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THE PROMISE OF UBIQUITY

MOBILE AS MEDIA PLATFORM IN THE GLOBAL SOUTH

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1 Executive Summary

Mobile telephony will be the world's first ubiquitous communications platform and is getting there faster than anyone expected. Its major path of growth is now in the global South where the mobile is not just a phone but a global address, a transaction device, and an identity marker for hundreds of millions of poor people. T ***is holds unprecedented opportunity for media in developing countries to engage their core audiences more deeply, reach new audiences on the edge of their current footprint, and provide interactive and customised information services that are both profitable and life-improving. But the opportunity is also a threat to traditional media, just as the Internet has been – and on a larger scale in developing countries. If media don't address the mobile as a viable information platform others will, and within the space of a few years media players there will have lost a large measure of their market share, 'mind share', and standing in society at large.***

Sometime in 2007 or 2008, the half way mark was reached – estimates for the number of mobile phones in the world now vary between 3 and 3.8 billion. The rich world led the way from the 1980s on, and markets are now saturated in Europe and North America, as they are among Third World elites. But most of the growth is now in the developing world, well down the social scale and stretching into the informal economy. And the rate of expansion is speeding up. It took 15 years for the first quarter of the world to get mobile phones, by 2003, and about four years for the second quarter. The next billion mobile phone owners, predicted by 2011, will be over 90% in the global South.

Mobile has long since surpassed the Internet in terms of numbers of users. And unlike the Internet, subject of fierce Digital Divide debates among enthusiasts and sceptics for a decade, it has been spontaneously adopted by billions of people and embedded deep in social consciousness. African peasants paint their mobile phone number over their front doors. Indian slum dwellers buy SIM cards to use on friends handsets. Chinese students spend three months allowance to buy a handset they can surf the web with.

But across significant sections of the global South the mobile phone now rivals television in reach. This mobile-led space is currently masked from view, partly by a lag in compilation of statistics, and partly by 'the decision makers bubble'. It's hard to imagine from business districts and leafy suburbs, where the mobile vies with so many other channels and has only ever played catch up, that 15 million people in Africa now individually own mobile phones but do not have access to a TV at home. And that mobile-led space is set to grow. Across the 50 poorest countries of the world, mobile ownership has grown by over 70% a year, every year, since the turn of the century.

If growth was spontaneous, there are now powerful global forces amplifying it. The mobile industry has become perhaps the best paradigm of a Bottom of the Pyramid business, with multi-billion dollar corporations targeting the poor as central, rather than peripheral, to their future. Operators like Vodafone, who could once command $100 a month per subscriber, now aggressively target markets like India, where the average is more like $5 and dropping. Phone manufacturers like Nokia and Ericsson send designers to India and China and compete to produce handsets to retail at under $25. All over the developing world the argument for liberalisation of telecoms has been largely won, as governments have bought the 'mobile for development' argument over the vested interest of incumbent operators and the short-term prospect of high tax revenues from a limited base. Global tech titans like Google and Microsoft are looking at the mobile as the next platform for software and

information services of all kinds, and are eager to grab a piece of it.

The resulting competition creates relentless downward pressure on prices and accelerates the move by operators into 'Value Added Services', foremost among which is information services. Pockets of technology leapfrog are already appearing. A higher percentage of Kenyans use Mcommerce than Americans or Finns. Pakistan boasts the world's first nationwide Wimax deployment. More Jamaicans access the web from mobiles than from desktop computers. The three quarters of the world who have yet to access the Internet or experience digitial multimedia will mostly do both through mobiles.

In terms of ubiquity, it is no longer a case of if, but when. A world in which nearly everyone owns a mobile linked into networks advanced enough to offer video and location-based services is years, not decades, away.

The question this report seeks to address is, what role will media play in this unfolding story?

We hope to help decision makers reflect on these issues, particularly as they affect media in the developing world, where the relative weight of the mobile explosion is and will be far greater in its impact on the media landscape as a whole. While the information space on mobile platforms is necessarily constrained – 'keyhole media' – compared to traditional formats like a newspaper or a TV channel, it offers tremendous potential to serve current and new audiences in a profitable way. New tools are bringing the ability to launch and manage phone-based services within reach of small and medium size institutions for the first time, and open source is democratising telephony as it already has Internet publishing.

But the opportunity is open to all, and the boundaries between telecom, tech and media companies are being blurred, just as they were for the Internet. If media do not move into the space with useful applications and services, others will and the role of the professional media sector will be diminished.

Chapter 2 examines the current and future reach of the mobile in the developing world and the factors driving it. **Chapter 3** explores how the landscape looks from different vantage points through a series of interviews with leaders in the mobile field – software engineers and designers, journalists, businessmen, representatives of large companies and small involved with everything from multinational news agencies, to community radio in Africa, to mobile start-ups, to activist groups in the Philippines. **Chapter 4** draws some general conclusions out of individual experiences and seeks points of departure into the mobile space for different kinds of media, broadcast and print.

Chapter 5 starts from where phone networks are now in the developing world and what is possible across AHAN – Any Handset, Any Network – to the three billion plus handsets in circulation now. Although geeks have predicted the demise of the low-tech SMS texting service for years, it continues to thrive and is predicted to keep growing everywhere around the world. Most texts are sent person to person but there are wide uses for 'application-to-person' services, especially when built on top of basic user profiles which allow the precise targeting of information snippets that best suits the simple format of 160 characters. Issues such as literacy, localisation, and business models are complex, as is the question of how to negotiate revenue share with network operators.

Conventional wisdom has been that media companies need network operators to run any kind of mobile service and generate revenues from it. While a good deal with an operator can certainly bring scale and promotion, we question the assumption that it is the only possible route. SMS server programs enable fluid management of user groups, user histories and customer service within such applications, requiring only the same degree of technical savvy it takes to run a simple spreadsheet program. Bulk SMS gateways now deliver messaging reliably into hundreds of networks all over the world. Mcommerce is opening all kinds of revenue-gathering possibilities for media, as for all other sectors in developing countries. Look hard at the institutional capacity and the audiences of any given media house and it may be possible to find

a viable service it can run itself. This strengthens its position in negotiations with operators, which then become a parallel track, as well as preparing for the near future, when the availability of mobile web will put the emphasis on self-managed mobile information services.

Voice-driven services are also discussed at length. Although the phone is, after all, a device for talking and listening, voice-driven services have played a surprisingly small role in information services offered so far. There are several possible reasons for this, among them the high cost of voice calls relative to texts and the failure of speech-interface technologies to evolve to a stage where they can be easily and cheaply deployed in developing country contexts. But that is changing fast. We see voice services as an area of hidden potential, and particularly recommend close consideration of Asterisk, the emerging standard in open source telephony software, which can bring a wide range of voice-driven information services within reach of media houses in the South.

In-house use of such structured communication by voice and text may be a first step for many outlets, particularly those which struggle with institutional management: editorial conferences summarised by SMS, micro-payments to keep freelance reporters in faraway locations in orbit, the mobile as the poor man's outside broadcast unit.

Above and beyond individual services and technologies, we consider the implications of the digital nature of the phone. This suggests some crucial aspects of the Internet economy – the laws of network effects, viral marketing, the dominance of user generated content and social networking – will apply to mobile also, working hypotheses which are borne out by early data.

In **Chapter 6**, we lay out the different structures of emerging Mcommerce, the fact that in developing countries the mobile is fast emerging as a tool for 'financial inclusion'. How will this affect its potential as a media platform? Do micropayments offer revenue generation possibilities for high-end services that media can launch and maintain directly?

Mobile web may be mostly in the future as far as the global South is concerned but it is the near future, which we explore in **Chapter 7**. While fully aware of the potential differences, we borrow from the experience of mobile web developers in Europe. What are the generic issues facing development of mobile web, what are the standing business models and what are the factors which affect adoption and use? Location-based services are an obvious holy grail of mobile media, but we consider a broader framework in which location is simply one element of context, and how it may become an implicit and ubiquitous feature of mobile applications rather than the point-to feature it is now, when it exists at all. We also define a 'watch list' of technologies under development of specific relevance to the developing world – although they may currently be too fragile or expensive for large-scale deployment, technologies such as voice recognition, GPS services, or two-dimensional bar codes could have far-reaching implications across the South. They could fall within range of viable use at any time.

In **Chapter 9**, we discuss the potential role of media development organisations in all this. What role can media NGOs play in the integration of mobiles into media offerings in the developing world? To a large extent, trial and error and the market will drive adoption and experimentation by media players. Nevertheless, there are small but crucial market gaps, such as free access research which focuses on the specifics of mobile telephony in the developing world. In some cases, too, media development organisations can act as the 'friendly solutions provider', offering at- or below-cost training and incubation of text, voice, and other telephony services across a media sector until individual outlets gain the confidence to manage their own services. This could be particularly useful in the case of smaller and community-level media, as could the convening power of NGOs in negotiations between media players and operators, tech companies and potential sponsors of social programming over the mobile. As the mobile develops into a fully-fledged computing platform with open source development environments, media NGOs could even evolve blue skies laboratories to evolve applications of potentially generic value for media in the developing world.

Here, pure technology could blend with the long experience traditional media practitioners have on the creative side to evolve programming that answers a real informational need in formats that make intuitive sense for their intended audiences.

Chapter 10 produces summaries of mobile market conditions in 20 countries across the developing world. Reach both in absolute terms and compared with other platforms, as well as relative cost are considered. More data are included on another 40 countries in an appendix, as is a glossary of mobile-related terms used in the report, and links to the full interviews summarised in Chapter 3, available as mp3s online.

There are few right answers in such a complex environment, fewer still when the specificities of each country are considered. The mobile experience of young South Africans drawn to instant messaging over mobile because of high SMS charges differ radically from those of their Filipino counterparts who commonly send 50 texts a day, or of millions of Sri Lankans struggling to use Latin scripts to text in Sinhalese and Tamil. Hundreds of millions of South Asians, where even low-end users talk more on the phone than their counterparts in developed countries, might have trouble relating to subscribers on the Digicel network in Jamaica, where the average length of phone call is estimated at 19 seconds. And that is only use of the mobile itself. To properly understand what role the mobile can play as a media platform in any given place, we need to understand its media context as a whole – print, radio, TV, Internet, local, national, reach, diversity, professionalism, viability. And even within a country, of course, what promises practical results will differ wildly depending on which demographic is being considered: multilingual business users on smart- or smartish phones in urban centres are half a world away from an illiterate smallholder in the back of beyond with her trusty Nokia 1100.

What we aim to do instead is suggest a list of useful questions and issues to be considered, a little bit of best practice as it has emerged from this fledgling field so far, and a broader perspective of how the mobile industry as a whole is evolving, both technically and in business terms.

The stakes are high. The Internet has transformed the lives of the billion people that have come to use it in the last decade. But the transformation that happens through mobile in the next will be both bigger in number and more radical, considering where the bottom half of the planet are starting from in terms of political, social and economic freedoms, and inclusion and participation in global processes.

The role that established media sectors in the developing world play in this will depend on how early and profoundly they grasp the change that is coming.

2 Reach – mobile now matches TV in the South

Nobody knows exactly how many mobile phones there are in the world but as of September 2008 industry estimates were between 3 billion and 3.8 billion handsets. Even accounting for some multiple phone ownership (Finland for example has 107%[1] penetration of mobile phones, and the United Kingdom 115%[2]), the device is on a path to global ubiquity.

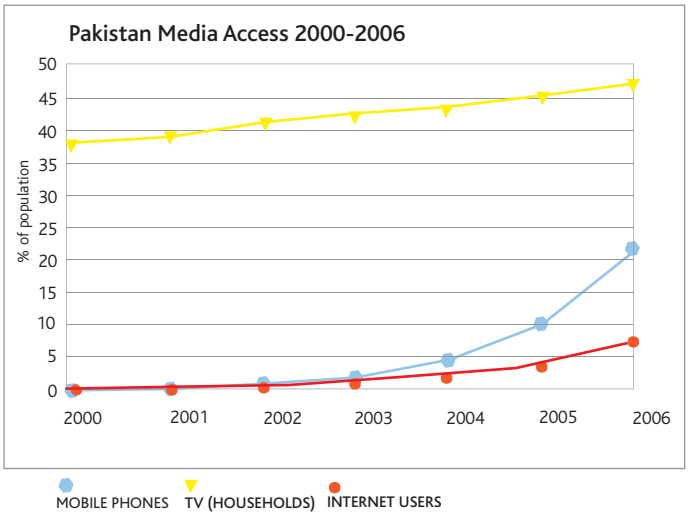
In media terms, therefore, in many parts of the global South the apposite comparison is no longer between the mobile phone and the Internet. In terms of reach, it is now between the mobile phone and television. In many poorer countries of the world, reasonable projections show an equal or greater degree of individual mobile phone ownership than household level access to TV.

The following sections outline the case for considering the mobile phone as the equal of television across the global South in terms of reach. It makes no assumptions about what are the advantages, constraints and unique characteristics of each as a platform for media and information services.

2.1. 2006-8 Explosion

Figures compiled by authoritative international institutions to some extent mask this difference because they are accumulated with some delay. For example, the World Bank has published two series of country-level analyses of the ICT sector, one providing comparisons on a series of indicators between 2000 and 2004, and the second updated version between 2000 and 2006.

The chart below shows mobile phone ownership compared to household level access to TV, as estimated by the International Telecommunications Union (ITU). Since 2000, clearly, mobiles have risen from a tiny fraction to dwarf access to the Internet in Pakistan[3]. But equally clearly, mobile phone ownership lags well behind access to television, which rose considerably in Pakistan from 2000 on, perhaps stimulated by the rise of private TV channels such as GeoTV, and against a backdrop of rising Gross National Income per capital from $480 in 2000 to $600 in 2006, bringing expensive television sets within the reach of more people in the country.



WHY THE MOBILE IS NOT THE INTERNET, OR ICT4D

As academia and the media have increasingly cited research claiming a correlation between mobile phone ownership rates and general levels of economic development, a debate has formed around 'mobile for development' in much the same way as it did around the Internet in the 1990s. The term 'Digital Divide' coined then incited a series of debates between advocates of 'ICT4D', or Information and Communication Technologies for Development, who argued that technology could transform social, political and economic marginalisation, and sceptics on the other hand who argued that high technology, as represented by the PC and the Internet, was irrelevant to the needs of the poor. It would be true to say, broadly speaking, that ICT4D initiatives over the last decade have largely failed to bring the benefits their supporters had hoped, whether because the technology was imposed from the outside, or such initiatives were 'supply-led' and failed to factor in the difficulties of adapting to local human resources and social structures. The risk of including the mobile in this Digital Divide debate is that it may mask crucial differences between the mobile and the PC-Internet platform. First, there has been spontaneous adoption of the mobile across all income and education categories around the world. Second, and closely related, the barriers to entry for the mobile both in terms of price and technical knowledge are far lower than for any current form of PC-Internet access.

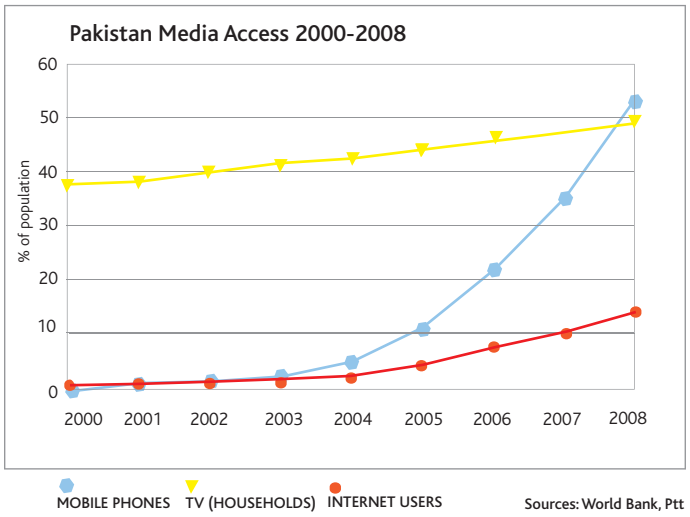
ILLUSTRATION 1: *Pakistan's media access as captured to the end of 2006, with TV showing an expected dominance over mobile phones or the Internet*

1 http://devdata.worldbank.org/ict/fin_ict.pdf
2 http://devdata.worldbank.org/ict/gbr_ict.pdf
3 http://devdata.worldbank.org/ict/pak_ict.pdf

But Pakistan has seen explosive growth in mobile phone ownership from 2006 through mid-2008; when this is factored in, a different picture emerges. Illustration 2 continues the data series through mid-2008 using data from the Pakistan Telecommunications Authority. It should be noted that the PTA data for earlier years matches the World Bank's composite ICT data closely, and is probably the source of the ITU numbers in those documents.

Mobile ownership is now marginally higher than household-level access to TV. TV households have risen from 37% in 2000 to 49.6% in 2008, but PTA figures, based on subscriber numbers reported by the network operators as part of their regulatory compliance, show mobile ownership at 54.5%[4]

ILLUSTRATION 2: *Pakistan's media access: an explosion in mobile phone adoption from 2006 on gives mobile as much reach in society as TV*

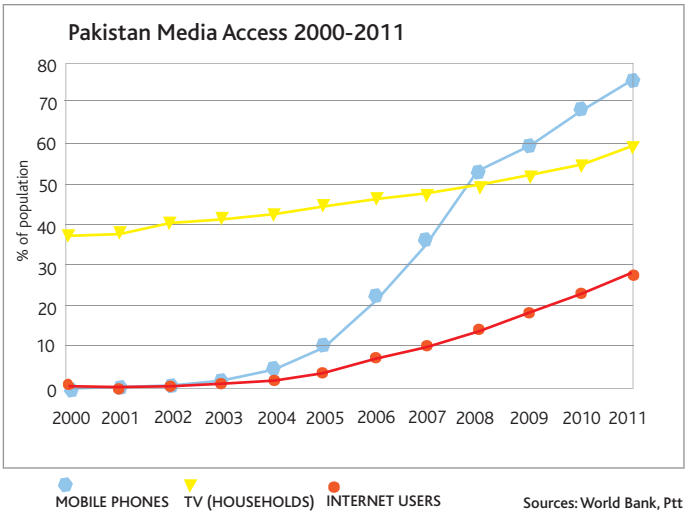


2.2. Predicted continued growth

The next key point is that industry experts expect mobile phone ownership to continue to rise sharply in Pakistan, as in many other countries of the South. Portio Research, in their report *The Next Billion*, predict that growth in Pakistan will rise to 130 million handsets by 2011, or 75% of Pakistan's projected population of 173 million at that time. This would extend the mobile-only space compared to television and Internet as shown in the figure below.

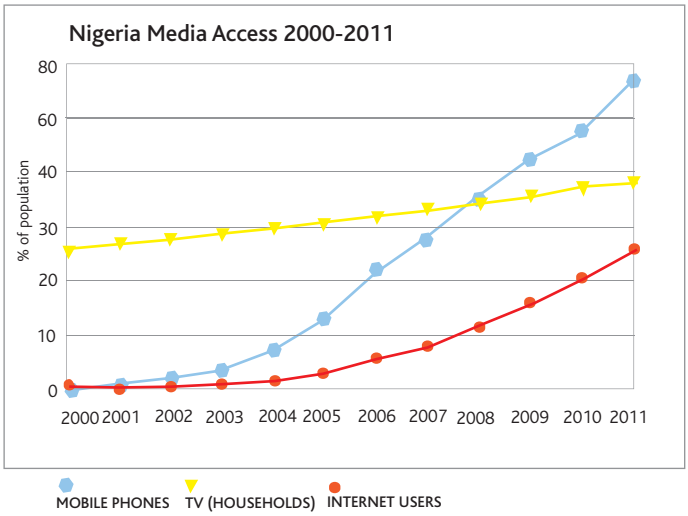
TV access can also expect to rise but more slowly. Both platforms are growing fastest in poorer and more rural social segments – so-called media dark areas. Portio predicts ownership will double in rural areas between 2006 and 2011, from 33% to 65%, and this increase in rural ownership will account for more than half the additional mobile subscribers in that time.

ILLUSTRATION 3: *Projections are for continued growth in access, especially among the rural population, meaning mobile may continue to have greater reach than TV across all levels of society*



4 http://www.pta.gov.pk/index.php?option=com_content&task=view&id=650&Itemid=603

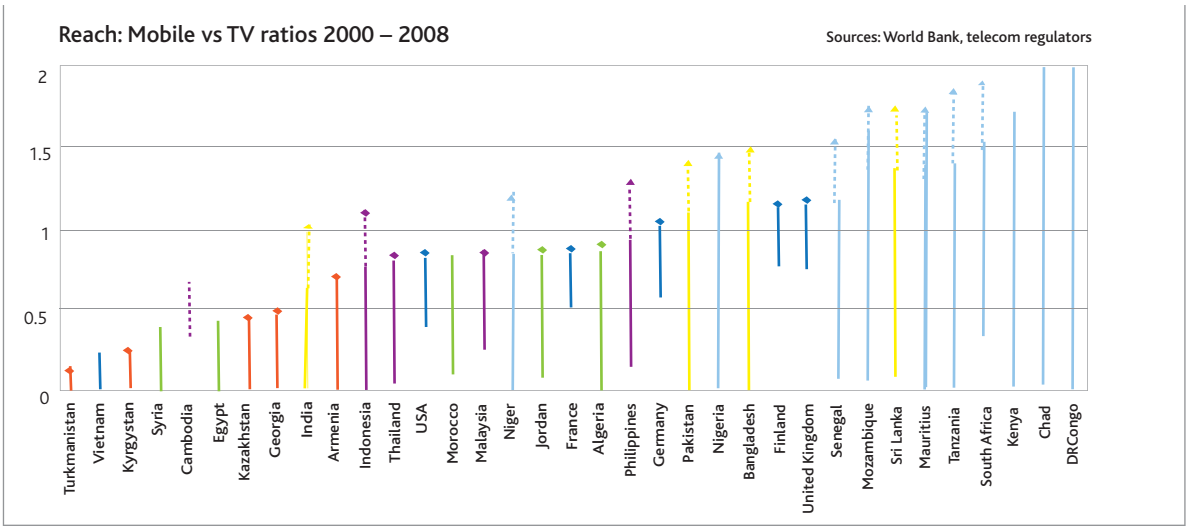
2.3. Generalised pattern



Pakistan is not an isolated example. The World Bank's composite data on ICTs supplemented by national telecoms regulator information for up to mid-2008 and industry predictions of growth, show similar patterns across the South. In a sense, the ratio of mobile phone ownership to TVs is starker in countries which are poorer and with less developed infrastructures. The chart below shows data in Nigeria from 2000 up to 2008 and then projections based on the same sources, the World Bank documents and Portio Research's *Next Billion* report. TV households grow stably, as they have done since 2000, to reach 37% by 2011. But in the same period, mobile phone ownership rockets to 56% of the population. In the case of Nigeria, this could create a remarkable group of 30 million people who own a mobile phone but do not have television in their homes.

In India, TV ownership has been rising fast along with the country's 9% GDP growth rate year on year throughout the 2000s, and is still some way ahead. But mobile phone ownership now stands at 23% of the population at large according to the latest figures from regulator TRAI[5], and is growing fast. It is not inconceivable that it could catch up by 2011 or 2012. Portio's own estimate of 40% mobile penetration is lower than other predictions, such as the Center for Telecoms Research, which estimates 600 million phones by then, or over 50%. Indonesia likewise. And again in both cases, most of the growth is coming from audiences and demographics traditionally marginal to traditional media – the poor and the rural. Portio estimates that mobile ownership in rural India will rise from just 6% in 2006 to 25% by 2011.

