applicable to spectrum policy for Bangladesh or the Caribbean Region. Instead, policy makers will have to be more circumspect and bespoke in fashioning spectrum solutions in developing countries that will bridge the digital divide.