Mobile Internet for Developing Countries

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Mobile development

The growth of mobile communications has been phenomenal. At the start of the last decade there were just over 10 million mobile cellular telephone subscribers around the world. At the beginning of 2001, this figure had grown almost 70 times to over 700 million. Around one in ten people around the world now owns a mobile phone. The number of mobile subscribers will surpass the number of fixed telephones sometime this decade (Figure 1). There are more than thirty countries—both developed and developing—where this transition has already taken place (Figure 2).

Continual improvements in mobile cellular technology have been essential for sustaining high growth rates. First generation mobile networks were analogue and constrained by both capacity and quality. Handsets were bulky and expensive and the price of the service was high. The second generation of mobile introduced digital technology. The number of subscribers that could be supported was dramatically improved through more efficient spectrum usage. Quality was generally as good as that delivered by wired telephone networks.

Market liberalization has also boosted mobile growth. Mobile has typically been the first segment of the telecom market where private operators have been allowed and competition introduced. This has had a positive impact on roll-out, pricing and service.

Wireless phones provide many features, the most obvious being mobility. Another attractive attribute is international roaming, allowing users to cross borders and continue to use their telephones. But it is perhaps the potential for mobile data services which is today generating the most interest.

Mobile Internet

There are a variety of Internet-like applications available for today's mobile phones. The introduction of the second generation GSM mobile phone brought a simple but popular application called **Short Message Service (SMS)**. This allows text messages to be sent from one phone to another. This e-mail for phones has proven popular for various groups ranging from youngsters to the deaf. In the month of December 2000, some 15 billion SMS messages were sent around the world, for an average of some 35 SMS per GSM subscriber and a five-fold increase over the previous year.

Wireless Application Protocol (WAP), commercially launched by many operators in 2000, allows mobile phones to browse the Internet. Users access web sites specially adapted to fit the screen size of a mobile phone. WAP has been plagued by a number of problems including a shortage of handsets, slow speed and a lack of applications and there were less than five million users at the end of 2000.

The tepid acceptance of WAP contrasts markedly with Japan's mobile Internet experience. Japan was the first country in the world to launch mobile Internet

services when NTT DoCoMo started its **i-mode** service on 22 February 2000. In one year there were five million subscribers; six months later this had more than doubled. At the end of March 2001, some 21.7 million people were using i-mode. There are two other i-mode-like services in Japan, EZWeb and J-Sky, operated by DoCoMo competitors. The three services had 35 million subscribers between them in March 2001 with over sixty per cent of Japanese Internet subscriptions from mobile. Indeed, NTT DoCoMo is now the world's second largest ISP, after America Online. One of the attractions of i-mode is that, unlike WAP, HTML-based websites can be easily adapted. Unlike WAP, where users are typically restricted to offerings from their provider's portal, i-mode users can access any compatible site by typing in the URL. Another i-mode success factor is that it is "always on" and priced according to information retrieved and not usage time.

The industry is now on the verge of another breakthrough to so-called third generation (3G) mobile networks. This milestone is significant for two reasons. One, it marks the first time that there will be a global standard for mobile networks. Up to now, mobile systems have been based on a variety of national and regional standards with no less than a dozen different ones in operation around the world today. This has had a detrimental affect on compatibility and prices. Second, the new 3G networks will support broadband Internet access.

The 3G standard goes by the name IMT-2000. Formally adopted by the world telecommunication community in May 2000, IMT-2000 will support high bandwidth including a minimum speed of 144 kbit/s and 2 Mbit/s under low mobility environments. The European Union has been an early advocate of 3G networks and called upon its members to rapidly license the system and launch networks by a target date of January 2002. Most Western European nations awarded licenses in 2000. Some opted for auctions which initially netted significant revenues for government treasuries. The downturn in euphoria over the high-tech industry and concerns about the high prices paid in some 3G auctions has resulted in recent auctions fairing poorly.