ILLUSTRATION 4: *Comparison of access between mobiles and TV in selected countries: lines are drawn along the axis of comparative ownership. A ratio of 1 means the same number of people own mobile phones as have TV in their houses. The bottom of each line shows the position in 2000, where mobile phone ownership was always lower than TV, running through to 2008 at the top of the line for each country. Countries where TV ownership is approaching universal are capped at the top of the line, those where ownership of both mobiles and TV is still relatively low have dotted lines extending into future possible reach of mobile phones.*



5 http://www.trai.gov.in/annualreport/AReport2006-07English.pdf

2.4 South not G7, East or Middle East

Compare ratios of mobile phone ownership to television across the world and some interesting trends emerge. Countries where mobile phone ownership outstrips TV tend to be at the extremes of the development spectrum - either the highly technologically advanced countries of the G7 like Finland, Japan and the United Kingdom, or developing countries near the bottom of many indices such as Chad, DR Congo, Bangladesh, Pakistan and Mauritania.

In Illustration 4, the ***comparative*** rates of mobile and TV ownership are measured in a series of lines. A ratio of 1 represents the same percentage of a country's population who own mobile phones as have a TV in their homes. Lower than that indicates more TV access than mobile, and higher than 1 more mobile than TV. The graph tracks the evolution of the relationship between 2000, which is the point at the bottom of each country's line, and 2008, at the top of each line.

Let us take two examples, the United States, and Sri Lanka.

The USA in the year 2000 had a mobiles-to-TV ratio of 0.4, that's to say with nearly universal TV access, mobile phone ownership was then about 40% of the population. This had grown by 2008 to 0.84 as the number of mobile phones in the US population grew to 84.6% of the population (the United States, in fact, is the last major growth market for mobile phone subscribers in the rich G7 countries).

In Sri Lanka, about 22% of households had TVs in the year 2000, but only 2.2% of the population then owned a mobile phone, creating a ratio of 0.1. But by

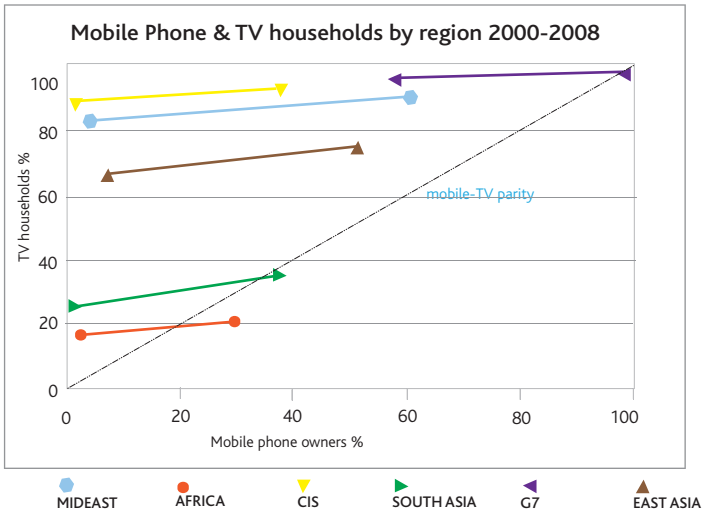


ILLUSTRATION 5: *The start of each line represents overall % of ownership of mobile and TV in 2000, compared to rates in 2008 at the other end of the line. Advanced and middle income countries are bunched at the top of the chart because they started with almost universal TV access and mobile is catching up. But half the world's population are on a different trajectory in Africa and South Asia towards the bottom of the chart. Here, ownership of mobiles may outstrip TV going forward.*

2008, this ratio had risen to 1.38, as some 44% of the population had mobile phones compared to 32% of households now with TV. It should be noted that the wider reach of mobiles in Sri Lanka has been achieved therefore despite a 50% rise in absolute numbers of TV owners in the country over the same period.

Two interesting features therefore arise in comparing the two very different countries. The first is that in the USA, despite major growth in mobile phone subscribers predicted for the next three years, universal access to TV means there is a natural cap set on the potential for the ***ratio*** of mobile phones to TV to rise, and therefore in the potential of the mobile to provide unique media reach. Portio's ***The Next Billion*** report predicts an additional 60 million subscriptions in the USA by 2011[6] and that with much higher revenues per user, the USA could represent 29% of growth in revenues for mobile companies worldwide, second only to China, and well ahead of the 16% growth in revenues India's 200 million extra subscribers over the same period might represent. But this could never lead to a mobile-only or mobile-led media space in the USA, as even with Portio's predicted penetration of 101% mobile phone ownership, mobiles would simply have caught up with television.

In Sri Lanka, however, both mobile ownership and TV households are still at

6 http://www.portioresearch.com/NextBillion_brochure.pdf

low levels in absolute terms (44% and 32% respectively). This means that not only is there a mobile-only space now – according to these ITU estimates some two million Sri Lankans might own a mobile phone but do not have TV in their homes – but that there is potential for such a space to continue and maybe even grow in the next few years. All that would be needed is for mobile phone ownership to continue to expand at the same, or a faster rate than the rise in the number of households who own a TV.

In the mobiles-to-TV ratio chart above, therefore, the five G7 countries are typified by relatively short lines of evolution from 2000 until 2008 – mobile access was already quite high in 2000, just not as high as the near universal access to television. They have also been marked with a cap at the upper end of the line, to indicate that there is little or no room for the mobile ratio to rise further.

Whereas the countries from Africa and South Asia all have big progression in the ratio – a long line between 2000 and 2008. Back in 2000, mobile phones were the prerogative only of urban elites in these countries, and even if television ownership has risen significantly in the last decade in some countries, it is not the explosive growth of mobiles. Dotted lines in the graph indicate the possibility of a further rise in the mobile-TV ratio in the future, and a clear possibility of significant mobile-led or mobile-only spaces among these populations in the future. Of the 10 countries in this chart showing the highest mobile-to-TV ratios, nine are African. In fact, this survey, which will be carried out more comprehensively in a second phase, suggests 33 million Africans from these countries alone own a mobile phone and do not have TV at home, as well as 13 million South Asians. It should be remembered also that the chart compares ***individual ownership*** of the phone with ***household level access*** to TV.

This mobile-only or mobile-led space is likely to be strongly rural. Portio, predicting a billion more mobile subscribers between 2007 and 2011, estimate that something like 600 million of them will be in rural areas of developing countries. These are broadly speaking also demographics in which TV households have been lowest, and even if in some regions, such as all the South Asian countries, TV ownership has risen fast in the last decade, mobile phone ownership has risen faster.

Another noticeable regional particularity is lower mobile-to-TV ratios among middle-income countries. Among the five CIS countries, Armenia reaches the highest ratio in 2008 of 0.7 mobiles-to-TV access, while Turkmenistan is the lowest of the survey at 0.12. The five countries of the Middle East region vary between 0.37 (Syria) and 0.89 (Algeria), but like the CIS and G7 countries the ratio cannot rise much further than its 2008 ratio because TV household access is already so high – of all these countries only Morocco has estimated TV access now of less than 80%. There also appears to be a correlation with totalitarianism. The former Soviet countries come from a tradition of near-universal TV provision as a propaganda tool, so all the mobile phone could ever do is catch up. But the same effect can also be seen with Vietnam and Cambodia within the group of East Asian countries, and Syria in the Middle East – it is hard to escape the suspicion that the inheritors of totalitarian regimes, whether or not they actively pursue ideological agendas, will have a prejudice, other things being equal, in favor of television and against mobile phones.

2.5. Least-Developed Countries

As of 2008, over 20 million people in the 50 countries of the world classified by the United Nations as 'least developed'[7] owned a mobile phone but did not have a TV in their house, according to extrapolations from best estimates by the ITU and the World Bank. In 2002, about 7 million people in these countries had mobiles. By 2007, there were about 110 million subscribers out of a total population of 823 million, or about 13% of the population. Growth was phenomenal, with a compound average across all 50 countries in the years 2002 to 2007 of 71% per year, every year. The ITU estimates for household level access to TV rose over the same period but by much less and on a stable curve, averaging 17% in 2000, and just over 20% in 2006.

7 http://www.un.org/special-rep/ohrlls/ldc/list.htm

LEAST DEVELOPED COUNTRIES MOBILE AND TV ACCESS 2002 TO 2007							
		MOBILES				TV	
COUNTRY	POP ('000)	2002 ('000)	2007 ('000)	2007 (%)	CAGR	2007	PEOPLE +MOBILE -TV
Liberia	3,942	2	563	15%	209%	4%	about 430,000
Afghanistan	28,226	25	4,668	17%	185%	36%	
Nepal	28,757	22	1,157	4%	170%	13%	
Mali	12,716	46	2,483	20%	122%	17%	about 375,000
Sudan	39,445	191	7,464	19%	108%	16%	about 1.26 million
Bangladesh	161,318	1,075	34,370	22%	100%	23%	
Samoa	189	3	86	46%	100%	89%	
Chad	11,088	34	918	9%	93%	4%	about 495,000
Lao P.D.R.	5,963	55	1,478	25%	93%	30%	
Ethiopia	85,219	50	1,209	1%	89%	4%	
Totals		1,503	54,396				
Sources UN, ITU, World Bank							

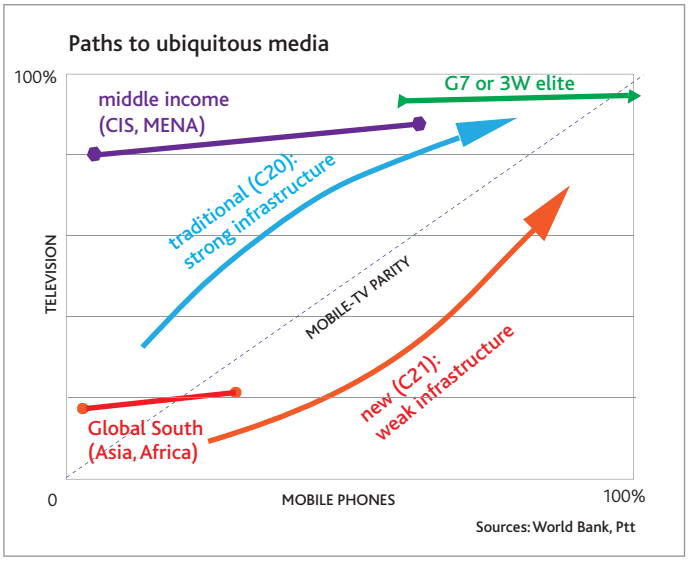
By these projections, there could be more than 4 million people in DR Congo who own a mobile phone but do not have TV in their houses, and more than a million in each of Angola, Mozambique, Sudan and Tanzania. Among smaller population countries, more than 10% of the population may have mobiles but not TVs in Equatorial Guinea, Liberia, the Maldives, Mauritania and Gambia. In all, fully half of the Least Developed Countries in the world may have more people who now own mobile phones than have access to TV in their homes.

2.6. The decision-maker's bubble

The chart below shows a schematic representation of the progress of mobile relative to TV in different regions and demographics of the world from 2000 until 2008. Underpinning it is the assumption that in all parts of the world increased connectivity, and the elimination of 'media darkness', will continue until at some point within the next generation near universal access will be achieved both for television, mobile phone, and perhaps also other forms of media and communications.

The question is more over the short- to medium- term. The disparities between large parts of the South which have never known communications infrastructure of any kind, and the rich and middle-income world, play out directly in the perceived importance of the reach of various media. Particularly, the idea that television must dominate.

There is also a danger here of a 'decision-maker's bubble'. Many different sub-



economies and sub-cultures exist within one society and economy as summarised by country-level data. If we start to regard the different trajectories in the graph as 'schematic', media executives and media development professionals themselves fall overwhelmingly into the G7 and middle-income schematics even if they belong to or are making decisions about countries which as a whole fall into a global South paradigm of little established infrastructure, and mobile phone challenging or even leading television in terms of reach among the population at large. In such contexts, it is easy to see why the reach of the mobile is underestimated.

2.7. A BOP business

One of the main reasons telecoms industry experts predict continued growth in mobile phone subscribers is the nature of the companies and entrepreneurial culture which surrounds the mobile phone.

It might be too rosy to say that mobile telephony is 'pro-poor' as an industry, but it is increasingly 'poor-centric', in contrast to TV or most other forms of media platform or content provision.

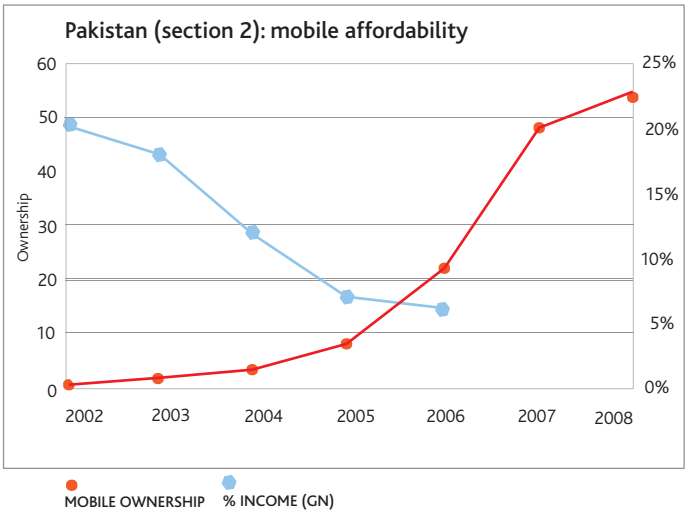
From network operators to handset manufacturers and applications providers, the mobile phone industry has embraced the consequences of ubiquity. The business cycle of innovation, early adoption, mass commodity, expanded market has sped up in mobile as possibly nowhere else except the PC industry, but the PC industry has nowhere near the penetration. Mobile phones are a classic 'Bottom of the Pyramid' industry sector.

This business model works for mobile companies because the numbers involved in the greater markets are so large that they outweigh the fact that they collect less revenue per month. Across the world, it took about 15 years, from the late 1980s until 2003 for the first quarter of the world's population to own a mobile phone[8]. It took four years, from 2003 until 2007, for the second quarter to arrive, and industry predictions are now that the third quarter will take another four years or less, by 2011.

a) MNOs and the decline of ARPU

Despite minor local differences, the mobile phone market pretty much everywhere began with the business market. Buying handsets, registration into a network and call plans were so expensive that they effectively precluded most people even in economies in the North. The telecom industry at that time developed a standard indicator of profitability called the ARPU, or Average Revenue Per User. The ARPU was how much revenue a company earned off each individual customer.

As new companies came in, competition forced the price of basic telephony services down. Mobile operators responded both by trying to expand the markets, within the northern industrial countries at this stage, and by developing



BOTTOM OF THE PYRAMID (BOP)

The phrase 'bottom of the pyramid' was first used by US President Franklin D. Roosevelt in conjunction with his New Deal policies in the 1930s. In modern times it has come to mean the 4-5 billion people in the world who live on less than the equivalent of $2 a day – some 70% of the world's population. The economist CK Prahalad proposed in a book 'Fortune at the Bottom of the Pyramid' treating the poor as a market for goods and services, and as a center for innovation. Building on the work of economists such as Hernando de Soto, Prahalad argues that the poor represent a sizeable market if only business models can adapt to price consciousness, and the cost of business which has traditionally been relatively much higher because of difficulties of creating infrastructure for goods distribution, and collection of payments. The phrase has become emblematic of an approach which sees many but not all pockets of poverty as being reduced or even eliminated over the next 15-20 years. In October 2007, for example, McKinsey predicted that the Indian middle class would more than double by 2025 to include 600 million people.
The belief in the inevitable growth of the middle class is at the root of microfinance, and other market initiatives increasingly targeting those within the bottom half of the world's income levels who seem poised to escape poverty in the next few years.

8 http://www.ednasia.com/article-17772-mobilepcsandtelephonesdriveasias-growth-Asia.html

THE NEW MOBILE MULTINATIONALS OF THE SOUTH

ZAIN/CELTEL	MTN	MILLICOM-TIGO	CLARO	WARID	MOOV	ETISALAT	DIGICEL
Kuwait	UAE	Luxembourg	Mexico	UAE	Ivory Coast	UAE	Jamaica
Bahrain	Afghanistan	Bolivia	Argentina	Bangladesh	Bénin	Afghanistan	Anguilla
Burkina Faso	Benin	Cambodia	Brazil	Côte d'Ivoire	Burkina Faso	Egypt	Antigua
Chad	Botswana	Chad	Chile	Georgia	CAR	Indonesia	Aruba
Congo DR	Cameroon	Colombia	Dominican R	Pakistan	Côte d'Ivoire	Nigeria	Barbados
Gabon	Cote d'Ivoire	Congo DR	Ecuador	Congo DR	Gabon	Pakistan	Bermuda
(Ghana)	Cyprus	El Salvador	El Salvador	Uganda	Niger	Saudi Arabia	Curacao
Iraq	Ghana	Ghana	Guatemala		Togo	Sudan	Dominica
Jordan	Guinea Bissau	Guatemala	Honduras			Tanzania	El Salvador
Kenya	Iran	Honduras	Nicaragua			UAE	French Guiana
Kuwait	Liberia	Laos	Paraguay				Grenada
Lebanon	Nigeria	Mauritius	Peru				Guatemala
Madagascar	Congo DR	Paraguay	Puerto Rico				Guyana
Malawi	Guinea	Senegal	Uruguay				Haiti
Niger	Rwanda	Sierra	Leone				Honduras
Nigeria	South Africa	Sri Lanka					Jamaica
Congo DR	Sudan	Tanzania					Martinique
Saudi Arabia	Swaziland						St Kitts
Sierra Leone	Syria						St Lucia
Sudan	Uganda						St Vincent
Tanzania	Yemen						Surinam
Uganda	Zambia						Turks & Caicos
Zambia							Trinidad

services such as texting and voicemail, which could justify maintaining higher ARPUs even as the price of the basic service fell. These services are collectively called Value Added Services, or VAS, by the telecoms industry.

Mobile telephony worldwide has now reached a third stage. With the exception of the United States, the G7 and rich world economies are saturated, as are the middle-class and urban demographics of many middle-income and developing countries. The response is an amplification of the two-pronged approach seen in the second stage – a drive to develop VAS, and an expansion of the market to yet more subscribers.

Vodafone's acquisition of Hutch Essar in February 2007 for $11 billion[9], the largest acquisition in mobile operator history, was a move in this direction. Vodafone's then CEO Arun Sarin, himself Indian, explained the deal in part as a drive to acclimatise the company to lower ARPUs, and to get substantial experience in the growth markets of the next few years. India's ARPU currently stands at about $6, but the newest customers have lower ARPUs than that as a market segment. Portio predicts ARPU among new rural subscribers will be as little as $4.4 a month. This compares to an ARPU of between $45 and $50 a month in the United States, and as high as $61 per month in Norway.Arub In Bangladesh, ARPU was estimated at $3 a month in 2006.

New companies are coming into being predicated on the mass expansion low cost model – almost uniquely, multinational companies based in the global South. Zain, for example, is a mobile operator headquartered in Kuwait which now owns major stakes in companies in 22 countries across the Middle East and Africa[10]. Zain targets accelerated growth in Africa despite low ARPUs there and recently introduced a pricing policy which effectively abolished roaming charges between all subscribers on all of its networks in any country. Orascom is another multinational based in Egypt

9 http://www.cellular-news.com/story/21933.php

10 http://www.zain.com/muse/obj/lang.default/portal.view/content/About%20us/Worldwide%20Presence

with 75 million subscribers across six emerging markets[11].

As a result of this shift in the traditional model, telecom experts are beginning to talk of AMPU rather than ARPU – Average Margin per User[12]. Vodafone, for example, claimed during its acquisition of Hutch in India that AMPU was roughly equal to the industrial economies, so lower ARPU was balanced out by larger subscriber numbers.

b) Handset manufacturers

Aggressive pursuit of the lower end of the mobile phone market has also led to falling prices in handsets. The GSM Association, an industry body grouping network operators and handset manufacturers, began an initiative in 2005 which it called the Emerging Market Handset. Using its convener power, it gathered network operators throughout Africa, the Middle East and Asia to buy over 12 million low cost handsets from manufacturers at a discount. The goal was to establish a handset for under $30, something widely achieved by 2008. The industry began to use a new term, the Ultra Low Cost Handset, or ULCH.

Nobody knows how many ULCHs there are in the world but their proportion of new sales is growing as companies such as Motorola, Nokia, Samsung, LG Electronics, BenQ Global, Philips, Ningbo Bird, Haier, and Kyocera compete in this space. Some analysts now describe the ULCH as sub-$20.

These companies are now designing handsets specifically for the poor[13]. Several features have already been introduced in response to demand spiralling up from patterns of use and need in emerging markets. Handset makers implemented a 'torch' facility on the phone when they noticed users in regions prone to power cuts using their mobile phone screens to light their way. Operators in many countries, noticing cost conscious users 'flashing' someone they wanted to ring them back with a missed call, formalised the process by offering a 'Call Me' SMS service as part of the basic package[14]. In early 2008, Nokia introduced a handset with multiple contact lists, each protected by a pin, in one of the first adaptations to the reality of shared use of mobiles in emerging markets. They are also said to be investigating what a handset for the functionally illiterate should look like.

c) Government: critical mass of competition

Governments have also significantly changed their attitude to the mobile phone industry, and spread of mobile phones, something which has accelerated growth, and reach into the poorer half of the world. The reluctance of countries with a totalitarian ideological background – such as Turkmenistan, Syria or Myanmar - to promote wide use of mobile phones has already been noted. Another constraint on growth which has been more widespread is pressure exerted by incumbent telephony companies, often in the form of a PTT, or state-owned or controlled monopoly, against new entrants and competitive pricing. In many countries for many years the visible returns to the public sphere in the form of revenues accrued by the PTT weighed more heavily on public policy than arguments by mobile phone entrants, or the World Bank and the ITU, of the benefits of liberalisation, leading to price cuts, leading to higher rates of mobile adoption[15].

But there are signs that in recent years liberalised telecommunications industries have reached a critical mass where it is the liberalised industry which represents the status quo in terms of public policy. According to the ITU, growth in the telecommunications sector globally, mainly driven by mobiles, was double average economic growth across all sectors between 1990 and 2003.[16]

ZAIN TYPIFIES NEW MOBILE MULTINATIONALS OF THE SOUTH

The global nature of the mobile phone sector has also prompted a profound rethink within the telecom industry. The promise of emerging markets compared to saturated Western markets has seen major companies such as Vodafone, Orange and Telefónica expand their operations there significantly. Even more striking has been the emergence of multi-national corporations based in the global South primarily focused on these markets. Companies such as South Africa's MTN, Warid Telecom and Etisalat both from the United Arab Emirates, Mexico's Claro, Côte d'Ivoire-based Moov, as well as Millicom (who, although based in Luxembourg, only operate in non-European markets) are multi-national companies competing across Africa, Central and South America, the Middle East and Asia. One of the most successful, however, is Zain. Formerly known as MTC, this Kuwait-based company has grown over the last 25 years to serve 50.7 million customers in 7 Middle Eastern and 15 sub-Saharan African countries with a workforce of over 16,000 employees (as of June 2008). For the first half of 2008, the corporation posted a net income of US $552 million. The future includes new headquarters in Bahrain and additional operations in Ghana (beginning late 2008). Zain, which means "beautiful, good and wonderful" in Arabic also has a strong emphasis on being a good corporate citizen to fulfill its goal of being a "community-orientated telecommunications player on the global stage". This manifests itself in programs based around "empathy, respect and participation", including high-levels of local employment, funding for education, health services, environmental and marine protection, sport, art and cultural initiatives. The company recently announced 'Zain One' in its Middle Eastern markets, abolishing roaming charges across subscribers in different countries, something that has stirred regulator interest worldwide.

11 http://www.orascomtelecom.com/about/Contents/default.aspx?ID=765

12 http://www.mobilein.com/Perspectives/CBOSS_Margins-1.htm

13 Video of chief Nokia researcher Jan Chipchase on research into phones http://www.ted.com/index.php/talks/jan_chipchase_on_our_mobile_phones.html

14 http://www.vodacom.co.tz/docs/docredir.asp?docid=3317 in Tanzania, http://www.digicelcayman.com/help_and_faqs/ for the Cayman Islands and Jamaica

15 http://www.gsmworld.com/TAX/

16 http://www.itu.int/newsroom/features/telecom_sector.html

SOMALIA, KOSOVO: MOBILES STRONGER THAN NATION STATE

Another remarkable aspect of the recent telecoms boom is the ability of mobile phone operators to penetrate what most corporations and economists would view as exceptionally difficult - if not impossible - operating and investment environments. Somalia is recognised by many as the archetypal failed state (with only Iraq and Sudan ranked higher in the annual list published by US think-tank Fund for Peace and magazine Foreign Policy) yet even here there has been a telecoms revolution. In fact, the very lack of state structure, may even be aiding companies such as SOMAFONE, Nationlink, Hormuud Telecom, Telsom Mobile and Golis Telecom Somalia do business. No state telecom regulator means no regulations to fulfil or licences to pay for, no government means no state monopoly run telecoms sector or corrupt ministers to pay off, also instead of paying high government taxes a small "tax" is paid to a local authority or warlord (usually around 5%) and another 5% is needed for security. Despite there being no courts of law bills are paid by relying on Somalia's traditional clan system. Another interesting example of how the mobile communications revolution is independent of the nation state, although profoundly different to Somalia, is Kosovo. Although in February 2008 the territory claimed independence as the Republic of Kosovo and was subsequently recognised by nearly 50 nations it has existed under the administration of the United Nations UNMIK program since 1999. During this time, despite minimal progress in key infrastructure such as a reliable electricity supply, it is estimated 35% of the population of 2 million people by 2007 used mobile phones. Aiming to capture this sector has created fierce competition between mobile operators Vala 900 and more recent arrival IPKO. While Serbs living in Kosovo largely ignore or boycott these brands and use the Serbian-based Mobi 63 instead. This in turn has been accused of being an illegal operator as it has failed to pay any taxes or a licensing fee to the government. regulator interest worldwide.

This is confirmed by country level statistics which show telecoms rising as a percentage of GDP. In South Asia, for example, the telecommunications industry represented 2.5% of GDP in Pakistan in 2006 compared to 1.8% in 2000, 1.5% in Bangladesh (0.8% in 2000), and 2.2% in India (1.4%). In Africa the proportions are higher: in Kenya 4.6% (up from 2.4% in 2000), in Nigeria 3.5% (up from 0.8%) and in South Africa a whopping 6.4% of GDP in 2006, up from 5.1% in 2000.

The mobile industries sometimes seem to represent flagship industries in the way that the national airline carrier did in the 1950s or 1960s. Even in states racked by war, the sector attracts investment and escapes investor flight because it has greater tolerance for political instability and economic chaos than most other sectors. Afghanistan, Iraq, Kosovo and Somalia all have thriving mobile phone companies.

3 Case Studies

3.1. Ken Banks – FrontlineSMS

Ken Banks developed FrontlineSMS in 2005 after realising in a project for the South African National Parks service that the mobile was beginning to make inroads into rural regions of Africa where the Internet was still non-existent. FrontlineSMS is a free-to-use SMS server program which when installed on a computer allows it to use an attached mobile phone to structure text messages out and back.

"The idea really was to write software that could get information out and get information back over the mobile phone," he said. FrontlineSMS was used by activists to monitor Nigeria's elections in 2007, and is now in use in over 50 countries.

Some current uses include UN sending out crop prices to farmers in Aceh province, Indonesia, health care services in Malawi, news alerts in Iraq, and security news for NGO workers in Afghanistan, and an SOS helpline for Filipinos working overseas.

"Very few people have had problems running text services. The challenge is to get people going in the first place. There are tens of thousands of phones out there, tens of thousands of software drivers. Once people are connected, they tend to find it pretty intuitive," he said. "It's been used in Nigeria, and Pakistan during the state of emergency in 2007 and in Zimbabwe since the beginning to try and get information out, and open up kind of a news channel in a country where I guess most of the media are controlled by the government."

Banks says the small format of the SMS medium has advantages as well as constraints. "It ensures information is tight and doesn't waffle on. You can say quite a lot in 160 characters."

Among applications which used the format successfully, he cited agricultural information and market prices and in the health sector, reminders for appointments, information on dosages for drugs, and particular health alerts, as well as reporting of human rights abuses by activists, or irregularities in elections.

"Most of the groups using FrontlineSMS already have established relationships with the people they are sending information to. They just have to extend that trust into the new medium," he said.

Banks says SMS can be used over other telephony services in the developing world because it can be managed by programs which are simple enough that they require no maintenance in contrast to, for example, voice-driven services.

Despite the explosion of mobile subscriptions in the developing world, he sees barriers to further adoption and use as not just cost of handsets and airtime, which is dropping, but also the issue of user friendliness. Models for mobile information services can't just be imported from the West, where in any case they have been technology- rather than needs-led.

"People who earn $2 a day, there are going to be things they want to find out, exam results, or figuring out how to sell the land they own. Understanding what those uses are is crucial and that's one of the gaps right now."

"A lot of the most interesting innovation in mobiles is coming from the South - financial transactions, M-government and so on," he said. Even with handsets, he cites the example of the LED torch feature, which was added after people in areas with bad electricity were observed often using the screens of their handsets as a torch. And however high tech the mobile web becomes, he believes texting will remain the key application across the developing world.

"SMS is always going to have a place even though it's seen as a poor person's technology."

ILLUSTRATION 6: *FrontlineSMS is an easily installable program that allows structured management of texting services, using either mobile phones directly or SMS gateways across the Internet*

3.2. Paul Meyer - Voxiva LLC

CEO Paul Meyer founded Voxiva in 2001. The company describes itself as a global leader in 'mobile-centric' information solutions, and has operations in 13 countries. It started in the health sector, where it deployed systems to connect disparate rural networks with headquarters across developing countries, but now works in a number of industry sectors using not just text but most standard telephony and web technologies.

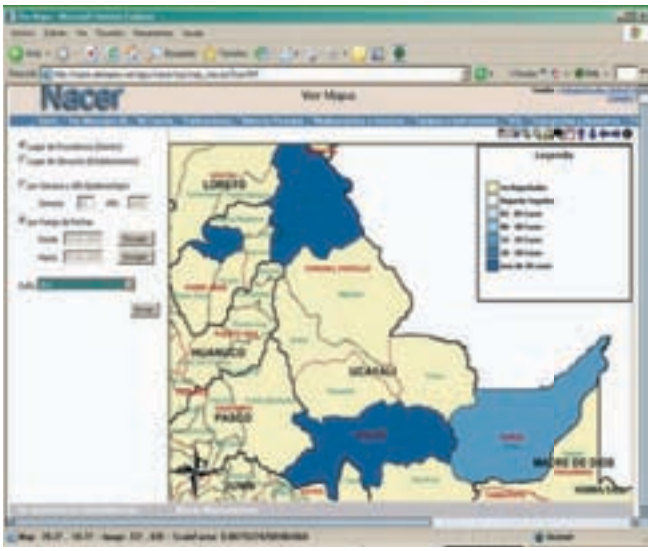


ILLUSTRATION 7: *Voxiva offers applications which integrate two way exchange of structured data over the phone, working primarily in developing countries*

"SMS is still the most ubiquitous medium, basically because of billing structures. It's cheaper than a voice call and that explains how widespread it is," said Meyer, pointing out that in South Africa where there was a local billing anomaly that made SMS expensive, there has been wide take-up of more advanced forms of mobile messaging like text services. "The mobile Internet is not a reality yet in a lot of places."

Meyer said in the mobile industry at large, the launching of significant M-banking and payment systems was transferring the centre of gravity of business by mobile from ring tones and wallpaper, which had been the first products of M-Commerce.

"People talk about M-Pesa in the context of remittances and sending money home but it also means you can transact. Just as you needed Visa and Paypal to start those systems of commerce, now those pieces of infrastructure are being put into place for the mobile," he said.

The ability to transact, he said, might also help media break the stranglehold operators currently have on information services that run directly across their networks: "You can do revenue deals with information feeds but the carriers take 70% of the money. So mobile payments might make some content and application deals more viable."

Because it has concentrated a lot of its work on business-to-business applications where information needs are relatively structured and complex, more than most companies perhaps Voxiva has tested the limits of the phone as user interface in the developing world.

Meyer said that with 'open user groups' – the general public as opposed to a labour force, or a specifically trained group of users, for example, quite complex information exchanges could happen over SMS one step at a time: "You send them a question, they answer it, you send them another question, and so on. You have to take it one piece of data at a time."

One application Voxiva recently launched was an interactive quiz by SMS in Mexico where you could assess whether you were at risk of cardio-vascular illness.

In closed groups, where people are repeat users, one text could comprise four or five pieces of data: a sales order, for example, might specify a product number, quantity, time of delivery, and buy price: "We've found that when the need is there,

people who are barely literate can master what they need to use texting in this way." Voxiva recently launched an application of this kind for the Mexican microfinance institution Compartemos and its 3500 sales force.

Voice-driven services such as IVR in theory offer a lot of advantages in terms of richer interaction. But they're more expensive to set up and to use: "Every call requires a dedicated voice channel."

Voxiva started in the health field, and its implementation of the TRAC service in Rwanda is one of its highest profile projects. But it is now also working in agriculture (Kofi Annan's AGRA initiative), and general sales applications. The company has developed a user interface which allows non-technical users to set up applications, Meyer said: "If you're a competent user of a program like Excel, you can build a telephony application with us".

His approach to media, as with other sectors, would be to build a specialised application that developed five or six use cases: "You could sit down and work out what the major recurring needs of a radio or TV station were and then build a new application around them."

3.3. Jasmine News Service

Chamath Airyadasa is a Sri Lankan journalist who worked for Reuters and then headed the AP Dow Jones office in Columbo before setting up his own news organisation using texts, called Jasmine News Wire. As of mid-2008 JNW had something like 100,000 subscribers paying 30 US cents a month across Sri Lanka's four mobile phone networks to receive a news alerts service.

"What the mobile medium allowed was the creation of a news service at a very low cost. We have got to the stage where we are now challenging the established media here," he said.

JNW began trying to sign up and manage subscribers itself over the Internet but found the process too cumbersome and exclusive for end customers, as they were having to charge $7 a month. But they soon moved to negotiating with the operators, and once they locked in a first deal they scrapped their own CRM structure.

"They manage the subscribers from their end. Anyone can subscribe by just sending an SMS and their monthly bill gets charged," he said. But JNW have been subject to price changes and variations as part of broader pricing policies set by operators in their Value Added Services. Airyadasa said it was possible prices would rise as some operators felt they had dropped too low, and were considering adding advertising onto SMS news alerts.

ILLUSTRATION 8:
Jasmine News Wire has about 100,000 subscribers to its SMS alert services across Sri Lanka

His view of what to put into the mobile medium seems geared by his long experience in news wire agencies. "The product we target to readers is Sri Lankan news that they would feel it worth being disturbed for. Because you know the disruption of a text message is higher," he said.

Most JNW users are in the capital Colombo or the Western province nearby, but despite the service being in English, Airyadasa says they have take up from all social sectors.

"We've launched a couple of operators who have low income subscribers and we still have 15,000 people on one of those networks. It seems like some people may not understand the entire message but they still find it useful to get a sense of it."

JNW uses cell broadcasts by the operators themselves to promote the service. Operators have sent out messages to millions of subscribers advertising the availability of the service. "From that, it's easy to pick up 20,000 people. It seems to be the most effective way to advertise".

Negotiations with the operators are hard, he says, but competition between them plays an absolutely vital role - as soon as you get one the others are interested too.

"The moment we launched on the number two operator, the number one operator who we had been trying to negotiate with for months came back to us immediately," said Airyadasa.

Competition in the news alert by SMS field seems to be hotting up. The country's largest operator Dialog has launched its own English language news alerts service, as has one of the private TV stations, and a website concentrated on financial news.

For JNW, growing the market is limited by the issue of scripts installed on mobile phones. Airyadasa estimates that only 5% of handsets in Sri Lanka have Sinhalese or Tamil fonts installed on them.

JNW is an agency, and so the team of 14 rate its competitiveness against the traditional news agencies like Reuters, and also claim its real-time alert system is what distinguishes it from radio or TV, where breaking news requires constant monitoring. This view also determines JNW's approach to the technology curve. If mobile web grew to a point where significant numbers of Sri Lankans accessed email on their mobiles, then JNW would have to consider launching email alerts in parallel: "As long as there is an alert, that is what distinguishes the news service."

As conflict rages in Sri Lanka between the government and separatist Tamil Tiger guerrillas, issues of media coverage – and censorship – have not escaped the mobile phone. The Reuters service on Dialog was closed because of the agency's style of including Tamil Tiger viewpoints in its coverage.

"The operators are not really sure of this medium because it's really new. I would have argued that they can just say 'it's a news service and it's independent from us' and try to stay away from political pressure but in Sri Lanka that argument doesn't seem to hold too well," said Airyadasa.

3.4. Emmanuel de Dinechin – Altai Consulting

Emmanuel de Dinechin has consulted in the telecom industry since 2000. Since 2004 he has been a founding partner in Altai Consultancy based in Afghanistan, where he has consulted for Roshan, one of the two main network operators there. Altai is also starting to work in Iraq with Asiacell, one of the operators there, and has done other mobile-related work in Central Asia.

ILLUSTRATION 9: *Mobile phones have taken off in Afghanistan since 2001 and penetration has now reached nearly 20%. But as in many post-conflict countries, the market remains opaque, with high churn, a grey market in SIMs, and very little data as to use patterns.*

"In theory the operators have an unbelievable amount of data relative to anyone else in these markets. Most regulatory systems require the user to register with a form of ID, so that means for every subscriber the operator has, at a minimum, name, gender, age and probably town of residence," he said.

In practice the reality for operators in developing countries is more hectic than that. Although they could mine usage data, for example, to figure out patterns, most of them have not structured their data to be analysable. And also the reality of the informal sector means that while each operator registers each subscriber and forwards details to the regulator, reality may start to blur the issues. In Afghanistan, for example, Altai estimates some 15% to 20% of Afghans are multiple SIM card users, swapping from one network to another as soon as a pricing plan changes. There is also a vibrant grey market of SIM cards, meaning the original registration data may or may not be accurate.

"In post-conflict countries there is simply no reliable information on consumer behaviour. You have to do the research yourself," he said. Altai has interviewed some 10,000 mobile users in Afghanistan in order to map usage onto demographics such as women, and age groups. On the other hand, the externalities of the market can probably be gathered in a week's research by 15 to 20 interviews with operator executives, applications developers, officials and others.

In Afghanistan, SMS services are limited to voting in competitions over broadcast media, such as the Afghan Star program on Tolo TV, or competitions on Radio Watandar, both in the capital Kabul. There are no voice-driven services, despite the advantage voice potentially offers because it can leap the literacy barrier.

De Dinechin says media outlets seeking to move into the mobile space should persuade the operators to back most of the development costs.

"Mobile markets have developed in similar stages in many different markets around the world. First the operators compete on coverage. Then they compete on

quality of the network. Then they compete on price. And finally they compete on innovation. This is where we are today in Afghanistan. Media-related products are key in today's competitive market," he said.

What the mobile medium offers advertising is control of both context and demographic at the same time: "Normally you get one or the other but not both. This is very powerful."

Although Afghanistan's penetration had reached only about 18% or 19% as of mid-2008, de Dinechin said that in a traditional commercial context that could appear as high: "About 53% of this country is under 16, and when you think in terms of the addressable market for commercial goods and services, largely men over 16 with buying power, they mostly have phones."

He also thinks that if media do not take the initiative, the operators themselves will go and seek the media properties they feel they need to compete in a market where Value Added Services will be increasingly important. In Afghanistan, the operator Roshan has bought rights to some popular children's TV programming. So far, they are only sponsoring the programs when they appear on terrestrial TV stations, but it is possible they could enter the market as media players in a more direct fashion themselves in the future.

"This mirrors what is happening in Europe. This is the kind of reason that brought Orange to buy the rights to the French football league this year," he said. "This is what the top executives of operator companies are saying around the world. If the media don't move into this space, the operators will do it directly themselves."

3.5. Jonathan Marks, Critical Distance

Jonathan Marks has worked as a public broadcaster in Europe for over 20 years, with Radio Netherlands and the BBC. His consultancy company Critical Distance now works in West Africa on combining emerging technologies, including mobile with traditional broadcasting, particularly the community radio sector which is strong there.

ILLUSTRATION 10:
the Association of Media Professionals in Benin negotiates with mobile network operators on behalf of community radio stations, and has also set up a technology research unit to test for durability of technologies in developing country conditions

"Making interesting programs costs money in any market or economy. We have to come up with better sustainability models than just hoping people will advertise on the station," says Marks, who has been working with the Association of Media Professionals in the West African country of Benin on the convergence between mobiles and broadcasting.

He says the environment for media initiatives into mobile is being helped by the ferocious competition between operators in the region. This means they are actively looking for ways to differentiate themselves from their competitors: "As far as the community radio sector goes, what distinguishes them is that they broadcast in local languages, not just English or French. This is their unique selling point and of some value to operators as they seek to acquire new customers in rural Africa.

Some stations have deals with operators that when they run competitions or phone-ins, callers from within that particular network become eligible for a prize, such as a year of free air time. In return, the operators are offering a share in revenues. Sometimes, they are also exploring sharing infrastructure as supplying distant base stations with fuel and maintaining a network of transmitter towers represents up to 60% of the costs of extending their coverage into rural Africa.

In Benin, the Association of Media Professionals has represented about 50 community radio stations in negotiations with operators, while some of the larger commercial stations based in the capital Cotonou have talked to them directly.

There is also a growing trend in the region to use mobiles for outside broadcast on radio. Beginning in elections in Mali a few years ago, the custom has spread to Benin and stations were planning similar projects in Ghana for elections at the end of 2008. Stations post reporters at polling booths and simply broadcast the phone call live at the moment when local officials announce results collected locally, in order to prevent electoral fraud.

"When we looked at what happened in Mali, we also realised there were gaps in the system because the radio stations were relying too much on volunteers and they weren't turning up. So now there is an experiment underway to use micropayment transfers to pay the reporters over their mobile phones," said Marks.

In Northern Benin some stations have also got municipalities to underwrite public interest text messaging service, such as seasonal information for farmers. They promote these services over their standard radio broadcasts.

Marks says even local radio stations are quite capable of handling multiple data feeds, and trickle charging downloads on an Internet connection when they have one, so the technical abilities to handle mobile phone services is clearly there.

But he doesn't see the mobile web happening in Africa at the moment. The main space for mobile is as backchannel and a connecting tissue between broadcasters and their audiences.

"Those media who move from a shouting model to a sharing model are likely to do best," he said.

3.6. Mike Grenville – 160Characters.org

Mike Grenville started an organisation to promote the use of texting in 2001 after he saw that the medium was catching on among mobile phone users but that the industry wasn't paying much attention to it.

ILLUSTRATION 11: *the wide availability of books of suggested SMS for all occasions across Asia shows how deeply embedded the medium is in popular culture across the developing world*

"SMS has always been a success almost despite of rather than because of the operators. I think it's because for so many years SMS was a technical channel the industry thought it would use for itself. It was nearly a decade before it started to take off as a popular medium in its own right in 1999, 2000," he said.

Grenville cites as proof of neglect the lack of the most basic management features for SMS that would enhance simple use: a blacklist or blocking function for particular numbers, an autoresponder for short periods away from the handset, threaded text messages in a manner similar to email, SMS copy to email – these are all minor enhancements from a technical point of view that would make a huge difference in usability.

Although the text format is limited to 160 characters, the specification for it is so stable that it is the lowest common denominator in global connectivity: "Of the three billion people on the planet who have a mobile phone you know that you can send them a message in this format and it will get through. That is incredible, and I don't think we have really got our heads around that yet."

There is a complex ecosystem in the texting world, he says, with network operators not handling their own messaging but turning it over to primary aggregators, who might in turn use secondary aggregators. Then in addition there are mobile applications developers, network infrastructure suppliers, and content providers.

The peculiarities of the medium offer several advantages. First, because it has its own place on the radio spectrum, it can remain 'up' when voice and other data channels crash due to pressure of volume. Second, the billing structure of sender pays means that the medium is largely immune to spam of the kind seen in email: "You don't see adverts for Viagra on SMS."

It is also deeply personal: "SMS is mostly done person to person. So even when

you're dealing with a machine at the other end, most people can't get their heads round that. Everyone who has a text-based service will tell you the same thing that they get messages back saying 'thanks very much' or 'goodnight, great service'," said Grenville. This should have implications for how media owners consider services using SMS in automated ways, or Application to Person (A2P).

Even when other data channels become widespread over mobile, such as instant messaging, Grenville says most operators still don't understand that each medium has its own specificities, meaning it is unlikely to be eliminated by 'more advanced' forms. In the case of SMS, it is both personal yet asynchronous, so less intense, for example, than instant messaging or a voice call. People will continue to use different channels for different kinds of communication.

In general, cost is being driven down, as is the cost of roaming in many parts of the world, in Europe by competition law, in the Middle East and Africa Zain, who own Celtel in Africa have abolished roaming within all the countries where they operate: "I think regulators will be looking at that and saying 'Vodafone, explain to us why all these places are different and you can't do the same'", he said.

In the media context, "SMS is like the glue between things. Glue between a billboard and users, between an advertisement or an article in the newspaper and the users. Between a program and the users." So, for example, a TV or radio station could use a text to alert people when they had breaking news.

3.7. Bobby Soriano – mobile in the Philippines

Bobby Soriano is a programmer and activist based in Manila who has been working on SOS SMS, a service for Filipinos working abroad who may be in distress. He has also worked on open source telephony.

ILLUSTRATION 12: *A huge mobile phone market in the Greenhills district of the Filipino capital Manila shows how deeply the device has embedded itself in society. Portio research cites estimates that up to 40% of mobile subscribers in the Philippines use second hand handsets.*

Soriano says that the service has evolved quite quickly from dealing only with emergency calls into a broader information service which deals with any kind of query from the hundreds of thousands of Filipinos working in the Gulf region and elsewhere. The Philippines has such a well developed texting culture – it has been called the 'text capital of the world' that Filipinos working abroad frequently take their SIMs from home specifically so friends and relatives can text them at local rates. It is also the country which spawned a mobile phone consumer protection movement called TxtPower. Launched in 2002 during protects organised by SMS that eventually unseated then president Jose Estrada, TxtPower has evolved into a movement which lobbies government for cheaper telecoms and consumer rights in the mobile phone space.

Despite this, Soriano sees no take up of broader telephony services: "Asterisk, the open source telephony server, is quite popular commercially but it is not used elsewhere. Voice cannot compete with the popularity of SMS, which is cheaper and more widespread."

Two other factors with influence in the Philippines, he said, is that literacy is high, meaning texting presents few barriers, and that Internet coverage over mobile and the telco providers is also high across the country, meaning the relative value of voice and voice-driven services are lower.

"We are seeing cheaper high end phones enter the market from China. Some

of them even have a TV receiver on them, so in fact they are like a pocket TV with a phone attached," he said.

Curiously, Soriano says, there has been little high profile use of texting by Filipino media to engage mass audiences, although some media are tapping into an effort to use mobiles for distributed reporting during elections, and making some use of texting internally.