In Asia, DoCoMo intended to be the first operator in the world to launch 3G. It was granted an IMT-2000 license in June 2000. It widely publicized plans to be the first to start a service in May 2001. Although a test launch will be made then, commercial operation has been postponed until October 2001.

While much focus is on handset-based browser services such as WAP and i-mode, the real utility of the mobile phone may be as a wireless data port (see Box 1).

Developing countries

Mobile communications has exploded in many developing nations. Mobile has often been the first competitor to sluggish government-owned fixed line telephone systems. Instead of waiting for years for a fixed line, and sometimes paying high line installation fees, citizens in many developing countries can now get a mobile connection on demand and need only to pay for the card that activates their handset. Furthermore, because wires do not need to be laid, mobile networks can be installed relatively quickly and are appearing in formerly 'unwired' places such as 'up-country' Uganda (see Box 2). Another big driver of mobile in developing countries has been the pre-paid card which turns the mobile handset into a portable, personal pay phone. Pre-paid service has allowed millions of users who would not normally financially qualify for subscription-based service to become mobile users.

One of the reasons that wireless Internet seems logical for developing countries is that mobile phones outnumber PCs. In addition, mobile phones are beginning to exceed fixed lines in a growing number of developing countries. Of course,

many of those handsets cannot access the Internet but most could be used for SMS, a precursor of Internet use. SMS is exploding in many developing countries. Take the Philippines for example where one of the leading mobile operators is Globe Telecom. At the end of 2000, it had 2.6 million subscribers (of which 86% were pre-paid) generating 25 million SMS messages a month. Revenues from SMS increased almost 500% in 2000 and accounted for 17% of Globe's wireless revenue.

Is it realistic to expect that the latest mobile Internet applications will also be launched in developing countries? The Congo, one of the poorest countries in the world, was one of the first nations in Africa to get WAP in June 2000. It was introduced by Celtel Congo, which only launched its mobile service in December 1999. A year and half later, Celtel had grown to be the largest telecom operator in the Congo with 14'000 subscribers. Celtel's WAP users can access content such as local news, exchange rates, travel schedules and overseas WAP sites.

Another factor that makes mobile Internet interesting for developing countries is the potential of so-called m-commerce, the ability to buy goods and services using a mobile phone. Cash is still king in many developing nations where citizens do not have credit cards nor would many qualify for one. This limits their ability to purchase over the Internet. But they do have mobile phones which could be used as mobile wallets with Internet purchases deducted from mobile bills or pre-paid balances.

Future

There are a number of things that need to happen if mobile Internet is to be viable in developing countries. One is awareness among policy-makers about the potential of 3G. Few developing countries have yet to outline their policy for the introduction of 3G networks. They are missing out on the opportunity to leap-frog.

A key issue is how to award licenses. Developing nations may want to minimize investment costs by avoiding auctions and high licensing fees. This would reduce the cost of service and attract more interest from potential investors. Another consideration is the structure of the mobile market. In many developing countries, investment capital is scarce. They may want to opt for one infrastructure provider who in turn provide wholesale capacity to numerous service resellers. This would reduce network duplication and minimize under utilization.

Another factor for success will be the development of locally relevant content adapted to small screen sizes. While the latest stock-market information or ability to purchase cinema tickets from a mobile phone may be attractive to the well-off, applications such as commodity prices and transportation schedules may be more suitable for the majority. The development of voice recognition applications would also be useful in countries with high levels of illiteracy.

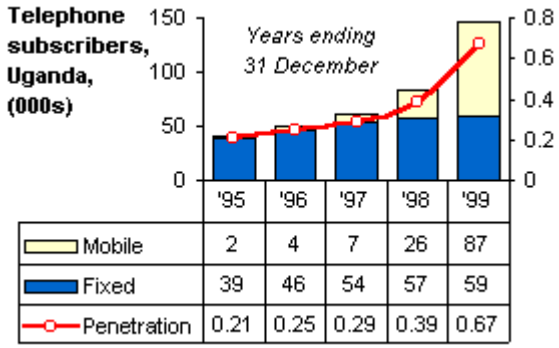
Box 1: Mobile Browser or Wireless Dial-up?