SOS SMS could prefigure many other services in the Philippines of structured human to humaan information services over text: "Particularly in the health sector, we are seeing many organisations preparing to use SMS as a kind of instant expert service. Send in your query instead of going to the health center clinic."

3.8. Ilicco Elia, Thomson Reuters Mobile Products

Ilicco Elia is Mobile Products Manager at Thomson Reuters for consumer media services across Europe. Use of Reuters services across the mobile web jumped over 10 fold from the start of 2007 through mid-2008.

ILLUSTRATION 13: *As well as distributing news headlines over mobile web, Thomson Reuters has also developed a mobile-centric reporting toolkit which is being used by correspondents covering the 2008 US elections.*

The major change in the mobile web is the entry of flat data pricing in Europe, which has driven access phenomenally, Elia said. Thomson Reuters own services were logging about 25 million page views a month in 2008 compared to 2 million impressions a month in early 2007: "It is impossible to over-estimate the impact flat pricing has had on use. What we found before was not just concerns over cost but also over transparency of cost."

Operators are changing from metered usage to opt-in, as offered by T-Mobile, to now a situation with Vodafone packages where the default is to offer unlimited data and the customer has to opt out. This has not just driven use, but also demand for video over mobile, for example: "We're finding high response rates for our round-ups, video pieces of 1 to 4 minutes."

Elia said that users of the mobile web behaved in a similar way no matter what device they came in off: when searching, they used full search terms rather than an abbreviated format. "Use is simpler than we had thought. There's no great research or delving deep into a story. It's much more generalist."

Thomson Reuters promote mobile services with advertising campaigns, and some deals with network operators for privileged spots on their mobile portal sites. Unusually for the agency, all mobile services are free to air, supported by advertising, with headlines set to a 15 minute delay. Thomson Reuters also uses text and mobile delivery to Blackberry phones for its professional services, but with much higher guarantees of speed and reliability.

As well as mobile web, they also run SMS texting services. Here the model varies by market. In Italy, the receiver pays per message whereas in the United States services are advertising sponsored. Thomson Reuters uses both in-text advertising, restricting the headline to 100 characters to leave room for an advert, or by interspersing news messages with separate texts carrying an advertisement, say once a week or once a month.

Elia said that in structuring their services, they found no cap on the total time a user would spend on mobile services, but it was more a question of recognising that access was happening at particular moments between other activities: waiting for someone in a cafe, for example, or on the journey to work. And despite the delivery medium being on mobile, location is only one aspect of the broader feature of mobile information services, which is context: "The fact that it's nine o'clock in the morning potentially means more than the fact that I am in London. Location is only one part of context, and depending on the kind of service offered it may not be the biggest part."

It is still hard to know a lot about user behaviour. Thomson Reuters cannot correlate use of mobile web services with subscribers to their text service, for example, because there is no registration on the WAP site or any way to know if a user of the website also uses their text service. Cookies, which allow a website on the standard Internet to recognise a previous user and customise the content being offered, are not yet standard on mobiles, although smartphones such as the Blackberry, the iPhone, and the Nokia N series now enable cookies into their operating systems.

"We also use texts to cross-promote other media, such as the website, or the mobile website, and even on screens. So there are links on the screen we have at Canary Wharf in London, and Times Square," said Elia. "On the football service, when we include a link at the end of a text headline which says go to the website for more information, we get a very high click through rate."

While access and cost may be lesser issues in Europe, there is more competition and saturation, which presents its own challenges: "It's all about finding the right content. Especially in the UK with the ubiquity of the BBC it's very difficult to charge a premium for content. You need to find content that is extremely relevant to an individual as opposed to generic content, to find that hook that makes people feel they're getting value for that money."

Reuters also experimented with voice-driven services, building audio downloadable to an iPod, and call-in services driven by text to speech, but found lower take up than for SMS and mobile web: "We found there was an issue of time. The time it takes to listen to the content, you can view the web pages."

The number of different handsets, screens, and software sitting on a mobile phone means every service has to be produced in four to five versions – the server detects which handset and browser a user has and sends them the corresponding version of the story: "It's a huge headache but you've got to do it. We cater for everything from a screen with 90 characters and four lines, to a full display with 340 by 240 pixels, or an iPhone." The number of items in a menu list and media formats all need to be changed.

Although Elia also says that use of pure WAP, the first data standard for mobiles, is fading away even in emerging markets such as India. It's now either mobile web or text, with not much inbetween: "We were surprised at the number of users on our Indian services who have fully mobile web compliant browsers, not just WAP. So much so that we have actually been thinking of discontinuing WAP as a versioned format."

Thomson Reuters priorities for their mobile services in the future? "We need to make our services much more personalised. At the moment I would have more ability to personalise an experience for a user on a browser across a desktop than for a user on a mobile, which is not right really."

3.9. Jan Blom, designer, Nokia, Bangalore

Jan Blom is an industrial designer who has spent the last two years in India for Nokia, first attached to the Srishti School of design in Bangalore and now heading up the company's multidisciplinary research centre in the city. His work focuses on what the growth of mobile telephony in South Asia, Africa and the developing world in general means for design of mobiles and the services offered on them.

ILLUSTRATION 14: *in tune with popular culture: Bollywood star Shah Rukh Khan is its brand ambassador in India. But Nokia is now also paying serious attention to local cultural factors when it comes to product design*

Blom says there are three big areas of difference he sees in usage between the developing world and countries like Europe: first, new users in the emerging markets

are less affected by information saturation and this affects the way they interact with the phone now. Second, although the mobile phone is an iconic gadget among high end users in traditional markets, he says a country like India is actually more fashion conscious still, and the ability of the device to project image or self-expression more marked. Third, the explosion of subscriptions from 2006 through 2008 means a large group of users now who are extremely cost conscious.

"We have been developing these technologies for highly literate populations, a typical Western middle class background. But now when we are looking at these new markets we really need to understand there is a qualitatively distinct kind of user group," said Blom.

One major issue is literacy: "Interfaces are highly textual at the moment. To fully utilise the functionality of the device you have to be literate. The question is, how do you break away from this textual design to some form of iconography or other method?"

Another challenge, particularly in the case of fashion-driven markets, is finding the right balance in design between global issues, such as some general ergonomic principles, and local cultural drivers. There is a rising interest in looking at all forms of applications and services which can increase productivity and provide livelihoods, and this might be an area where the global element is heavier than local considerations.

This interest is driving a host of partnerships in India between operators and tech and media companies. Blom cites the Reuters Market Light service which targets farmers in Maharashtra state with crop prices, and a recent initiative by Tata Consultancy Services to create an agicrultural information service with a device that analyses soil and then sends data by mobile to a central repository.

SMS still dominates services offered over mobiles, Blom says: "The industry is pushing the limits of SMS. It has become a very standard way of accessing the Internet, you make a request and then something happens on the back end. To some extent, the dominance of SMS has slowed the growth of other services."

The challenge for media is in promotion, or customer acquisition in rural and inaccessible areas. How do you take a pilot and scale it up to national or global level? What are the intuitive ways of enabling service discovery? Nokia, he says, has researched in rural environments where clearly peer group recommendations and trusted authorities within communities are critical to this process. Social networking processes particularly have some globally relevant characteristics which will be crucial to the way services on the mobile unfold.

"We are thinking about when the handset has become cheaper and five billion people are connect. How would that change the world?"

Blom sees large areas where the mobile in developing countries is leapfrogging use in industrial countries because it is driven by a different position in the communications landscape, and its ability to answer local need.

"Health care, education and government – these are all areas where we see significant leapfrogging in emerging markets. I'm really hopeful and enthusiastic. I think we are looking at big changes in the next decade brought about by mobile technology," he said.

Blom said it might be possible that even access or entry into the mobile world might be subsidised or sponsored in some Bottom of the Pyramid demographics by a company or by government.

But there is a danger of too much concentration on left-brain concepts of economic development: "Discussion is around a framework of what would increase productivity, livelihoods and so on. But I think a major area that we need knowledge of is that people are also seeking playful experiences and emotional expression. We should really be looking at the role of ICTs enabling these experiences. When we go into bottom of the pyramid users, we should be looking at applications which bring about joy and social interaction."

4 The implications for southern media

4.1. Working Conclusions

a) If you don't do it, someone else will

As Emmanuel de Dinechin from Altai Consulting says, if media companies do not step onto the platform created by the explosion of mobile phones, other companies will. Not least the network operators themselves, who now expect to compete with each other in the field of Value Added Services, which includes media. All over the world they are buying rights to top entertainment and sporting events. To some extent southern-based and run media organisations may not realise the threat of competition in the mobile space from brands they do not regard as media because they have not experienced the same phenomenon on the Internet to the same extent as their northern counterparts. The drain of advertising revenues from print editions and even TV across industrial countries has led media houses to take online seriously, forcing them to integrate the Internet into their core business models[17]. By extension they will probably watch the development of mobile closely. Internet advertising has eaten away less at traditional media in southern countries because of its low penetration. The explosion of mobile phone adoption, and what it represents in developing countries, will be more far-reaching in its implications for traditional media than the Internet has been.

b) It's only just beginning

Another billion people will get mobile phones in the next four years, and every mobile phone owner has access to voice- and text-based services. In addition, the web is about to spread onto mobiles all over the world in a big way. In China, for example, some 73 million people access the Internet from mobile phones[18], 29% of total Internet users in the country, a proportion comparable to industrial countries.

c) Text is everywhere, voice is (surprisingly) nowhere

Despite frequent predictions of its demise, text messaging by SMS is surprisingly vibrant everywhere around the world, including OECD countries. More advanced messaging formats such as MMS have not grown s predicted. Text will also remain prevalent for many more years because it has already proved its ability to deliver complex services such as full banking or intricate supply chain management despite the constrained format. Curiously, voice-driven services are not widely used in the developing world, despite their potential to overcome literacy issues. This could be due to relative pricing – voice calls remain far more expensive than texts in many networks – but also a lack of awareness of the potential offered by Asterisk and evolving open source in telephony.

d) Know what you're offering

Mobile-based media services can have a variety of unique selling propositions. For Jasmine News Wire in Sri Lanka, it is news alerts once or twice a day of events people don't mind being disrupted for. For Thomson Reuters in Europe, it is a news service across the mobile web that users access in the cracks of their day. For the increasing number of radio and TV stations who run SMS-based competitions it is brand extension. What mobile cannot be is simply a cut-and-paste of a media outlet's main product.

ALL MEDIA PLAYERS NOW...

As the mobile phone evolves into a more fully f edged digital media platform, and services offered on that platform become a key commercial battleground, it becomes harder to tell what a media company is. Google, for example, regularly state that they have no plans to own or create content, normally considered the prerogative of media companies. But it depends what you mean by content. They own Youtube, a major blogging site called Blogger, and a managed online encyclopedia site recently launched called Krol and Google news is a structured offering of media production. Google have also said they expect mobile to represent a huge part of their traffic in the developing world, and have just released their own mobile development platform called Android. Among network operators, Vodafone's new CEO Vittorio Colao comes from a media background and said he was interested in more media plays. Nokia in 2007 declared themselves to be an Internet company, and have been developing a mobile portal called Ovi. Microsoft ventured into media with the Internet in its joint venture MSNBC. The telcoms industry has borrowed a term from baseball, 'triple play' to describe a company seeking to offer telephone, high speed Internet and TV. Mobiles are likely to be included in such all-in packages in the future

17 http://www.wan-press.org/rubrique20.html

18 http://www.economist.com/science/tq/displaystory.cfm?story_id=11999307

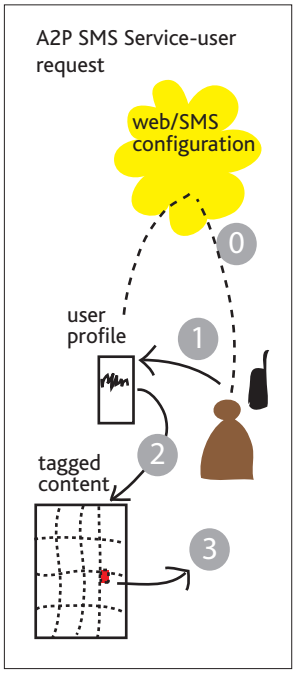
e) Know Your Market

Nielsen, the world famous broadcast ratings company, has acquired a company to launch ratings services for mobile media, including a chip which tracks all handset activity[19]. Nevertheless, it is surprising how many media initiatives have been launched without full research into the specifics of the local mobile phone environment. What percentage of phones can receive text in a local non-Latin script? What are the pricing plans of all the networks in your country of operation, how have they changed in the last 12 and 24 months and how are they likely to change in the immediate future? Is anyone offering any kind of voice-based services, if so, what platform are they using? What have local operators offered as revenue shares on premium SMS services? What are the leading applications of mobile-based services in your country?

f) It's tough down the food chain – strike out on your own if you can

Media players may need to do deal with network operators to get a profile, cover promotion costs, or reach scale. But they often suffer from the greater size and power the operators enjoy in negotiations, and the lack of a transparent market in revenue sharing. The growing availability of cheap or free tools to run SMS and voice services means media leaders would be well advised to consider launching at least some services they run and own themselves. This strengthens in-house knowledge and the negotiating position with the operators, and could generate significant revenues in its own right.

ILLUSTRATION 15: *Schematic of an application-to-person (A2P) service by SMS. A user has subscribed either by SMS or over the Web, giving the service a basic profile (step 0). In step 1, she requests information - the service uses the incoming caller ID to find her profile and then matches it (step 2) to the most relevant item of content in the database of tagged content. Step 3, the system sends back the piece of information relevant to that user.*



g) Look Everywhere for the Business Model

Business models can include a classic subscription service where the media collects subscriptions directly, revenue share on standard or premium air time or SMS, or in-text advertising. Most large network operators sponsor content, and in the context of public good news there are increasing cases of social marketers or local authorities paying for mobile information services. In Africa, community radio stations have done deals to share infrastructure with operators in remote rural locations.

h) Broadcast point of departure: participation

Radio and TV stations might consider a natural point of departure phone-based services which seek and maximise audience participation. Where Internet access is high in developing countries, TV stations have experienced the same drain of audiences, particularly the young and tech-savvy, to the Internet, as in the Philippines[20]. The mobile offers two immediate possibilities for broadcasters: greater engagement and audience participation, and the development of individual relationships with viewers. Broadcast outlets which carry significant news also have an option of considering real-time alerts.

i) Print point of departure: the right snippet of data

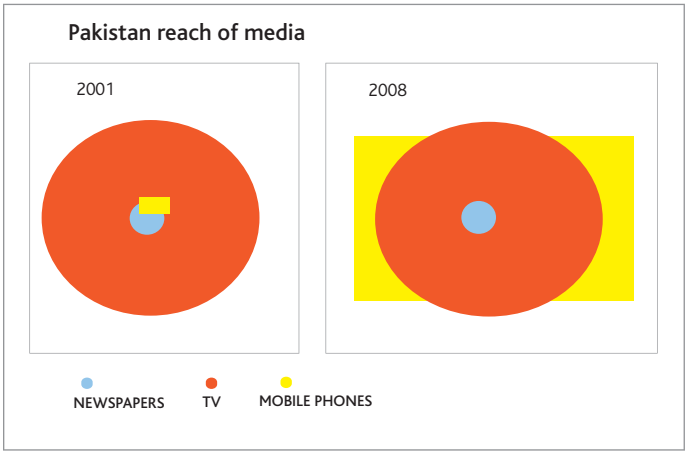
Newspapers and other print media may have other possibilities. They are more likely to be run off content management systems, and more likely to have a mass of text-based news and material that, in theory, can be mined and provided over text, the prime means of delivery of mobile services in the developing world. The World Association of Newspapers has conducted research to suggest that even where advertising and other revenues are falling per subscriber in the print edition, they are rising online[21]. One obvious application for many newspapers is a classified ads service over mobile, searchable by keyword.

What mobile offers to newspapers is extension beyond their normal physical distribution networks. WAN estimates that newspapers worldwide are read by over 3 people per copy, with that ratio being higher in many developing countries[22], but circulation is often heavily concentrated in major conurbations.

19 http://www.nielsenmobile.com/html/measurement_meter.html
20 http://mikeabundo.com/2006/11/17/the-fall-of-philippine-tv/
21 http://www.wan-press.org/article17391.html
22 http://www.wan-press.org/article17377.html

5 Any Handset Any Network – opportunity is now

This chapter describes the kinds of services that can be offered by voice or SMS texting – the two functions that are available on and across any of the world's 3 billion handsets on any of its thousand or so major mobile networks. It is only AHAN services which can exploit the exploding reach of the mobile phone, as schematised in diagrams below relating to Pakistan's media base.



5.1. In-house use of voice and text

One of the simplest uses of mobile phones available and suitable to media in developing countries is in-house. This sounds so simple that it is not immediately clear why thought should be given as to how to structure use of the mobile phone within media organisations. If everyone has a mobile phone, isn't it just a case of the editor phoning a reporter as and when needed?

What such a view ignores is the possibility of structured information flows.

Suppose the editor records a one minute message on a phone system outlining the results of that day's editorial meeting, for example. The results are then available to anyone calling from a list of pre-approved phone numbers, meaning the whole extended network of the radio station can interact with management in real-time. Suppose a reporter is working on a business story and the news desk can easily SMS five other reporters in a pre-defined group for supplementary information or contacts.

Media managers who are not technically literate also tend to ignore system complexity when thinking about appropriate communication channels. Internet access, for example, is defined as a binary and reporters and the extended network of the media house either "have it" or don't, when reality is usually more nuanced. If a reporter accesses the Internet once a week from a high speed connection, twice a week from low speed cafes, and three days not at all, is email a viable communication channel or not? Yes, except not for real-time, or in this case, same-day response. So mobile is often a useful channel of communication even when most of the network has (some) Internet access.

Community radio stations in Africa have also used the phone effectively as an outside broadcast unit, famously in the case of general elections in Ghana. Several stations placed reporters at voting centers and transferred broadcast to them live as voting boxes were about to be opened, a key moment in which election fraud can happen.

In other cases, management has used the ability to transfer mobile phone credit to pay freelance reporters, encouraging better responsiveness at key moments[23].

5.2. Texting

a) Market

Global SMS texting topped a trillion messages in 2005, averaging what was then two text messages per user per day. All industry experts agree that figure is rising fast but their estimates for how much vary: Ovum Consulting predicts it will reach 2.3 trillion by 2010, or a 16% rise year on year; Gartner estimate 2.83 trillion texts in 2010 for an annual growth rate of 22%, and Portio Research estimate 3.18 trillion, or annual growth of 25%. Texting still accounts for the lion's share of all data revenues over mobile phones, and some three quarters of revenues from all messaging services over mobile - $66 billion in 2007.

In spite of that, some analysts say the telecoms industry continues to regard texting as 'a given' part of their business model, and part of the mass market commoditised end at that: "SMS has succeeded in spite of, not because of, the network operators," says Mike Grenville, founder of 160Characters.org.

There are two significant trends to mark within SMS. The first is that, despite prediction of its decline that are almost as old as its use, SMS continues to grow fast in the developed countries. The Mobile Data Association in the United Kingdom published a report showing monthly use of SMS during the first half of SMS averaging 1.6 billion texts, a 30% increase on 200624. Although MMS, or multimedia messaging, had been predicted to replace SMS since perhaps 2004, usage over the same period was 10 million messages a week – or less than 1% of SMS rates.

Second, however, is that a large part of the appeal of SMS in developing countries is its low cost, and known cost. But here and there, where these advantages have been challenged by local pricing

conditions, SMS use is vulnerable, losing out to applications which appear to be technically 'high end' but are cheaper. So MxIT[25] are gaining traction among young South Africans because their messaging service – linking Yahoo Messenger, Skype and other Internet messaging clients over the mobile phone - undercuts local SMS rates there, and mobile start-ups report similar success in signing up customers for their post-SMS mobile messaging services in India and Indonesia. Clearly it would take some time for such applications to reach critical mass in developing countries, but the fact that in places they can undercut SMS on price means it is a development to be watched.

On the supply side, SMS gateways such as Clickatell which make it easier to automate the sending of texts to large numbers of people have become more accesible, and achieved greater reach across countries and networks in the mid-2000s. Another factor which could make use of texting easier for media is the more general adoption of content management systems in media production in recent years. This can make the process of identifying individual pieces of news or content to be delivered via SMS easier to manage. A third element is the wider availability of SMS server programs such as FrontlineSMS[26], which enable management of groups of users, user histories, and so on.

b) Obstacles

Some barriers exist to adoption of SMS for information services by media.

Cost – SMS is costed per message with the sender paying (apart from in the USA and Canada, where typically the receiver also bears part of the cost). As such, it is expensive to run information services to large numbers of subscribers, even if unit costs are small. Ways to cover those costs are: receiver pays via request texts

SMS – SHORT MESSAGING SERVICE

The first SMS was sent as a test in the UK in1990, but for years it was used simply by operators themselves as a technical channel, and was not adopted more widely by mobile phone users until the late 1990s. Since then use has exploded as it has become the most extensive text communication system in history, an 'accidental success' like the 802.11b wireless protocol which led to rampant growth of wireless Internet. SMS has several distinctive features: an extremely stable architecture limited to 160 characters in most scripts has ensured global interoperability – any of the 3 billion handsets on the planet can send a message to any of the others. It also has its own spectrum allocation, meaning it can work when all other voice and data channels are down due either to generic weak signals, or peak usage. Texting has become embedded deep into the cultures of many developing countries, to the extent that books of texts to send to friends (and boyfriends and girlfriends) are widely sold across Asia.

23 Jonathan Marks, Critical Distance, interview for this report

24 http://www.text.it/mediacentre/press_release_list.cfm?thePublicationID=6F5A90F5-15C5-F4C0-992D5F8DDAF2BDCA

25 http://www.mxit.co.za/web/index.htm

26 http://www.frontlinesms.com/

charged at premium rates – this is a standard model in many countries all over the developing world; in the case of a high-end service the sender finds another way to bill the receiver by cash or payment online or by text itself – this has not been common but could become more so with the growing use of the mobile phone to make payment and various M-commerce systems; the service might be sponsored or subsidised by another party, such as a company, or a public agency. 'In-text' advertising has been widely used in India and somewhat in the United States, and in West Africa community radio stations have obtained sponsorship for SMS services from local municipalities. These cost issues of course apply to text-out uses of SMS by media. Text-in services to increase participation and public voice in a media outlet do not face these challenges.

ILLUSTRATION 16: *wallet card with phone menu choices - Voxiva*

Literacy – This factor of course varies hugely from one country to another, and to different demographics within a society. As mobile phones approach ubiquity, the proportion of users who are functionally illiterate will grow both in relative and absolute terms. But it is also important to work with a nuanced definition of literacy, and balance that against the kind of service being offered[27]. Some services, such as a standard update of the weather, or commodity prices, require a bare minimum of literacy and providers of such services in Africa and South Asia report some use even by users who struggle with the literacy issue. Also, a user's interaction with menus can be vastly improved by even the simplest of instructions, such as the wallet-card sized set of menu codes distributed by Voxiva in its health applications in Peru. Whereas any 'free text' service sending out content or headlines not according to a pre-set format sets a higher literacy barrier.

Script – Closely related to literacy are script issues across many parts of the world. SMS was evolved in Latin script countries and adaptation to other scripts is variable. In the Middle East, for example, Arabic script is now routinely available and used for texting, whereas in South Asia many languages have still not been properly integrated into the handset, or do not work easily across networks[28], and Latin script versions of local languages such as Pinyin or 'Hinglish' are used. This may still be the case even where scripting problems have now been resolved at a technical level because texting evolved in these societies among educational elites who are comfortable using Latin script, and this usage still permeates SMS culture, or because some scripts based on character sets rather than alphabets are more cumbersome to deploy on the standard mobile phone keypad.

Lack of familiarity – It is difficult to find solid data for this, but anecdotal evidence suggests a wide disparity in willingness to adopt SMS by phone users. Some societies such as the Philippines have adopted texting en masse, and within a broad range of societies academic researchers have identified the young, and more particularly young women, as higher than average text correspondents. Here the nature of SMS as a communication medium needs to be appreciated: it is personal by mere dint of arriving on the mobile handset, yet also indirect, discreet, and asynchronous – offering a low intensity form of what digital culture specialists call 'presence'.

'P2P' or 'A2P' - The overwhelming quantity of texts sent and received as of mid-2008 are by one person to another, known as P2P in the jargon, or 'person to person'. Analysts see potential for growth of SMS as a medium used 'A2P', or 'Application to Person', where an information system sends out a text to a mobile number according to pre-set criteria. Media offering generic information services by text would fall into this 'A2P' space, and management would need to consider what the likely take-up of such services might be in any given demographic. Consent is obviously critical, given the limited nature of the format.

27 http://www.janchipchase.com/blog/archives/design_research/illiterate_communication_practices/

28 http://feedelix.com/FeedelSMS.html

SPAM – Few cases are routinely reported of SMS spam, probably because the sender pays. Network operators in any case maintain SPAM filters which block messages exceeding certain thresholds. Nevertheless there have been cases of political parties and movements particularly spamming a mobile phone network, which could decrease confidence in the medium. And more broadly, the Japanese leader in mobile Web DoCoMo refunded $217 million in subscriptions to users after spammers succeeded in penetrating their services, such was their sensitivity to the issue. But that sensitivity is also context-dependent: Paul Meyer, CEO of Voxiva[29], which operates widely across Latin America, Africa and South Asia, comments: "People in more remote environments tend to be more interested and less sensitive to regular messaging than those of us who live in information saturated environments."

Negotiations with the operators – Where media are negotiating with network operators for revenue sharing agreements, they often face the problem of being too small to get senior management attention within the operator, or having a weak negotiating position because of being so small relative to the operators, who are often among the largest companies in a developing country economy. In one country in the Middle East for example, a leading operator insists that any content providers go through a number of intermediate aggregator companies while they take 50% of revenue, meaning the content provider then has a second set of negotiations with the aggregator to split the remaining 50%. There do not appear to be any industry wide norms for shares or splits of revenues, but the figures below show figures for operators in the UK. Broadly speaking two principles apply: first, that the content provider share of revenue increases with traffic; and second, that it also increases in relation to higher-value SMSs.

UK MOBILE OPERATORS: LOW RATE PREMIUM SMS REVENUE SHARE (20P)

Traffic (000 SMS/mth)	>0k	5k	25k	50k	100k	250k	500k
Vodafone	16%	16%	26%	30%	32%	40%	40%
Orange	29%	32%	34%	36%	38%	41%	41%
O2	60%	60%	60%	60%	60%	60%	60%
T-Mobile	45%	45%	63%	63%	63%	68%	68%
Virgin	45%	45%	45%	45%	47%	49%	54%

Source: Clickatell June 2008

UK MOBILE OPERATORS: MIDDLE-RATE PREMIUM SMS REVENUE SHARE (50P)

Traffic (000 SMS/mth)	>0k	5k	25k	50k	100k
Vodafone	48%	48%	51%	52%	53%
Orange	49%	49%	53%	54%	55%
O2	64%	64%	64%	64%	64%
T-Mobile	53%	53%	57%	57%	57%
Virgin	45%	45%	45%	45%	48%

Source: Clickatell

c) Taxonomy of text services

There are various different information flows possible through SMS, each with its own characteristics.
Information services in:

Free text, quiz and competition – This is the most common form of extension by media into the mobile phone space currently, and involves simply inviting viewers, listeners and readers to enter competitions, or comment on programming. Presenters then display a selection of material in as real-time as possible. At a very basic level, this can be very low cost, the station operating off a simple handset and reading out by

29 http://www.voxiva.net/

voice, or typing in selected text messages. National or metropolis-level TV and radio stations typically incorporate it[30], giving rise to the impression among media executives that their sector already integrates broad use of the mobile phone space with their existing offerings. Smaller, and community-level media have yet to integrate this kind of extension as a standard feature, because awareness of and access to simple tools such as a text-to-Web-page conversion or a standaline client program such as FrontlineSMS is lacking.

Structured community input – The next stage up in terms of managing in-flows is 'structured' input, which makes possible aggregate opinions. For example, a TV or radio station can solicit a vote and then use a range of programs to tally the votes automatically, in real-time. How many listeners believe a politician's claim at the start of an interview that allegations of corruption in the public schools service are false? The interviewer can feed back a result such as 'only 23 out of 312' within minutes – while the politician is still on air. Viewers could vote where to send a roving reporter for the next day's report, or rate their local refuse collection service from 1 to 10, to provide the basis for a panel discussion. The ability to gather responses and place them in basic structures automatically, rather than manually attempting to read them off an actual mobile phone handset, is what makes such services viable.

Information services out: these should be differentiated from the user's point of view, between those which are initiated by the producer, and correspond more to a traditional broadcast model (known as 'push' in the jargon), and those which are polled by request of the user ('pull').

Cell broadcast (push) – a network operator can broadcast a SMS message to all handsets in its district. This conforms most closely of course to a traditional broadcast model. However it will rarely offer value – the cost in normal circumstances would be prohibitively high, and as text is a more personal medium than radio or TV which are by nature disruptive, it would rarely provide a good user experience. The exception is public emergencies. Since the Asian tsunami of 2004, the international humanitarian community has been thinking of interventions in natural and man-made disasters by persuading network operators to push cell broadcasts of particular messages. In the developed world, authorities in the Netherlands, for example, have tested and maintained an emergency texting route to the general population in case of flooding. Cell broadcasts might be described as extremely useful an extremely small amount of the time, and positively disadvantageous at all other times.

Subscription (push) – This is where someone signs up to a continuous service on an ongoing basis. They would probably be charged a flat fee for the service every month, not pay by the individual message – as Jasmine News Service do in Sri Lanka, for example, where the subscription is about 30 US cents per month, and roughly two messages a day are sent out, but it could be more or less depending on if it is a light or heavy news day. Payment could either be by deduction from mobile phone credit, or direct to the content provider who then clearly has to factor in the cost of the messages to the subscription price.

On Request (pull) – This is where information is sent out after an individual request. This would normally be by sending a keyword to a particular number more narrowly specifying the nature of the information desired. For example, sending the word 'cricket' to a given number on Reliance in India might return the latest score in the India-Pakistan Test Match. In advanced countries this 'polling' of underlying databases can be quite sophisticated. One company in the United Kingdom, for example, will send out a bottom and a top price range for any model of car to buy second-hand on being sent a car registration number. A stock market service might return the latest

FILIPINOS ARE THE WORLD'S TOP TEXTERS!

Over 10 million Filipino subscribers to the Smart network averaged 12 SMS messages per day during the last quarter of 2006, according to a report by Wireless Intelligence, making them the busiest texters in the world. The 1008 SMS messages per subscriber were over three times the highest European network cited (Telia Denmark), and over 15 times the average for Cingular subscribers in the United States over the same period. Other networks cited as high texters in developing countries were Maxis (Malaysia), Movilnet (Venezuela) and Starhub (Singapore).

30 For example in Zambia http://www.lusakatimes.com/?p=1982, India http://www.indiantelevision.com/special/y2k4/olympics_tv.htm, and Nigeria http://premiumsmsnigeria.blogspot.com/

price and in-day movement of a particular stock on being sent a particular company's trading symbol. These kinds of services must be either sponsored by an outside party, or run in coordination with a network operator, as it is not feasible for the content provider to recoup the cost themselves.

Triggered Alerts (pull) – One powerful application of SMS is where a user seeks to follow developments in a particular field, such as the prices of a dozen stocks she invests in, or physical commodities in a marketplace. In this case, the user would define these stocks and ask to be informed whenever their price changed on the market. This kind of service combines elements of both push and pull but it has high granularity suitable to the SMS medium.

5.3. Voice Services

It seems obvious that voice-driven services would be a significant part of information services on the phone. It is, after all, a device for talking to people. In practice however, voice-driven services consistently generate smaller revenues than SMS on mobile networks across the developing world.

a) Market

Unlike texts, figures for voice-driven services over the phone are quite simply unknowable. This is because whereas for texts each operator reports to the national regulator, who in turns publishes statistics, or forwards them to international bodies like the ITU, many voice services may be effectively 'hidden' from operator level. If you call a number and leave a message on an answering machine, you have used a voice-driven service yet the network could not capture that fact.

Nevertheless industry experts produce estimates for IVR menu services in various countries. One recent report estimated use of voice portals and IVR menus in India[31] at just over 1% of total phone usage, which would put it at about $200 million a year. In Bangladesh, industry insiders estimate value added services as a whole could represent 5-6% of mobile phone industry revenues, and of this voice-driven menus might constitute 15 to 20% of VAS, equalling something between $10 and $15 million a year.

A similar picture emerges from many developing countries. Voice calls account for about 90% of total revenues, and of the 10% that remain, SMS texting accounts for at least 50%. The remaining five percent of the total is split between various other VAS, and of these IVR may be a significant element of anywhere between 5% and 30%.

IVR offers the potential to break through literacy barriers by offering on-demand information services by voice. For media owners, especially broadcasters, it would also seem to offer a more natural 'fit' in the sense that reports could be re-purposed to the phone with relatively little effort.

In fact, it is not quite that simple.

INTERACTIVE VOICE RESPONSE – OR IVR

If you are reading this report, you have used an IVR service whether you knew it or not – to book an airplane ticket, check details of a bank account, or even just to retrieve messages left to a mobile phone account. The term IVR now means basically any information service which can be programmed by a user dialling in over the phone. In some cases, the programming may be by spoken commands, in which case the server has to use 'voice recognition'. Or, more simply, it can be by using the key pad on the phone. Each button has a different DTMF tone the server phone on the other end can recognise, effectively turning the mobile phone into a simple menu selection tool. Call centers use IVR systems to manage customer service.

b) Obstacles

Traditionally the kind of functionality offered in an IVR menu has only been available through *expensive closed-source telephony applications*. These were originally hard-coded into equipment (as most software was in the first days of computing), and then evolved into proprietary software applications, in many cases still running off pre-configured hardware. Such applications are often very expensive, charged on a licence basis, and hard to understand and interact with. While on the Internet software engineering has trended towards open standards, helped by major contributions of open source software, within telephony these trends have been much slower to take hold.

An open source telephony server called Asterisk is now breaking into this area. Written by software developer Mark Spencer in 1999, Asterisk[32] is now a stable, robust telephony server which offers all the functions of a Private Branch Exchange (PBX)

31 http://cellstrat.wordpress.com/2008/08/12/mobile-vas-numbers-for-india/

32 http://www.asterisk.org/

– all the add-on functions now used, for example, inside corporate phone networks, such as call forwarding, teleconferencing, dynamic menus based on incoming caller ID, and so on. Another positive development is that Asterisk is one of the best supported open source technologies in terms of commercial solutions providers[33]. Many large corporations now run their in-house telephony services off Asterisk, and 100 seat call centers are driven by it, including in developing country economies such as India and the Philippines. It is thus proven to be robust.

But the barrier to entry for non-technology companies is still high, as it is available only on Linux-based operating systems, not in any version of Windows. In addition, Asterisk was designed primarily for PBXs to interact with what the telecoms industry calls POTS, the Plain Old Telephone System of landlines, and is underdeveloped in its ability to mount services purely within the mobile space, whether GSM, CDMA, or other. Asterisk or any PBX system functioning on and from mobiles would have much greater potential in many developing countries for two reasons: first, the wireless population is now often many times larger than the fixed line population in these countries, and second, it is the integration of services on the PBX into a landline system that is often the trickiest and most expensive part of designing mobile services on a relatively small scale, as each landline system has its own engineering peculiarities, and is often subject to near-monopoly by a current or ex-incumbent PTT company where telephony services in other areas have opened up. This means applications and code bases could be ported from one telephone network to another, or indeed one country to another far more easily. Curiously, little work has been done with Asterisk or open source telephony in a social development context so far.

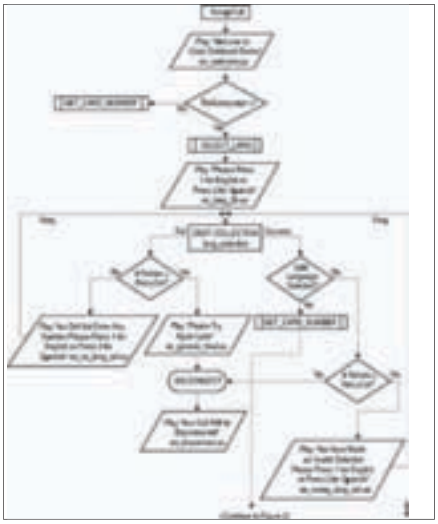


ILLUSTRATION 17: *Call flow in an IVR service - each decision by the user triggers a step by the server*

Automation of services are highly problematic for most developing country environments, particularly any technologies which attempt to bridge text and voice. Text-to-speech technology (TTS) is the technology which takes text written in a computer and renders it into an approximation of a human voice. Voice recognition works the other way round, taking words spoken by a human and attempting to transcribe them. Both have suffered what might be called 'techno-optimism' and also rich country development syndrome. Early predictions for wide use of these technologies on the open market have been replaced by more narrow uses, as dictation systems trained for one individual, for example, or within known specialisations where the programs' vocabularies can be adapted to narrow context. Most of the development effort has been with the languages of the rich world, and within those, of dialects and forms spoken essentially by the educated elite. In other words, although in theory English, French, Spanish and Portuguese offer wide deployment possibilities in the developing world, in practice the variants of these languages spoken in developing country contexts render the applications hard to use. Also, research has shown that speech-driven systems need to be substantially adapted if they are to benefit illiterate or semi-literate users, as in the case of Tamil Market, the University of Berkeley's initiative to provide crop prices and daily news to farmers in the Indian state of Tamil Nadu[34]. The way these technologies are often deployed, you need to be educated to understand machine speech, and if you have a non-standard dialect of a language – such as is common among those at the informal economy level – the machine will fail to understand you.

Another approach to this constraint is voice services offered by pre-recorded sound files. This solves the intelligibility problem for users, since they can listen to another human rather than a machine. This workaround functions well for services which are information updates within stable templates – a weather report, for example, which quotes the highest and lowest daily temperatures, wind speed, and expected rainfall, or a market report which quotes opening and closing prices and the amount of trading.

Lack of ease and comfort – Research shows many users are not at ease with voice-driven interfaces above and beyond issues of automation of speech into or out of a service.

Scaling – Voice systems are a real-time system and so present greater scaling

33 http://www.opensourcexperts.com/Index/index_html/Asterisk/index.html

34 http://www.cs.cmu.edu/~dgroup/papers/TamilMarket.pdf

NOKIA 1100 – BEST-SELLING PHONE EVER

Explosive growth in mobile phone ownership across the globe has been accompanied by the incredible success story of one mobile phone in particular. The Nokia 1100 was launched in late 2003 specifically aimed at lower income groups and those in developing countries. By May 2007 this phone had sold well over 200 million units to become, not just the worlds best selling phone, but the world's biggest selling electronic consumer product (even eclipsing the enormous sales of the Apple iPod, Sony Playstation 2 and Motorola's RAZR). The 1100's design was a response to the unique challenges faced by users in developing countries (such as rugged climatic conditions, lower technological knowledge and lack of access to electricity). Therefore it was made to be easy to use with large keys and a simple user-friendly menu system. It also had to be robust, so came with dust proof casing and non-slip sides but was also light. Even the battery lasted a long time after being charged. The most popular phone in the world was deliberately designed to be a simple phone with only basic functions. Its popularity in fact partly stemmed from this – a mobile phone that was simply that, a phone - instead of being one that was also an MP3 player, digital camera and Internet connection as well. This was in sharp contrast to the 3G focussed mobile phone industry, releasing and promoting ever more complex, feature-laden "smart phones" - with micro-browsers, polyphonic ring tones, the ability to record and stream video/ audio, Bluetooth wireless communication, etc. As well as being able to make and receive calls, the Nokia 1100 also included some useful features such as text messaging, a phonebook, an alarm clock, and a bright built-in LED torch. However, through keeping the phone to this basic design (and even minimising packaging and colour printing) it could also, and arguably most importantly, be sold at a low price. Not only making it affordable, tough and easy to use but also exceptionally popular.

problems than SMS texting. For texting, latency is an issue, and a large scale service seeking to text tens or hundreds of thousands of users very quickly could therefore run into scaling issues either with or without the cooperation of the network operator. But as text is asynchronous, an SMS delivered within a few minutes is usually enough to satisfy user need and peak requests or traffic can therefore be queued out in a way which provides satisfactory service in most cases. With voice, once a caller has dialled in, the system is either 'up' and running in real-time, or it fails the user.

Voice compression codecs get more efficient all the time, and so in theory voice systems can scale fairly effectively with relatively few technical resources. An Asterisk server needs about 60 Khz of processing power to handle a single phone call, which means the average server computer sold today could handle up to 50 simultaneous connections – all you need is the server, and that many actual connections out to the telephone system as offered by a couple of T1 lines, for example. But it means that voice-driven and IVR services can get quite quickly into issues of load balancing between more than one server, itself an arcane technical issue, and such broadband connections are often much more expensive even in absolute terms in developing countries.

One important aspect of considering scale in voice-services is to anticipate, and if possible research, the future schedule of demand for any particular service. A traffic alert system, for example, may well receive 90% of its requests during the morning and evening rush hours. A sports news service could receive massive traffic during a crucial match or competition.

c) Taxonomy of voice services

Basic call-in services – the staple of voice-driven services is the call-in service, where a caller dials a number and is offered a menu of choices. Because listening is slower than reading, format constraints are tight. In contrast to a website which might offer a dozen major sections and perhaps 40 links off its front page, IVR best practice suggests the maximum choice feasible is four first-level options off the main menu[35], and no system should go more than three levels deep.

A news or current affairs headline service could therefore be offered by providing a top three o=r four items as headlines, with a more in-depth story existing one level below when a user selects the number in the menu.

Personalised call-in – One refinement of this is to use an incoming callerID to create a dynamic menu based on the identity of the caller. This provides more accurate targeting, and a higher chance that the service can use the limited window of contact with the user to provide information of particular interest to her, but of course poses the question of how the caller identity has been linked to a particular profile of interests in the first place. Conceptually, such a profile can either be ***explicit*** because a user has signed up to a service indicating her general interests, or ***implicit*** where content is customised based on previous usage from that caller number in the same way as a website can customise content based on implicit user data collected from a cookie sitting on the user's PC.

This is where the concept of mixed media offerings comes into its own, with the mobile, as the most personal device with the most continuous access, positioned as the 'glue', or the 'remote control' of the range of services offered[36]. A user can configure a profile online, and on that basis receive customised news whenever they call into a particular number.

Call-out – Conceptually a variation of personalised call-in, with the user specifying a request to be called on particular triggers, such as an event threshold, or a particular pre-set time, or simply when there are any updates on a given subject. Call-outs can be useful in high-risk security environments. Here, the caller service can disguise the nature of the call by routing the call through a bank of numbers that an adversary such as a state security apparatus with access to the records of the network operators cannot detect as linked to the information service.

35 http://www.call-center-tech.com/ivr-best-practices.htm

36 http://www.thefeaturearchives.com/topic/Announcements/Four_Futurists_on_Tomorrow_s_Mobile_Media.html

Global South specific services – Finally, it should be remembered in the context of the developing world that mass market mobile telephony is now reaching the informal sector economy, and the Bottom of the Pyramid. This means there may be other models for useful and profitable services media owners can provide which do not follow the trajectory of mobile services in the industrial world because they respond to different needs, or take advantage of different opportunities. One example is already ***Dial-An-Expert*** services offered by various NGOs, such as the collaboration between the MS Swaminathan Foundation and One World Online in the Open Knowledge Network37. In industrial countries like the United Kingdom, services such as Texperts[38] have already created a small industry model of Internet surfers replying to questions put by SMS[39]. The different labor structure of developing economies means such services might well be sustained by voice.

Another example is in ***voice-driven classified advertising***, where a potential buyer and seller are put in contact not by direct person-to-person calling but through a switchboard with a unique identifier which forwards to the advertiser's actual number. From the user side, the mediation offers greater security by the level of indirection through the switch, as well as the potential for extra services such as language brokering or listening to a more in-depth message from the seller describing the item. From the media owner's point of view, routing through their switch gives flexibility in a business model – they can charge the seller for each directed call, the phone equivalent of a 'clickthrough' in online advertising.

There is also the possibility of ***teleconferencing***, currently a facility limited to elites and formal business use in the developing world. But add together two elements from the developing country context – first, that the phone is the first opportunity for many to access any formally organised information-based network and second, that many sub-cultures will be largely or exclusively oral – and it is not hard to imagine many of the aspects of digital community from the Internet, such as newgroups, email newsletters and text messaging, transmuting in the phone space into a series of conference rooms open 24/7.

What Asterisk and any other affordable source of configurable telephony offer is the possibility of the human resources backing any voice services being located anywhere. Call centers of course already use this principle, conveying millions of customer service calls originating in northern countries to India or Africa over VoIP networks for answering. But the principle can be further extended to the concept of a ***distributed call center***, where, precisely because of the ubiquity of mobile phone coverage, a relatively small entity such as a regional newspaper or radio station could set up services staffed by experts teleworking from home, simply on call as an expert or operative to answer this or that question, or perform a service over their own mobile phone.

5.4. Even AHAN is 'digital'

It is important to recognise that whatever approach is taken to the technology curve, the mobile phone is an inherently digital space, and therefore some of the laws of the networked economy, which is underpinned by the digital nature of the new communications infrastructure, and the growth of services on the Internet are germane to *any* mobile service, regardless of whether it is deploying cutting edge Wimax video data, or plain old SMS.

a) UGC

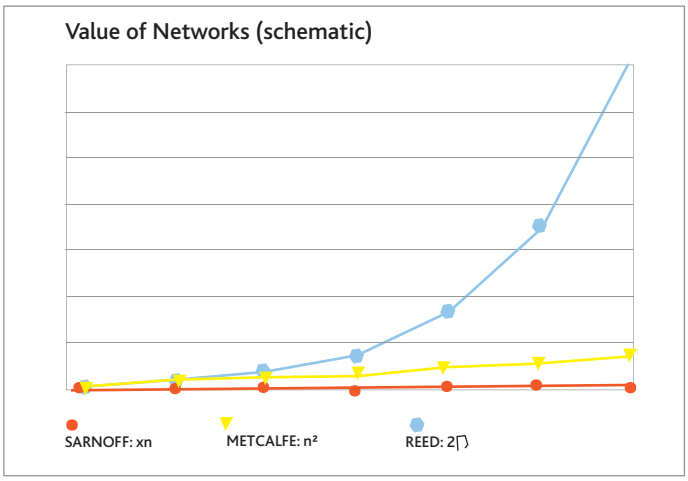
It took a decade of observation of Internet for Web 2.0 theorists to posit 'User Generated Content', or UGC, as key to the growth of communities[40]. Traditional media are still debating whether UGC, in the form of citizen journalism, constitutes or can constitute part of 'real' journalism. Is Google a media company? Is Youtube?