While there is much talk about using the mobile handset as the window to the web world, a more practical use might be as a dial-up telephone for connecting computers or Personal Digital Assistants (PDAs) to the Internet. First of all, the screen on a mobile handset is small and not ideally suited to intensive web surfing. Indeed, WAP-based services do not allow access to non-compatible and non-portal web sites. Second, improved access speeds for mobile phones make them as fast as or even faster than fixed-line dial-up. While conventional GSM cellular speed and even DoCoMo's i-mode is limited to 9.6 kbit/s, useful only

for email, still photos, or the transmission of pictograms, there are a number of products that are dramatically increasing this speed. High Speed Circuit Switched Data (HSCSD) multiplies GSM speed by three up to 38.4 kbit/s, roughly equivalent to the throughput of a dial-up fixed telephone line. General Packet Radio Service (GPRS) offers a tenfold increase in data throughput to a theoretical 115 kbit/s. The next stepping stone towards 3G will be the implementation of EDGE, offering data services and applications at speeds up to 384kbit/s essentially using existing infrastructure. 3G mobile claims to offer speeds of up to 384 kbit/s in mobile mode and 2 Mbit/s in stationary mode.

At these speeds—equivalent to current broadband offerings via ADSL or cable modem—the mobile handset becomes very interesting as a port to the global Internet. This is particularly relevant for developing countries where fixed lines are limited. A high-speed mobile user in Bangladesh would theoretically have more bandwidth locally on his/her mobile phone than the total international bandwidth of the country. The problem would be finding the PC or PDA to connect it to. One possibility is shared access, with 2.5G and 3G mobile technologies used to connect cyber cafes to the Internet. For example, Grameen in Bangladesh would like to provide Internet access from its Village Phone Centres. The problem is convincing developing country policy-makers that mobile data technologies are relevant to them and having them adopt the appropriate licensing and regulatory framework.

Box 2: Uganda's mobile miracle



	'95	'96	'97	'98	'99
Mobile	2	4	7	26	87
Fixed	39	46	54	57	59
Penetration	0.21	0.25	0.29	0.39	0.67

The Republic of Uganda, covering an area of 235'885 kilometers, is an agricultural country with a population of about 22 million. Over 85% of its citizens live in rural areas. Uganda's Gross Domestic Product (GDP) per capita is less than US$ 300 (98), making it a Least Developed Country. It has historically had one of the lowest levels of telephone penetration in the world. However government initiatives to boost the economy through privatization and foreign investment are starting to pay off. Nowhere is this more evident than the telecom sector, which is now one of the most liberal in Africa. Uganda licensed a private GSM mobile operator, CelTel, in May 1995 and introduced a second operator, MTN Uganda, in October 1998. The results of these changes have been dramatic. Uganda's overall telephone density tripled between 1995 and 1999 rising from 0.21 telephone subscribers per 100 people to 0.67.

This rapid growth is a direct result of MTN's entry into the market. Although MTN full service license allows it to offer all telecommunication services including fixed telephony, it has focused on mobile. One reason is that wireless networks are quick to install. Another is the use of prepaid cards since most Ugandan's would not meet the financial criteria for subscription-based service. In a little over one year, MTN emerged as the largest network operator in Uganda surpassing not only CelTel but also the incumbent fixed operator, UTL, in terms of number of clients. In July 1999, Uganda became the first African country where there were more mobile than fixed telephone customers. MTN has not rested on its laurels. It has been aggressive in expanding the network

into what Ugandan's refer as "up-country", that is the rural part of the nation. Over 50% of the population is now covered by mobile cellular and some 40 towns have service. What is remarkable is that the number of mobile subscribers widely exceeds earlier forecasts of a potential mobile market of only 10'000! The planned entry of UTL into the mobile market should further spur growth with some estimates putting the potential mobile client base at half a million.