There is no question, though, that the phone is a 'UGC' medium. Not only is it's

37 http://users.ictp.it/~twnso/docs/NL17-3-KS_India.pdf
38 http://www.texperts.com/
39 http://news.bbc.co.uk/1/hi/business/5317982.stm
40 http://en.wikipedia.org/wiki/User-generated_content

original and still main purpose, after all, is for people to create their own conversations, within the space defined by all the different data and information service possibilities, messaging on mobiles is by far the largest component, and within that, person-to-person texting is by far the largest component. An entrepreneur who runs a social networking service in Bangalore reports for example that it is easy to enforce a law of 'no forwarding' of SMS jokes or stories by traffic analysis, because less than 1% of user-generated text messages among his 30,000 users exceed 100 characters, despite the nominal 160 character limit, whereas pre-formatted jokes go over.

Media should understand the broader ecosystem into which any information



service they would launch fits into, regardless of any position they hold as to the role of UGC in their core journalistic operations. Alerts by text may be forwarded by one paying user to several non-paying friends, for example. That can either be seen as a negative drag on revenues, or as a positive force of viral marketing[41] and free promotion, if harnessed within trust networks, and, if possible, some way to capture of some of the revenue from the forwards. Even in Japan, where the assumption might perhaps be that enthusiasm for high-end services was a given, researcher Takei Natsuno has shown mobile messaging really took off after an icon of a heart, or an emoticon, was introduced into the paging services that were widespread before the development of the mobile Web there.

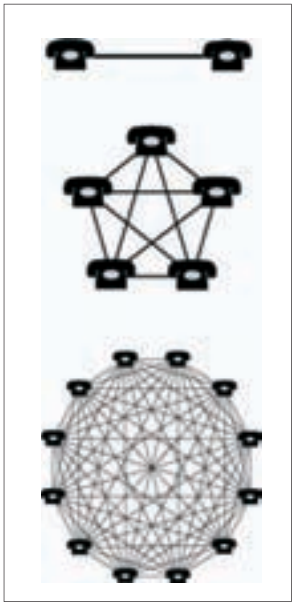


ILLUSTRATION 18: *Visualisation of Metcalfe's Law - the value of a network = the square of the members in it.*

What kinds of service to launch is a debate that should be broadened beyond the newsroom to the business side of any media outlet. One UGC application, for example, which has enormous potential in the developing country context is classified advertising, particularly person-to-person selling. In most developing countries, the inevitable constraints on newspaper's physical distribution outside large cities has been a brake, while broadcast, which does have the reach, is impact rather than record-driven and cannot capture the detail required in an individual buy or sell offer. It is true that historically most buying and selling of substantial assets has been purely within face to face social networks, and to some extent this relates to broader and deeper sociological phenomena, such as trust in the Fukuyama sense. But it is also true that most of the last two billion people who have bought mobile phones have never actually possessed any other practical tool to seek beyond immediate social networks, just as it is true, of course, that digitally-based selling networks could seek to blend and complement rather than replace existing social network selling.

Traditional media outlets should also consider that, there may be a certain inevitability about some of these kinds of applications evolving. As trusted brands, they are well positioned to launch them, but if they don't, other companies, perhaps classified as technical, or as 'commercial', will. One Google executive said in an interview that the company expected as much as 80% of the company's traffic in Africa – and revenues – to come from mobile devices in the long run, 10 to 15 years, and was already laying the framework to meet this demand.

41 http://en.wikipedia.org/wiki/Viral_marketing

b) Inclusion

As mobile phone ownership moves beyond half into the third quarter of the world's population, it's potential as a development tool becomes the focus for broad debate. Network operators such as Idea Cellular in India in advertising campaigns are clearly promoting mobile phone use as embedded in all social contexts[42] and the service as key to social transformations such as rural education[43]. As discussed elsewhere, sectors such as microfinance and banking are seeking to use the phone to engage broader numbers of customers in a more continuous relationship. Other start-ups and social initiatives seek to use the phone to bring some of the 'trust' attributes of the official sector to the informal economy for the first time, such as work histories, recommendations, and better organisation of freelance or casual labour markets.

The key concept here is inclusion. The microfinance movement states as its goal 'financial inclusion', and many of the perceived benefits by new users are of being included for the first time in formal systems of various kinds. The phone lends itself to this paradigm not just because it offers a point of communication, but also a stable point of contact. The number is also a 'sender ID' which works across phone networks. This can work as the basis for recognition of an individual across sessions, the customisation of content or dynamic menus of various kinds, just as a user name and password do on the Internet, facilitating not just access to information systems but inclusion in them[44]. It is important to note this potential also exists within the shared phone paradigm.

c) Network effect

The phone shares with the Internet perhaps its most important aspect, economically speaking, and that is the Network Effect. Simply speaking, the fact it is a two-way medium, and any point on the network can communicate with any other point on the network, means the value of the network as a whole increases in a fashion that is not 'linear' as the size of the network increases. This is important, as it underlies a change in prevailing model from traditional media like broadcast. David Sarnoff, founder of NBC in the United States, famously proposed Sarnoff's Law, which says the value of a broadcast network is proportional to the number of viewers.

But as the Internet developed, computer scientist Robert Metcalfe proposed in the 1980s that the value of a network is actually equal to the square of the number of members of the network. This is represented in the diagram on the left, and explains many of the ***network effects*** which have happened on the Internet in the past decade.

The mobile phone is essentially a digital communications space, like the Internet, meaning that it is interactive (two-way) and peer-to-peer, instead of the model of traditional media, which is that of a central hub (the newspaper or TV station) and a collection of 'spokes' (readers or viewers) who are largely disconnected from each other. The mobile phone is therefore subject to the norms of the networked economy.

David Reed, a professor at MIT, suggested in 2001[45] that even Metcalfe's Law was understated, as it viewed the points in a network as inert (computers) whereas social networks as they emerged on the Internet through email lists, newsgroups and later commercialised networks such as EBay and Facebook were people, who in addition to connecting to any other person in the network, could combine and recombine in any number of sub-groups existing in the network at large. Reed's Law, therefore suggests that the value of a network such as Ebay is actually ***exponential***, increasing by a value of 2 to the power of ***n***, where n is the number of members of a network.

Although others have disputed Metcalfe's Law[46], there is consensus in the emerging discipline of network analysis that networks act in non-linear ways. In other

42 http://www.youtube.com/watch?v=sHHlMbctZoo

43 http://www.youtube.com/watch?v=0bh3HP51rJs

44 http://www.youtube.com/watch?v=KxRv6mx-yKw

45 http://www.contextmag.com/archives/199903/digitalstrategyreedslaw.asp

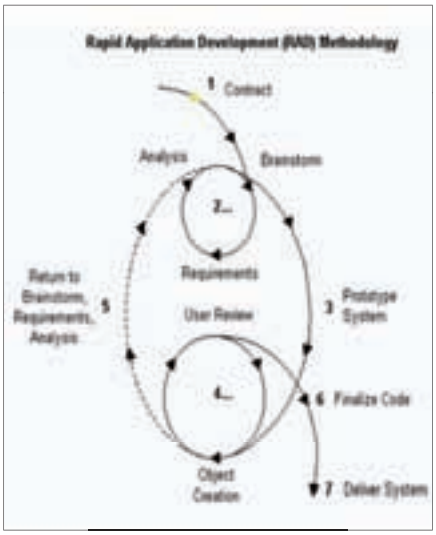
46 Metcalfe's Law is Wrong, Bob Briscoe, Andrew Odlyzko, and Benjamin Tilly http://www.spectrum.ieee.org/print/4109

words, whether a network's value is Metcalfe, less than Metcalfe, or as high as Reed, everyone agrees that it is greater than Sarnoff.

Although this may seem like an academic exercise, it is key to understanding the role and relative importance of the mobile phone as it expands to ubiquity, in a slum in Mumbai, the fields of Irianjaya, or the savanna of Botswana.

d) Fine-grained stats: obsessive watching

ILLUSTRATION 19: *RAD, a method of building software which assumes testing and refining are a permanent part of every product*



Another key feature phone systems share with the Internet, as digital media, is the granularity of knowledge about use of any service or application. This has strong ramifications for the way information services over the mobile could or should be constructed.

Media owners offering any service – across voice, text, or higher end services in the data layer – can know how many users, from which mobile phone networks, at exactly what times of day, to the second. They can track day by day the success or failure of services to meet targets. They can build systems which classify automatically a large group of thousands of users into different categories, and examine how an individual receives and uses an information service. Industry standards at a basic level are the number of seconds length of a call, and the number of texts in or out of a particular gateway. Information service providers can add to these basics by the way they build the service to include extra internal data: capturing a call path within an information service in the same way as a website captures a 'surf' across it from one page to another, or in the case of a text service, capturing patterns of content forwarding, or keyword response.

On the supply side, a digital production platform offers the potential also to fine tune and adjust each of the system's major features in turn, and observe its impact on use. On an Interactive Voice Response Menu, for example, does traffic go up or down if you reduce the number of top level menu items from five to three? How are subscriptions to a service by SMS affected when it is offered in local script as compared to Latin script? In a service characterised by peak-and-trough use, can related information services be offered in a system's 'down time' which capture greater traffic at relatively low production and system maintenance cost? How do any or all of these changes affect each particular sub-category of users, and what conclusions could be drawn from those findings?

The high granularity of knowledge about website traffic is widely known now, because of the accessibility and use of systems like Google Analytics, which are free to end users. Similar freely available tools do not yet exist for telephony. But it is important to note that leading websites have used these methods on the Internet for a decade. The raw data is intrinsic to the technology and has always been available, and commercial services, or in some cases in-house programmers have constructed their own analytical programs to perform traffic analysis.

The same is possible now with the phone. Given that start-up in the mobile phone space is generally costly in terms of time and money, and ongoing costs relatively lower, media owners could benefit enormously from building traffic analysis in to projects, and also adopt a rapid prototyping methodology towards offering services. They may or may not find the elusive 'killer app' with their first offering but they should be looking at traffic patterns day by day to see, have formed an initial impression within 10 days, a stronger view within 30 days, and perhaps a final and decisive view within 60 to 90 days of launch of a service. They should also have several other information service ideas, or adjustments to the current basket of services, under consideration at any one time, preferably informed by user behaviour within the current system.

This suggests an approach similar in its flexibility and self-knowledge to just-in-time inventory processes in industry, or rapid application development processes followed in software engineering for 15 years.

5.5. With or Without the phone companies?

One vital question for media owners is how to approach relations with mobile phone companies. There can be no general rule as everything will depend on the particular media outlet, the kinds of services you are thinking of offering, how negotiations with local mobile network operators unfold, and what your other options are.

What this guide recommends to media owners is: consider launching your own services even if you eventually intend to work through mobile operators, for third reasons. First, the barrier to entry for running such services has come down considerably in the period 2005 or so to 2008 because of the broader availability of easy-to-use tools and interfaces with independent service providers for things like texting, and PBX-type phone services. Second, depending on the service, you may well be able to find other ways to generate revenues, either using a technical 'workaround' to collect payment from subscriptions, or by finding external sponsorship for services. Third, the knowledge you acquire running even small-scale services yourselves will greatly strengthen your negotiating position with mobile phone networks.

a) Scale

The biggest advantage working with operators offers is access to scale, the enormous numbers of mobile subscribers out there.

"What we managed before negotiating with the operators with proof of concept. It was the contracts with the operators that allowed us to take our services to scale," said Chamath Airyadasa of Jasmine News Service in Sri Lanka.

Economies of scale happen on at least two levels. First, the media owner is spared the cost of building and maintaining a technical infrastructure which can support mass use. Typically, arrangements with a content originator involve them simply uploading their content to one point, either directly to the operator, or often in the case of texting and SMS, with an intermediate service aggregator. Issues of concurrency, or the number of people using a service at any one time, are critical in voice services, and also significant in texting, and these issues are, in theory, solved if an operator or aggregator takes over hosting. It should be noted however, that operators do not always support content services as fully as they say they do: information services advertised on short codes in South Asia and the Middle East frequently do not work, or have hidden restrictions such as they only work within one cell of a mobile network, not across the network as a whole, or in some cases the short code has been reassigned.

Second, an operator can offer wide promotion, saving significant cost for the media producer, and solving one of the biggest problems facing mobile services, how to market and spread awareness of the availability of the service. In the field of SMS, for example, operators typically offer content providers in their Value Added Services programs free promotional texts to tens of thousands, sometimes even millions of mobile phone subscribers.

b) Revenues and Revenue sharing

In terms of revenues, there are almost no industry norms. Content providers in developing countries have been offered anything between 10% and 60% of revenues generated by calls to premium rate phone lines, or texting services.

This makes analysis of the market at a global level tough, as does its opacity – reliable information is hard to come by. Generally speaking, though, there are two trends occurring which probably counterbalance each other in terms of the potential negotiating strength of media companies in such negotiations with mobile phones. First, there is increasing competition among network operators everywhere, which is forcing their margins down, and plays in a content provider's favour by offering the possibility of bidding one operator against another. But second, those falling margins affect overall revenues that can be generated from any VAS, so the media owner could end up with a higher proportion of a lower base of revenue per user.

Some media owners in developing countries have reported difficulties even in getting consistent negotiations for revenue sharing begun with mobile networks simply because they are so much smaller as companies. It may be worth media which

WHAT'S IN A NUMBER? SHORT CODES

Many information services on the mobile are offered by so-called 'short codes', meaning that instead of subscribers having to call or text a full phone number of 10 or more digits (0123 456789), they can dial one of three, four or five digits (i.e. 1234, or 12345). This makes promotion much easier, as such short codes are placed in broadcast adverts and on billboards in streets. Operators typically provide such short codes for information services offered on their own networks, but there is often an issue on the interoperability of short codes across mobile phone networks. If you are on network A and would like to subscribe to a service on network B, either you cannot use network B's short code at all, or you can but it is more expensive to you as a user outside the network than it is for a user within network B. Media owners should note short codes are held by the operators and so always effectively 'rented' rather than owned by a content originator. Another strategy might be to obtain a full phone number which is easier to remember, such as 01234 555555.

SHARED INFRASTRUCTURE – AN AFRICAN OPPORTUNITY?

Community radio stations in West Africa are now negotiating with mobile operators to offer them the service of maintaining the infrastructure they need for base stations and mobile phone transmission towers. This may offer a sweet spot for community media across Africa, and other areas in the developing world where remoteness means mobile signal has yet to spread reliably. Industry analysts suggest that such network maintenance costs represent up to 70% of the total cost of deployment by operators into rural areas, especially where the electricity grid is unreliable. Local radio in some cases may already have transmission towers they can rent to operators, or in other cases operators might extend the broadcast signal of the stations in return for local maintenance of their base towers.

do not compete with each other, such as a network of local radio or TV stations, negotiating with the phone companies collectively. In Benin, for example, community radio stations have negotiated with operators through the Association of Media Professionals based in the capital Porto Novo.

A low share of revenues in voice and text which are in any case being driven towards commoditisation may mean that media owners could consider identifying high-end services they run themselves. Profit back to the media owner from a few hundred subscribers paying a few US dollars a month could equal or exceed the content producer's share of profits from a service with ten times that number of subscribers offered as a VAS by a network operator.

Also, lower down the social scale there is increasing interest by third parties in offering information services to the new broad social base of mobile phone owners. Whether it is health organisations seeking to spread information about HIV and associated services in Africa, or local authorities in India using text to inform their local constituencies about security arrangements, or market prices for crops grown locally, 'third party pays' is a growing model for voice and SMS services. In these cases, the need for arrangements with network operators to minimise the cost, and share revenues decreases.

c) Owning the customer, owning the service

A media outlet signing up to offer a service through a mobile operator generally loses control of that service. They may or may not access detailed server-side data about how subscribers use the service. They probably will not have access to the list of phone numbers of subscribers, making it impossible to cross-market to them except by negotiation with the operator. They cannot guarantee that the operator will agree to keep the same short codes for their services, and in most cases they also cannot control the price at which the operator offers their services to an end user. To strike an analogy with traditional media, the owner is then much more in the position of an independent production company selling content to a network broadcaster. Individual conditions such as which network strand a program appears on, or what terms are for re-broadcast across different affiliates or sub-networks, may be available for negotiation, although in the case of phones because the network came first and the VAS came later, it should be noted that there is not anything like the same culture of negotiations with content owners as there is in television. In any case, each such condition has to be individually negotiated and depends on the consent of the operator.

Even if, therefore, most revenue or traffic on a media outlet's services eventually ends up being via operators, launching and running mobile services themselves gives them the power to negotiate, and the option of going it alone. To rely exclusively on working through operators would be like having an Internet strategy that revolves exclusively around being bundled on a portal like Yahoo or MSN, without developing your own website as well.

The advantage any media owner has compared to others in terms of offering services is the ability to cross-promote. A radio station or newspaper can promote phone numbers or short codes for its information services to a public which already trusts it.

d) Participation versus Revenue

The feeling that a media owner needs a network operator to launch mobile services is strongest if those services are being conceived of as essentially extensions out of one-way broadcast. But we have seen that combining messaging in from user mobiles, whether as voice, or as texts, is a key aspect of positioning media brands within their communities as mobile ownership spreads, and with it the paradigm of interactivity. In cases where a media outlet is seeking to engage and structure participation from the public, the ongoing costs of communication are mostly borne by the public themselves if they are calling or texting in, and in any case are unlikely to reach the scale of mass market applications. Meaningful 'free' audience input can be obtained with dozens of phone calls or messages in, and even structured audience input requires only scores, or at most hundreds of responses. The major costs of such services to small media are in set up and technical maintenance rather than ongoing communications.

6. M-Transactions

The role of the mobile as media platform needs to be considered in light of another major transformation happening in the developing world involving the mobile phone – its evolution into a financial and banking instrument.

'M-Commerce' has been used to mean many different things. It can mean use of value stored in the phone to buy things, with those things being either physical or digital, and available locally, or remotely. It can mean at a simple level access to details of a bank account, or manipulation of a bank account via the mobile phone, or transfer of money from one individual to another individual within a particular mobile phone network, or across networks. And to the extent that mobile access to the Web is increasing and the Web already has its own methods of commerce such as secure protocols to buy things, connect to credit card accounts and systems like Paypal, the phone is the 'm' component in ecommerce which has been with us for more than a decade.

It is also important to note that it has been a buzzword in Internet business circles since the late 1990s, when mobiles first began to pick up critical mass in the markets of the industrial countries[47].

The distinguishing feature of systems that are now being launched across the developing world is that they involve substantial numbers of people who are, in the jargon, either 'unbanked' or marginally banked. As researchers have pointed out, the deployment of such systems across the world does not mean conversion of countries in Africa and Asia to Western consumer models of commerce. There is widespread evidence that their first uses are to amplify existing patterns of exchange, such as remittances between relatives, rather than create revolutionary new ones, and it remains true that all such systems need to be studied against general localised patterns of trading[48].

Nevertheless, the mobile looks set to play a transformational role in facilitating payments and transaction histories within and across emerging markets in the next generation.

It is not yet clear what implications this has for the role of the same device as media platform.

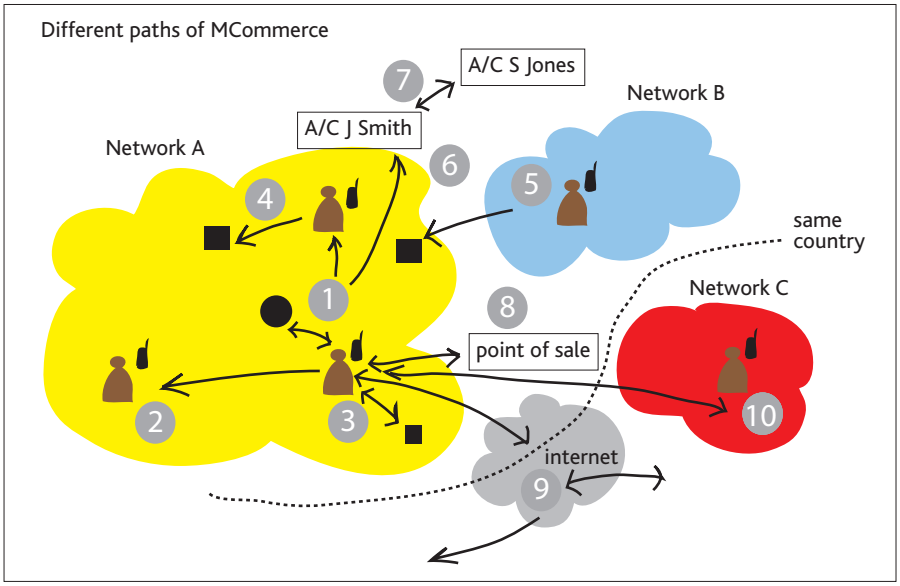


Illustration 20: 1 left– The first form of commerce over the phone historically, between a subscriber and the operator for products the operator is marketing such as ring tones. Payment takes place either by direct billing (post-paid subscriptions) or premium SMS (pre-paid). 2 – Transfer of mobile phone credit from one subscriber to another within the same network. The phone credit can not normally be monetised. 3 – A subscriber registers and pays in money to an agent within the operator's network (such as in M-Pesa, G-Cash or Smart systems). 4 – The subscriber can now transfer cash to another subscriber on the same network, who can cash it at any agent. 5 – Transfer can take place to a subscriber on another network but cashing out has to take place at an agent attached to the same network operator. This is fairly friction-free within the same country if the scheme is large enough. 6 – Coordination of an existing bank account 7 – Transfers in and out of the bank account to other accounts, commanded by text messaging from the phone. 8 – Use of accumulated credit to buy goods or services at point-of-sale (such as Smart Money on the Manila subway system. 9 – Either mobile access to the Internet, or Internet payment over a PC using credit acquired across the mobile network. 10 – the Holy Grail of Mcommerce, free transfer of money to a subscriber on another network in another country, which can be cashed in anywhere around the world.

47 http://www.ecommercetimes.com/story/21464.html

48 http://research.microsoft.com/~jdonner/Papers/jdonner_mbanking_ICA_2007.pdf

6.1. Remittances & Financial Inclusion

a) M-Pesa in Kenya

ILLUSTRATION 21: *the m-pesa scheme in action (courtesy of www.financialdeepening.org)*

In January 2007, Vodafone started an M-commerce system in Kenya with its local partner Safari.com called M-Pesa. Subscribers using a Safari.com SIM card can send or receive money into an account held by the network operator using a menu on their mobile phones. The project initially targetted 200,000 customers by the end of 2007 but reached that figure by the end of April. By the end of the year, in fact, they had registered over two million users, out of Safari.coms 6.5 million subscribers. The distinguishing feature of the system is that it allows payments in and out of digital money through the network of agents that normally sell mobile phone credit. This was a ready-made distribution chain and infrastructure of over 1,600 agents around Kenya, larger than the largest bank branch network. The network also accepts deposits of any size up to 50,000 Kenyan shillings ($730), with transfers starting at a minimum 100 shillings ($1.40), explicitly targetting small payments and liquidity. The transaction fees were deliberately priced to undercut traditional money transfer services such as Western Union.

"We are effectively giving people ATM cards without them ever having to open a real bank account," said Michael Joseph, chief executive of Safaricom[49].

b) G-Cash and Smart Money – the Philippines

The two largest operators in the Philippines, Smart and Globe, currently have over 30 million mobile subscribers between them. Globe launched G-Cash system in October 2004, a roughly similar service to M-Pesa. Registration with identity documents is required, after which transfers can be made to any other mobile phone user, whether or not they are a member of the scheme. Payments are cashed in or out at a network of some 1,800 agents around the country. Transaction fees undercut the traditional players in the transfers market. G-Cash also enables transfer of funds to merchants.

It is perhaps the trajectory of Globe's competitor Smart that best illustrates the constant expansion of possibilities[50].

ILLUSTRATION 22: *a payment system originated by the operator Smart has extended now to the Manila subway (courtesy of Edwin Soriano)*

Smart actually introduced Smart Money, a card that allowed use of the phone and SMS to transfer funds as early as 2000, but as the system required a bank account, it has not been considered as transformative as M-commerce systems that work without it. In May 2003, Smart introduced Smart Load, looking to increase margins on its sales of credit to the pre-paid market. By December of that year, they had increased their distribution outlets from 50,000 to over 500,000, including corner stores, students, housewives and other individual sellers. The transfer to selling without cards also triggered adoption of mobiles in rural districts of the Philippines.

In addition to these schemes run by the operators, and perhaps influenced by them, many Filipino banks have launched schemes where customers can transact with their existing accounts using their mobiles once they have registered.

These two schemes are achieving weight and diversity. In 2007, G-Cash partnered with Western Union to create Smart Padala, a system which works internationally aimed at the huge Filipino remittance market. Meanwhile Smart Money has been extended to various 'real world' trade systems, most notably the subway service in the capital Manila. Both systems are also now being used as alternatives in Philippines-based ecommerce schemes. This is, of course, an elite function - according to World Bank estimates in 2006 only about five million Filipinos regularly accessed the Internet. But it is likely that even of those only a small percentage are equipped to carry out ecommerce, and that a system which originated on the mobile handset is thus extending to offer convenient payments and transfers in

49 http://www.guardian.co.uk/money/2007/mar/20/kenya.mobilephones
50 http://www.digitaldividend.org/pdf/smart_communications_case.pdf

many different contexts.

The extent to which mobile use has spread and transformed society in the Philippines has become a case study pursued by researchers for possible lessons to be applied elsewhere[51].

6.2. Micropayments for media

Where the growth of mobiles to transact may impact media is in the possibility of micro-payments through the mobile phone. Network operators around the world have already enabled these kinds of payments in the case of digital content they themselves offer, such as ringtones, caller ring back tones (CRBT) and wallpaper for the phones themselves. One recent study estimated this market as 8% of the total VAS market in India[52], or worth some $70 million a year.

The question of whether media outlets can originate content of a kind that a user will pay for directly is complex. What is clear is there is an established platform available to allow collection of payment for such items if the problem of the value proposition is solved. As the phone develops into a transactional tool of all kinds, it may be that content most likely to be eligible for direct charges in this way is content that in some way facilitates a transaction – market prices before a purchase, for example.

In some cases operators have also enabled payment by debiting a subscriber's account.

Juniper Research estimated that mobile payments worldwide will rise from about $60 billion now to $300 billion by 2013, a compound annual rate of increase approaching 40%[53]. Major markets are expected to be not just Europe and North America but also East Asia.

6.3. M-Government

M-government is the idea that authorities at both a local and national level will offer services to citizens using the pervasiveness of the mobile phone to create a new channel. Policy makers and technologists have been discussing this since 2002-3 in the developed world and several major conferences have been held. But again, it is an area which may become a relatively more important area for the developing world. In India, the start-up SMS One54 has created a model where local authorities including the police and emergency services and panchayats all pay to have messages distributed to lists of mobile phones collected by the company. Founder Ravi Ghate claimed to have signed up nearly 200,000 mobile phone numbers in Maharashtra state. The system of community-based SMS newsletters is free to end users because government authorities pay a premium to have their messages distributed. Among the company's products is a Local Area Portal designed to be the interface between a panchayat and its local citizens.

Providing a link between government and citizens is something which media in many developing country contexts say is part of their function regardless of the media platform used. Mobile offers potential for media outlets to pioneer these services among their constituency and also earn revenues, using a 'publisher pays' principle.

From the media point of view, such messaging would need to adhere to the established norms of advertising across other media platforms. Party political broadcasting such as Barack Obama's selection of his vice-presidential running mate Joe Biden, for example, would jeopardise many media brands55. On the other hand, if a media outlet would accept advertising from government agencies in any given sector in their traditional offering, there is no reason why they could not accept it across mobile also.

51 http://www.sida.se/sida/jsp/sida.jsp?d=118&a=33306&language=en_US
52 http://cellstrat.wordpress.com/2008/08/12/mobile-vas-numbers-for-india/
53 http://www.juniperresearch.com/shop/viewreport.php?id=130
54 http://www.smsone.in/mservices.htm
55 http://gigaom.com/2008/08/24/what-obamas-text-message-campaign-reveals/

7. Future Visions

Where to be on the technology curve is one of the trickiest questions facing any media outlet in the developing world in general, not simply with regard to the mobile phone. It is easy to see the danger of being on 'the bleeding edge', adopting the latest technology and gadgets in a wave of enthusiasm with projects that don't take root in real world conditions. But there is an equal danger of erring on the other side of the balance: assuming that the South's technology curve must simply follow the one the industrial North has already passed along, and failing to realise the sheer pace of change.

The most important principle must be therefore to monitor constantly local market conditions and the evolution of technologies under research. Because analysis that a particular technology is irrelevant to a certain audience, even if accurate, is only by definition true at the precise moment it was formulated. Markets can change in a matter of weeks.

The other major consideration for media must be also what guides the mobile industry more broadly: subscriber numbers and access to any given service are only one part of the equation. Value per subscriber and cost of production are the other parts. A high-end video alert service to 1,000 subscribers might cost as much to set up and run as SMS alerts to 100,000 people. However if the revenue and margins back from the 1,000 are equal to or greater than the texting service, then the high-end mobile Web service is just as 'viable' for the media outlet concerned.

Some of the same barriers to adoption of high-tech in the global South as in the North – downloading apps is difficult. Others are new barriers; yet other new 'opportunities' – or needs served by high-end technology on mobile which don't exist in G7.

ILLUSTRATION 23: *'context is everything': a schematic showing the influences on context in mobile information services by San Francisco design house Giant Ant. Reproduced with permission.*

7.1. Possible tech breakthroughs to watch for the global South

a) Speech-interface technologies

Speech interface technologies, whether text-to-speech (TTS) or voice recognition, are a prime example of a technology which could achieve critical mass for a developing country environment and pass from being wishful thinking to opening up new information service possibilities. Siemens is just one of many IT giants developing speech interfaces in Indian languages. The same is true of Chinese, Arabic and other developing country languages which capture broad 'markets'.

b) Machine translation

Machine translation of texts is another technology which embeds within it elements of artificial intelligence, or the ability for the system to improve performance by examining empirical data, and where, therefore, the fact that the languages of developing countries have been less exposed to or enfolded in machine translation algorithms means the quality of the software is lower. Pricing also currently sets it beyond the point of useability for many developing country contexts. But both the quality and price of machine translation software into languages like Arabic, Farsi, Chinese, Tagalog, Urdu, Hindi, Bengali and the other major Indian languages is improving all the time. The principle of ***machine-assisted translation*** should be noted here – blending machine translation with human translation. Large media owners such as Thomson Reuters have been using machine translation for some years to produce a first draft and reduce the amount of time the human professional translator needs to complete a given text.

c) Two dimensional bar codes

Barcodes which are readable by phone cameras are becoming widely used in tech-oriented societies like Japan and South Korea but have enormous potential application in the developing world. A number of different formats are available, but essentially the conversion of the old one-dimensional barcodes used in commercial contexts into two-dimensional black and white matrices means they can be 'read' by mobile phones in ordinary contexts rather than advanced industrial scanners.

Most phone cameras in the market now have enough resolution to take a picture which a reader software program can convert into any kind of data, such as a URL, phone number, or text message. Reader programs are available free and come installed on higher-end phones as of mid-2008 such as the Nokia N95 and the iPhone. There are also generator programs on the Internet which allow input of text for conversion into a 2D barcode[56]. All the prerequisites are in place, therefore, for low-cost adoption of a technology which has double potential for the developing world, since it not only offers high contextuality to enable a service provider to target information, but in a way that potentially avoids the literacy issue since the resulting end information could be in any medium. It presumes widespread availability of data networks and the mobile web, or at least MMS over GPRS networks, of course, but as and when these are available, 2D barcodes have wide applicability for the developing world.

ILLUSTRATION 24: *Billboards showing semacodes, or a form of 2D barcode matrix. Such codes, which are readable by most phone cameras, are a form of hyperlink in the physical world*

d) Handsets

The handset is perhaps the biggest part of mobile phone infrastructure which can be specifically adapted to the needs of different market segments. Nokia, for example, in early 2008 brought out a handset which can hold multiple contact books, each protected with a PIN code, a major design innovation in the context of the paradigm of shared use of mobile phones. Similarly, they are actively researching how a handset might feel and work for someone who is functionally illiterate[57]. Features on a handset have a multiplier effect in terms of the development of other technologies and applications relevant to the spread of the mobile phone in developing countries.

56 http://en.semapedia.org/community/

57 http://research.nokia.com/bluesky/non-literacy-001-2005/index.html

For example, a critical mass of phones with cameras enables widescale deployment of a dependent technology, such as data matrix barcodes[58]. which in turn could feed location-based services. It could also trigger an inflection point which creates viable business models for person-to-person selling networks over mobile phone, based on pictures of the items on sale.

e) Data networks

The world's first countrywide Wimax system, offering fast wireless speeds across an extended area, has been deployed in Pakistan. Two companies, Wateen and Mobilink Infinity, have rolled out access across at least 17 cities, and some 200,000 customers have subscribed[59]. It is too early to tell what impact this will have on use of mobile data services. A senior executive at Reliance in India, who are conducting pilots for Wimax connectivity in Bangalore and Pune, says applications developers will be encouraged to think in terms of using video to compensate for literacy, or computer literacy, issues.

7.2. Mobile Web – multimedia, web 2.0, coming... soon?

ILLUSTRATION 25: *browsing the web on an iPhone using the safari browser*

Use of mobile Web services is finally catching on in industrial countries, after nearly a decade of hype. Apart from Japan and South Korea, which had specific dynamics that led to explosive take off of mobile Web services, adoption has been slow in the industrial world. In the United Kingdom, about 25% of mobile phone subscribers are estimated to access the Web from mobile phones in the first half of 2008, a 30% rise on 2007. But given that the web over mobile phones was first touted in the late 1990s with the development of Wireless Application Protocol (WAP), there has been little progress to mass market adoption.

In the developing world, access to the Web over mobile phones is a tiny proportion of the mobile phone space as a whole, compared to the billions of air time minutes and SMS texts sent. But although evolution of mobile services is still at an early stage, it is clear that ***in countries where fixed line access to the Internet is low, mobile Web could rival it***. Mobile Web access is estimated to have surpassed fixed line access in Jamaica, for example60, a country with a Gross National Income of $3,500 in 2006. Another generalisation is that ***access to the Net over mobile in developing countries is rising fast.*** AdMob, a leading advertiser specialising in the mobile Web, published a report saying traffic from Africa to the 5,000 mobile websites it interacts with had jumped 21% in 2008 Q2 compared with Q1[61]. Globally speaking, five of the top 10 countries generating traffic across these mobile websites were in the developing world – Indonesia, India, the Philippines, South Africa, and Malaysia, collectively accounting for 41% of the country-delineated traffic. Based on some 400 global websites which were publishing in the 12-month period July 2007-8, they estimated growth in access to the mobile web to have risen 106% in that period, or 6% a month. The browser firm Opera reports similar growth across the same countries, adding that the early adopters show a high male-female bias and the 18 to 27 age group is most prominent. In South Africa and Indonesia, access to social networks is reported to account for 60% of total mobile web usage.

If these early trends are anything to go by, not only could mobile phones represent the primary way most of the three quarters of the world access the Internet, rather than through fixed lines or PCs, but also that web experience could happen almost entirely within the web 2.0 paradigm of social networking and user generated content. This would contrast sharply with the experience of the industrial world of

58 http://en.wikipedia.org/wiki/Datamatrix
59 http://www.wimax.pk/
60 http://web.archive.org/web/20060723171501/www.isrg.info/ISRGWorkingPaper2.pdf
61 http://www.admob.com/marketing/pdf/mobile_metrics_jul_08.pdf

the 1990s, where despite the best efforts of World Wide Web creator Tim Berners Lee to encourage a 'read-write web' by creating two-way protocols in HTML, the main programming language of the web[62], the Internet was little more than an extension of one-way publishing for some years.

A third aspect in which the mobile web may surprise is that a transition to multimedia from text and still images may be shorter than it was on the PC. Experienced Internet users naturally assume a similar slow gradation, through text-led sites to use of images, to multimedia eventually, will happen on mobiles.

"The step from providing a completely flat mobile site to a site that also gives you some of its video and audio content is actually very short. The technology is exactly the same. There is no wait for multimedia," said Sergio Falletti of the mobile applications developer Future Platforms. Certainly, the ability to support multimedia must depend to some extent on how much bandwidth operators offer in their data services. But Falletti makes the point that many technical bottlenecks such as interoperability of file formats, and compression codecs, have already been solved in the mobile context. Data from AdMob estimates that over 80% of mobile phones which acces the web in Indonesia, the Philippines, and India can support the download of video clips, marginally lower than the United Kingdom but actually higher than in the USA.

ILLUSTRATION 26: *for many, the mobile web could be a multimedia experience from the start*

The mobile phone's small form size is a factor orienting towards multimedia use globally: whatever enhancements handset manufacturers and application developers make to text entry, the mobile is unlikely to become a text-entry device of choice compared to the PC. In the developing country context, where questions of computer and general literacy come into play, this trend could be accentuated.

a) What works on the mobile web? Quick rules of thumb...

Quick reference – the same principle of exactly targetted information extends from AHAN information services by voice or SMS to the mobile web. People on the go need a lot less information than sitting in front of a desktop computer, but the bits they do need they need more. In this sense, 'news you can use' prevails, whether is real-time traffic reports, the answer to a question that comes up in the middle of a meeting, or the weather. As we have seen with AHAN services, a large factor in 'news you can use' is who the 'you' is and whether the informations service knows the user – so customisation and adaptation based on explicit or implicit user data collected for that individual, or across a potential group of users as a whole.

Messaging – The fastest-growing area of the mobile web are messaging facilities of various kinds: email, voice mail and social networks. Apple's iPhone has created voicemail as a pick-and-choose function instead of having to play each message in the order it was delivered, giving the user the same level of control you might expect in an email program, and many industry insiders expect this to become a norm other phones and networks will have to match.

Location-based services – GoogleMaps is possibly the first major location-based service to reach mass scale across the mobile web. These services are examined in more detail in the section on full mobile applications.

Access – this is a vital issue for the global South, where rural populations are larger in proportion to urban ones than in the industrial world. Although Internet access through shared facilities – the Internet cafe – has spread across the developing world, it is 'pinpoint' access, demanding that user go to the access point rather than access comes to the user. Yet the infrastructure of base station towers run by the network operators has given signal coverage across far greater proportions of the population even than the half of the world which currently owns a mobile phone. This

62 http://web2.socialcomputingmagazine.com/all_we_got_was_web_10_when_tim_bernerslee_actually_gave_us_w.htm

lack of fixed line Internet access will make a crucial difference in the developing world, because it implies mobile web could soon be competitive. If you have to get a bus, or ride a bike for 30 minutes to use the Internet, the total cost of that access is a lot higher than just the fee you pay at the Internet cafe.

b) and what doesn't... Quick rules of thumb...

Concentrated work – Handset manufacturers and application developers seek to maximise the ability to enter and manipulate data on a mobile device, with enhancements such as a 'soft keyboard' which appears as a touchscreen on the handset, or an extension you can plug in, as in the case of the Palm phone. But the mobile will not be able to compete with the PC in this field until speech-driven interfaces become easy to use, cheap, and fully featured forms of interaction with the phone. In the case of most languages as used in developing countries, that is likely to be the best part of a generation from now.

Long form material – Reading longer pieces on a mobile device involves both more interaction and more difficult interaction than it does on a desktop, scrolling down with a finger or a stylus, to read text which is in any case smaller.

c) Forget gizmos or Digital Divide, pricing will be the biggest driver of growth

Industry insiders say probably the single biggest determinant of the level of access to the mobile web is pricing – not just lower prices, but transparent pricing, as the initial pricing policy network operators follow in many countries of metered usage is effectively opaque. You may have visited four pages on the mobile web, but nobody knows how many kilobytes those pages were, and therefore how much it cost you. Some experts have likened this to online services in the 1990s when AOL, Compuserve and MSN applied a similar metered pricing plan[63], and former Vodafone CEO Arun Sarin said in 2007 he expected all mobile services including to data to move to flat pricing over the long term[64].

d) How to make a mobile website 1: transcoders versus custom design

The simplest means of creating a website that can be viewed on mobile phones is to use a transcoder. What this does is to take a standard website page and crunch it through a series of algorithms designed to make the website more viewable on mobiles by, for example, adjusting font and picture sizes to the lower screen resolution on mobile phone handsets compared to the PC.

ILLUSTRATION 27: *transcoding automatically takes a website and 'shrinks' it to mobile*

In theory, transcoding means a user accessing the web from a mobile can visit any site on the Internet, and transcoding has become a business of its own as network operators such as Vodafone in Europe and Sprint in the USA use services such as Novarra, ByteMobile and OpenWave to transcode all sites on the web when someone using a mobile handset requests a web page.

At the other end of the spectrum is a school which says design should be customised to the mobile medium.

"The amount of content you can present is completely different, and more importantly the context of consumption is completely different," said Falletti. "In most cases, for larger websites, you really wouldn't want to force the user through the same navigational structure as you do sitting at a desk top across the Internet. Partly because navigating through 10 categories and three levels is very difficult when you have a very small screen but also because if you are on the go probably what you are looking for in a website is different."

What mobile-specific design does is to predict or research what the dominant contexts of access from a mobile phone brower might be and then design a sub-set of the larger website for that purpose.

In many cases, the two approaches can be combined, with a special sub-set of services designed specifically for mobile while the website as a whole remains accessible

63 http://www.nytimes.com/2007/11/25/technology/25proto.html

64 http://www.thisismoney.co.uk/investing-and-markets/article.html?in_article_id=415244&in_page_id=3

from the browser through a transcoder. The question of correct balance between the scale and low cost achieved by pure algorithm crunching of the transcoder, and the higher functionality and cost represented by custom design, is a matter of fierce debate among applications developers and network operators[6566]

e) How to make a mobile website 2: underlying architecture

Design for mobile web is facilitated by the quality of an underlying technical architecture of a website. In theory, all that is needed for mobile is the creation of a new 'view' of some sub-set of data already stored in the website's database. To this extent, the adoption of basic content management systems is a prerequisite to successful development for the mobile web. Tagging of items of content and their classification into different sections, with form separated from content, allows designers to concentrate simply on creating the best viewing experience.

There are two important lessons from this with regard to media in the developing world. The first is that media outlets should be encouraged to adopt and deploy a content management system (CMS), which provides the basis for digital production. Typically these CMS systems have been evolved in the rich world to build websites. In the global South, however, it is their potential to offer knowledge management within an organisation which is far more important. Media in developing countries often do not possess systems for internal archiving, structured group messaging, version control on stages of a piece of journalism going through from reporter to news desk to publishing, or a detailed knowledge of how their staff use their production platforms.

The second is that, no matter how 'technical' and abstract features of this database seem, the way the CMS is configured at start-up will determine many possibilities long into the future, such as the technical and financial resources needed to launch mobile websites. It is therefore vital media managers are involved in discussions with technical implementers of classification and tagging systems for their content at the conceptual stage.

f) How to make a mobile website 3: browser and compatibility issues

TOP 10 HANDSETS ACCESSING MOBILE WEBSITES SERVED BY ADMOB: JUNE 2008

USA	UK	India	Indonesia	South Africa
Motorola RAZR V3	SonyEricsson K800i	Nokia N70	Nokia N70	Samsung E250
Motorola KRZR K1c	Nokia N95	Nokia 6600	Nokia 6600	Motorola V360
Motorola W385m	3 (Amoi) Skypephone	Nokia 6233	Nokia 3230	Nokia N70
RIM Blackb erry 8100	SonyEricsson W810i	Nokia 3110c	Nokia 7610	Samsung J750
Motorola Z6m	SonyEricsson K610i	Nokia N73	Nokia N73	Samsung E370
Palm Centro	SonyEricsson W850i	Nokia 6030	Nokia 5300	Nokia 6234
Kyocera K24	SonyEricsson W580i	Nokia N80	Nokia 6300	Samsung D900i
RIM Blackb erry 8300	Nokia N93	Nokia 2626	SonyEricsson K510i	Nokia N73
Motorola C155	SonyEricsson W910i	Nokia 7610	SonyEricsson W200i	Nokia 5200
LG LX260	SonyEricsson W880i	SonyEricsson W200i	Nokia 5200	Samsung D500

AdMob's statistics show a large correlation between India and Indonesia, where Nokia dominates and many of the same models are popular for use on the mobile web. But the figures also show a disconnect between these emerging countries and the USA, and again between the USA and the UK (and possibly the rest of Europe). South Africa is different again from its Asian counterparts, sharing a high Nokia ratio (4 out of 10) but preferring Samsung.

Although the mobile phone is smaller and offers less screen resolution and granularity than a PC and keyboard, the permutations of hardware, operating system and web browser are greater than on the traditional Internet.

This makes design of a mobile website potentially harder, as a design which fits on one screen and browser may make no sense on another. In practice, though, databases exist of all the different handset and microbrowser combinations, and their

65 http://wurf .sourceforge.net/manifesto/

66 http://www.volantis.com/volantis-announces-mobile-content-transcoder-v30

technical specifications, allowing a designer to test that a design works for all or most of the phones that it is anticipated will access the site[67]. This is the largest area to date of open source contribution to applications and website development in the mobile space.

This question of how fragmentation of platforms may play out in developing countries is complex. The market share of various handset manufacturers differs from Europe and North America.

Nokia dominates, especially among Smartphones right at the top of the scale, together with the Symbian operating system, creating a more homogenous platform for high-end applications. On the other hand if operators seek to encourage mobile web by lowering prices and introducing flat pricing plans, there could be a far more disparate handset population to deal with in the South at the mass market level. Even screen sizes differ greatly, with a low-end phone able to display 128 by 128 pixels, whereas a low-end phone now sold in Europe boasts 240 x 320 pixels, or nearly five times greater screen resolution.

The optimist theory of platform fragmentation is that it naturally diminishes over time, as mobile web grows, encouraging handset manufacturers and applications developers to adopt more open standards to create a larger mobile web network in a virtuous circle. This is what happened on the Internet as accessed across the PC in the period from the mid-1990s to the mid-2000s.

The pessimist analysis would suggest though that as all new phones produced get 'smarter' there is the potential for fragmentation to continue, or even deepen. Since its release in 2007, Apple's iPhone has sought to create a computer-like model of a mobile device where voice and data are totally integrated, and where a user can install any number of applications developed by third parties, just like software on a desktop computer. As of mid-2008 the company was claiming tens of thousands of paid downloads of applications, and a venture capital fund announced a $100 million fund to develop applications for the iPhone[68]. So Apple and the iPhone now represent a second major entrant to the mobile device market at a global level, each vying for market share.

Meanwhile Google announced in 2007 it will build its own operating system for mobiles, called Android, and launched an 'Open Handset Alliance' grouping 22 companies, including handset manufacturers, chip makers and networks[69]. So there will now be three competing operating systems and browser combinations on mobile phones, each with big money behind them, trying to grab share of what is seen as a huge market in the long run.

g) Safety in numbers: multi-tiered architecture

One of the main problems of planning technical systems in developing world contexts is not uniformly low or bad conditions. It is the extreme variability of conditions. Planning a network roll out where everyone had bad Internet access, or everyone was illiterate, is easier than planning a news or information service where 70% of people access from Internet cafes, but there is also a small but rising and influential group of users who access using Smartphones.

If and when media outlets get round to planning high-end applications or mobile websites, they should therefore ensure the high-end systems 'fall over' into middle-end systems, which in turn fall over into low end systems if need be. Specifically, a tailored mobile website might be backed up by a transcoder converting a standard website to basic viewability over a mobile phone, in turn backed up by an SMS alerts service.

67 http://wurf .sourceforge.net/

68 http://www.iht.com/articles/2008/03/07/technology/07apple.php

69 http://news.bbc.co.uk/1/hi/technology/7080758.stm

7.3. Downloadable applications

Broadly speaking, the barrier between mobile web in general and applications is if a user has to download an application into the mobile phone. Here the issue has always been making it easy enough that many users choose to do it. Historically, the mobile industry has faced this problem in the North: the United Kingdom has one of the most advanced mobile web and data markets in Europe and yet while the Mobile Data Association estimated that [70] three quarters of all phones were capable of GPRS by the end of 2005 at a time when actual mobile web usage did not exceed 15% - even by the middle of 2008 it had risen to only 25% of mobile users. One estimate for India in mid-2007 showed a similar picture: out of 200 million mobile handsets in the country, some 60 to 70 million were GPRS-capable, but only 3 to 4 million had ever had their GPRS services activated.

Problems of adoption have included the fact that a phone might be capable of mobile web and applications but not have its settings configured in the right way when bought from a shop, or that the download process is hard to understand, or that applications were not fully functional across all the different permutations of handset and operating system. Because an application seeks to interact with the mobile at a deeper level both in terms of hardware and operating system software, the problems of compatibility mentioned above have been greater. The Java programming language was evolved by Sun in an attempt to overcome interoperability problems in computers as a whole, and its 'J2ME' version was designed to work on mobile phones. But industry experts say it has only partly delivered on the promise of 'write once, deploy anywhere', and that fine tuning is often needed to make a mobile application work on different handsets.

This picture is gradually changing as mobile data access becomes more reliable. In Europe, for example, that mobile applications are now often promoted by just a link to a web address where it can be downloaded. The evolution of the mobile into a fuller computing device might also accentuate take-up of applications. Apple claimed when it launched the iPhone that it had 500 applications fully developed, and Google claims to have 1,800 applications submitted to an open competition[71] before launching Android.

a) GPS and location-based services – the long term future

One of the major drivers of applications and deeper functionality on the phone will be Global Positioning System chips[72]. These are now being standardly integrated into so-called 'smartphones' released into the top end of the market. If all information services over the mobile are highly context specific, then the precise location of the user is one of the biggest single determinants of context that there is.

Over the medium- to long- term GPS will blend with a wide range of information services. In the beginning, the location may itself be the focus of the service, such as in directions or mapping services. But soon location will become an implicit part of determining other services. For example, an application may be able to 'guess' if a user is stationary or transitory by checking GPS positions over the last 60 minutes. The two states of 'stationary' or 'transitory' might be cues to present or not present all kinds of other service: sedentary, for example, could be the time to present updates of information items that offer a higher degree of disruption, such as a video message, whereas transitory might be a cue to offer services related to travel.

b) Proxy location-based services – the short- to medium-term

In the context of the developing world, it is important to note that location-based services do not need to await the widespread presence of GPS chips in mobile handsets, which could take 5 to 10 years. It is possible to build mobile applications which for all phones which use information about location, based on the base station

GPS: MILITARY-TO-CIVILIAN TECHNOLOGY

GPS, like the Internet, was originally the invention of the US military, who launched it in the 1970s. It was released for commercial use in the 1980s, but the system of 24 to 30 satellites is still managed by the US Air Force. Each satellite constantly sends out signals at light speed which contain the exact time the message leaves the satellite in space and the orbit the satellite is in. Each GPS chip then receives as many of these messages as it can, and determines its own position on Earth by calculating the time difference of the signal and it strength. A chip normally needs a signal from four satellites to give an accurate position. At first, civilian use was made deliberately inaccurate so that it could not be adapted for military purposes. Now the sole restriction is on objects behaving like missiles – travelling at high altitude in the sky and high speed.

70 http://www.themda.org/PressReleases/Page_Press_ChairmansOpinion.asp

71 http://www.fiercedeveloper.com/story/android-developer-event-yields-almost-1800-entries/2008-04-22

72 http://en.wikipedia.org/wiki/GPS

information from the mobile operator network. In many countries across Africa, the Middle East and Asia, the neighborhood of the nearest base station is now displayed by default on the screen of the mobile phone. Move across Delhi, for example, and you will successively see 'International Airport', 'Connaught Place' and 'Red Fort'. Even in countries where operators do not display this information on the screen, it is still there and available to the handset at the application layer, meaning programmers can incorporate it in building applications.

The operators and other companies make databases available which can map a base station name on to a geographical area.

Of course, the degree of precision depends on how densely base stations are packed together, meaning in geographical terms there is a high degree of precision in cities, and lower in rural areas. Nevertheless, this method can often identify where a handset is to within a few square kilometers and feed it locally appropriate information. In some countries, network operators also offer a much more precise location of a handset based on triangulation between three base stations combined with the strength of signal from each.

7.4. Business Models

Broadly speaking the mobile web and information services follow the same pattern as the rest of the Internet: websites are free and revenues are driven by advertising, while some, but not all, applications are paid for.

Gartner Inc consultants estimate that the global market for advertising on the mobile web is growing fast and could reach $2.7 billion in 2008, up from $1.7 billion in 2007[73]. They predict a rise by 2012 to $12.7 billion, on continued year-on-year growth of 50%. This compares to standard online advertising which Price Waterhouse estimated at $21 billion for 2007, up 25% on 2006.

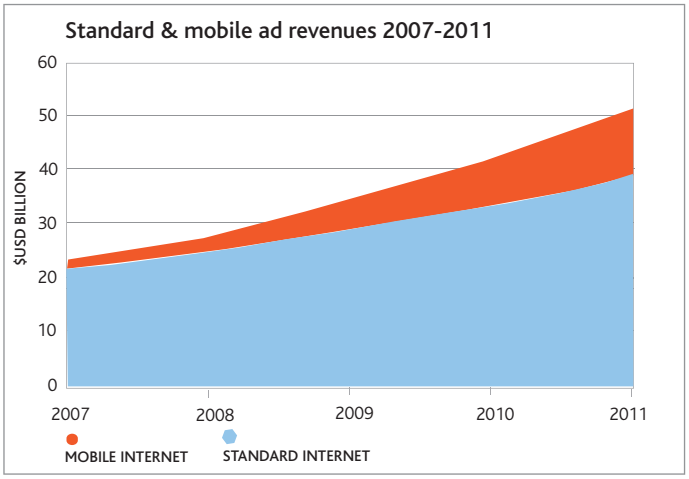


ILLUSTRATION 28:
sources: PWC & Gartner Inc

Although issues of disruptiveness and spam are critical in mobile because of the personal nature of the medium, so far clickthrough rates on mobile have proved higher than on the Internet across the desktop, possibly because of novelty value. Another feature which is emerging is sponsored content. In the industrial North, the sponsor may typically be a commercial brand seeking exposure for its products, but there should be potential in the developing world, as with texts and other media platforms, to offer the mobile web as a medium for sponsored content for social marketing.

In applications, the same kinds of rules apply on mobile as on the desktop – games and puzzles, generally speaking, are paid for while many general applications are not. Early indications are that news will be among the free applications, as it has largely been on the Internet. In the App Store for the iPhone, for example, all top 10 of its news applications are free, including services from the New York Times, Associated Press, and Fox News[74].

73 http://www.telecomredux.co.uk/content/view/5313/6/
74 http://www.apple.com/iphone/appstore/

8. Media Development – a friendly solutions provider

As mobile is huge and happening anyway: the question is what role media development organisations and non-profit interventions more generally could make in helping media in developing country contexts enter the space earlier, better, and in a more informed way.

Across the world, high profile media brand are in the mobile space now. Transnational satellite TV stations and national terrestrial channels scroll contributed SMS texts from viewers across the bottom of the screen. Radio stations run phone-in programs live with callers from mobiles. Flagship newspapers routinely include a mobile number where readers can vote by text.

In fact, it is the high profile nature of these media which may offer a clue as to what role media development can play in the evolution of mobile. Many, perhaps most, media outlets in many developing countries are beneath the threshold where they can research, plan and launch phone-based services themselves, local FM radios in small towns or country areas, sub-regional newspapers, the town's own cable channel.

Also, media outlets which do use mobile are often using it at the most basic level – texts for competitions or real-time commentary, for example, and have not grasped the potential to integrate the phone with their other media offerings, or in a structured as opposed to flat manner, or consider revenue earning possibilities.

This is where media development organisations can provide a multiplier effect for what will certainly soon be the world's most pervasive medium ever. Media NGOs can offer impartial consultancy about which mobile strategies to follow, informed by global best practice, market-oriented, embedded in the field realities of the developing world but with an eye to global technology trends and offerings which match.

8.1. Mobile media research

A research centre, whether real or virtual, into the spread of mobile phone use and aspects of this new platform relevant to local media could provide great benefit.

a) Watch the phone marketplace – country by country and regional/ global levels

Researchers could collect the basics of mobile phone markets country by country. Subscriber numbers, pricing policies, signal coverage, volumes and usage of SMS texts, the emergence of Value Added Services – these are the basics. Pricing particularly can affect usage patterns fast, and the rate of change in subscriptions is currently so fast that a database of these basics for all developing countries could be updated quarterly. With a vision of the mobile as a natural extension of, or part of seamless offerings across many media particular attention would be paid to studying the impact, and grasping any numbers related to mobile services offered by media outlets. Primary research could also study specific questions as how to use mobiles to engage with particular demographics, especially those beyond what commercial advertisers call 'the addressable market' of customers for consumer products into the broader population which in many cases is a constituency for M-government or social marketing.

b) Evolve South-friendly indices (price basket)

The telecoms industry itself currently uses indices evolved in the industrial countries even as the weight of its market expansion shifts towards the global South. For example, the use of the OECD price basket to evaluate the relative cost of an average mobile subscription, when research in Africa and South Asia shows different usage

should necessitate a different index[75]. The handset population is another critical factor where country-specific measurements are not publicly available in the developing world, and yet could greatly assist media executives trying to understand what kind of mobile offering could be accessed by what percentage of the local market. Krusell, a Swedish manufacturer of mobile phone accessories, publishes a highly regarded index each month based on its own sales across 55 countries but this index is necessarily geared to high-end users[76].

If country-level figures exist in the South, they tend to be estimates in expensive reports from consultancies beyond the reach of most media in developing countries. It could be relatively straightforward to construct country-by-country estimates of the handset population based on polling figures from dealers across a range of demographics. This, when combined with the known features and specifications of those handsets, would give greater confidence in appropriate mobile service development.

Other indices specific to developing countries might be measurement of the shared handset paradigm and the meaurement of texting patterns broken down by language script where this is an issue.

c) Be across all market and academic research

The spread of mobile phones is the subject of increasing attention from academics from a number of disciplines, including network communications, anthropology, sociology and development economics as well as technology. Not infrequently such research could serve the planning level for media executives[77].

d) South-friendly technologies

A deep understanding of the evolution of mobile-related technologies particularly friendly to the context of use of mobiles in developing countries could both prevent expensive 'white elephants' where immature or inappropriate technologies are deployed, and speed up the spread of technologies which have reached the stage of usefulness in particular contexts. Optical character recognition, speech-driven interfaces, visual recognition software, developments in handset design are just some of the fields of innovation where advances could make a difference. Emphasis in such research would be to watch these technologies for advances in robustness, ease of use, and price.

8.2. Consultancy role

a) Needs assessment

Consistent effort devoted to the mobile space would position the media development sector to provide effective consultancy for media outlets. What is possible or advisable for any outlet will be based as much on their current in-house capacities and orientations as the market at large. Proper needs assessments will take that into account, as well as a broad view of potential across a range of services, such as social marketing, classified advertising.

b) Country-/region-level skill centres – hosting etc

A number of tools and technologies are evolving fast which bring the barrier to entry to the mobile services market down – text server programs combined with international bulk SMS gateways, and open source telephony. These are now technologies which can certainly be sustained at a sector level for many developing countries – for example, across the community radio sector in Africa – but not at an individual outlet level. Consequently, this is where media development organisations could make a difference. Centres could develop pilots, hold training courses, and

75 http://lirne.net/2008/03/mobile-benchmark-studies-in-south-asia-and-latin-america-compared/

76 http://www.krusell.se/nav/marketing/?pressRel=112

77 Jonathan Donner's review of mobile phone research, which reviews some 200 studies around the world, would be a useful point of departure http://www.informaworld.com/smpp/content~content=a792941785~db=all

even under certain conditions host services for media outlets. Media are likely to make much better decisions about what to offer if they have in-house staff trained in the range of mobile-related technologies. A key part of this vision should also be promotion of content management systems in general, as it is the use and adaptation of CMSs which facilitate the flexibility and ability to engage media audiences in a targeted manner. Research will focus on open source CMSs as being more appropriate to most media needs in developing countries, and particularly when they develop extensions into telephony systems[78].

c) Advocacy

There are at least three major areas in the mobile space where media outlets could do better negotiating collectively than alone, and where organisations with international experience and networks could assist in the process.

First, in ***negotiations with mobile network operators***, non-competing media could achieve the greater revenue share the operators have traditionally given to single outlets when they reach higher traffic volumes across services like text. There may be other areas as well, such as negotiations to lease the infrastructure of base towers and local electricity solutions to operators still seeking to extend their coverage in the least developed countries.

Second, in ***negotiations with technology companies***. The mobile space is attracting great attention from a host of hi tech companies, and its trend to ubiquity also means greater interest in applications across the global South. Global media corporations such as Thomson Reuters can strike deals with technology providers like Nokia on their own[79], but there is no reason media which serve significant sections of the growing mobile market cannot do the same. Most are unlikely to try, or get the right level access by themselves, however.

Third, liaison with all potential sources of ***social marketing and M-government*** use of the mobile. Use of the mobile for these purposes in the South is both potentially huge, and blendable with media outlets' own extension into this space.

8.3. Blue Skies Innovation

ILLUSTRATION 29: *the emergence of an open source operating system on the mobile with a large developer base could create potential for South-friendly mobile media apps*

The rapid advance of capabilities on mobile handsets now on the market represents a new opportunity. Technology giants like Apple and Google are seeking to stimulate sizeable developer communities geared to mobile applications. As in the case of Google that its mobile operating system Android will be fully open sourced. This should create the potential for software development and the incubation of applications particularly suited to information services in a developing country context. Sub-grants to media creatives to work with technologists on the design and prototyping of appropriate applications could produce great yields in terms of useability by big constituencies of the new mobile subscribers in the South in a way that might not be addressed by market forces because those constituencies do not

78 http://plone.org/products/atasterisk
79 http://reutersmojo.com/

represent enough buying power to justify the effort.

For example, the ability of a phone to embed base station data supplied by operators at the application level to offer proxy location-based services for phones where the new software platforms are installed but which do not possess a GPS chip. Another field of development could be to ensure maximum enhancement of functionality in handsets which fall into the GSM Association's Emerging Market Handset[80] range.

8.4. Emergency Response

ILLUSTRATION 30: *When an earthquake hit Pakistan's NWFP and Kashmir provinces in October 2005, Internews helped establish emergency broadcasting by radio. Future emergency responses will likely combine mobile messaging over SMS with more traditional media.*

The new reach of mobile phones makes them an obvious platform to integrate into media initiatives involving emergency response (ER). The local communications loop is an aspect of ER which is under wide debate in humanitarian and non-profit funding circles in any case. Since the tsunami in 2004, it has been clear that local media and communications are an essential part first, of service delivery in disasters and later, in transparency and accountability of the humanitarian effort. Various platforms such as Strong Angel in the United States[81] are considering strategies for integrating media into ER. Mobiles have also been used on the ground by media organisations, such as Internews after the earthquake in Yogyakarta in 2006[82].

The obvious immediate application in disasters is the cell broadcast of SMS – in the first few hours and days after disaster hits, SMS is perhaps the best method to distribute wide area information. A study by network operator MTC into Lebanese use of mobiles during the 2006 war between Hizbollah and Israel[83] discovered that there were several bottlenecks in the use of mobiles: in the first days of the war, there were peak moments when the network was jammed on voice and data traffic. At these moments, because SMS has its own place on the frequency spectrum, it is frequently 'up' when other parts of the spectrum are down. But in addition, after an initial spike call volume went down in the following weeks of the war, partly, MTC conjectures, because of the destruction of base towers along with other infrastructure, but partly also because so many Lebanese subscribers were on pre-paid price plans. In the internal flight created by the fighting in the south, they were unable to buy new cards once they had used the ones they had. Texting again escapes this constraint.

But wide area cell broadcasting drops in value as the disaster itself recedes and the response effort gets underway, creating greater specificity of conditions in each sub-district affected by the emergency. In any case, as far as media is concerned, it is likely to become a facet of ER handled at strategic level by negotiation between network operators, governments, and the major humanitarian organisations.

Media outlets could use mobiles in two other ways. First, to maintain structured real-time communications in-house, and to keep journalists informed of latest developments. 'Rip and read' material designed for rebroadcast can be sent by SMS, and in-house messaging can ensure coordination. Of course this will happen on an informal basis, but the correct use of simple tools such as an SMS server will increase institutional efficiency by an order of dimension.

80 http://www.gsmworld.com/emh/

81 http://www.strongangel3.net/

82 http://www.internews.org/prs/2006/20061019_indo.shtm

83 http://www.zain.com/muse/obj/lang.default/portal.view/content/Mobility/A%20Nation%20Under%20Siege/The%20Dial%20Tone%20of%20War

Second, by using the phone to offer information services to specific communities. If regional or locally based media have already been offering services by mobile, so much the better because they could have lists of numbers from current subscribers. If not, they could address specific messages to specific regions. Location-based services do not have to be high-end in technological terms or require a GPS chip in the mobile handset, which would clearly be inappropriate in these contexts. Proxy services can serve all phones within the space of any given base station[84] but this requires pre-planning to build applications to build a database of base stations as they relate to geographical area, and integrate it into a SMS server application. This is the kind of application that could best be developed at national or even super-national level, and then made available to networks of locally-based media. As such it would be a natural development for media development organisations.

8.5. Closed Society Initiatives

There are also contexts in which the mobile phone could be seen as a media platform which is less censored and under surveillance within closed societies. In some cases, the mobile offers a degree of anonymity beyond the Internet, for example, because the same tracking tools and means of censorship have not yet evolved.

Such initiatives would be difficult and expensive. It is no coincidence that countries with repressive political regimes such as Myanmar and Zimbabwe are often those where mobile phone penetration rates are relatively very small, so the potential impact is lower. This is also related to a relatively higher cost of ownership and airtime in these countries – in Cambodia and Myanmar, for example, subscriptions can run into hundreds of dollars which relative to local buying power is extremely high. Authoritarian rulers naturally, and correctly, fear the mobile as a liberation tool and attempt to curb use, even while recognising its benefits for a trusted elite.

Use of mobile represents technical and security challenges in these contexts. In some countries, like Iran, the mobile phone infrastructure is geared to make anonymity impossible - every SIM card is linked to a known individual with identification Even in countries where this is not the case, or where there is a grey market for SIMs and handsets, such as across Africa, anyone providing information services over mobile in these environments has to assume that the government can access the enormous held by network operators on usage. The operators themselves routinely run traffic analysis of calls and text messaging which could detect structured activity to provide an information service simply by looking at patterns of usage. There are ways to plan to circumvent these restrictions but none of them are full-proof in terms of security and they are expensive to build – setting up an SMS server to run off a bank of SIM cards, for example, and then creating a program which would randomise which outgoing SIM it used, or, one step up, an interlocking network of such SMS servers in different locations which would, in turn, mask activity which would be noticeable in traffic analysis as coming from one network operator 'cell', or base station.

Care also needs to be taken in such initiatives because the phone is a real-time application. Creating solutions which offer anonymity therefore represent legitimate security concerns. All over the world, for example, guerrilla groups typically use mobiles to trigger bombs[85].

SIM, IMEI & ESN – DATA TRAILS ON THE MOBILE

Every mobile phone uses a SIM (Subscriber Identity Module) card which identifies the number it is using on a network. One level of monitoring by an adversary, therefore, is to track who bought that SIM. But each mobile handset also carries a unique identifying number, known as an ESN (Electronic Serial Number) on CDMA handsets, and an IMEI (International Mobile Equipment Identity) on a GSM handset. There is a 20-country database of IMEI numbers routinely used to blacklist and block handsets which are stolen. But the ability to track both SIM and handset can also be used to monitor all activity in the mobile space.

84 See section 9.3. b) of this report

85 Iraq, Afghanistan, Kashmir and Sri Lanka are among conf icts where there are regular reports of Improvised Explosive Devices being triggered by a mobile phone call.

9. Country Summaries

The country data which follows is intended to give basic information about the mobile space in selected countries according to standardised formats. The first is a table showing the rate of mobile phone adoption, for example, Kenya:

KENYA (SOURCES: COMMUNICATIONS COMMISSION OF KENYA, ITU)	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)	0%	2%	4%	5%	7%	15%	20%	30%	31%
TV household (%)	15%	16%	17%	18%	19%	20%	21%	23%	24%
2. AFFORDABILITY									
ARPU (% GNI per capita)		45%	41%	45%	35%	20%	16%		
3. TEXTING									
Texting (millions/month)					13	21	30	37	

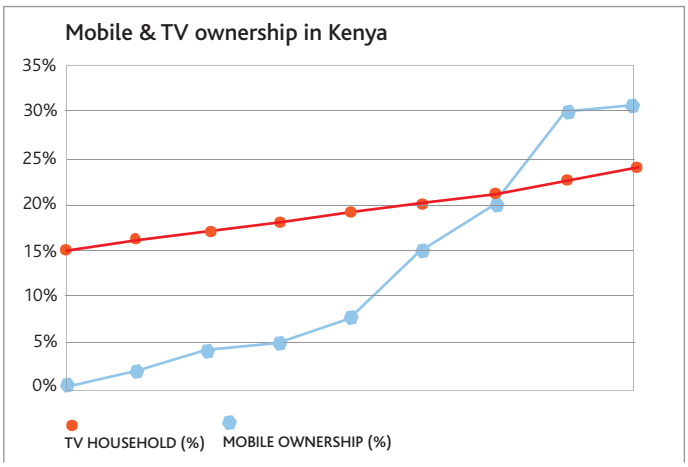
The first rows in this chart show the reach of mobile reach, together with the sources. In most cases, mobile phone subscriptions come from the national telecom regulator, which usually requires operators to report month by month on subscriptions. TV household access rates are sourced from the International Telecommunications Union. World Bank ICT reports have published figures from the ITU for the years 2000 and 2004, or in some cases 2006. Intermediate years are estimated (and put in Italics to distinguish them from data points from authoritative sources). In section 2, ARPU quotations – the average phone bill for a mobile user - are usually either from the state regulator, or a particular operator. They are expressed as a percentage of the average national income and in most cases quantify the falling relative cost of mobile ownership and use. So here in Kenya, we see average use of a mobile dropping from nearly half the average monthly income per head, to less than a sixth. The last column shows any figures available for SMS traffic in country. Together, the numbers in the table yield the chart on the right.

There are two particular figures which show mobile's penetration into social strata known as the Bottom of the Pyramid, or BOP. Where present, they are encapsulated in the box beneath.

The first figure gives a range for the number of people who own mobile phones but not TVs. This is derived from the World Bank and ITU numbers in the table above, when measured against the UN's 2008 estimate of that country's

BOP Mobile Reach – Kenya 2008

People who own a mobile but do not have a TV in their house	*850,000 to 2.6 million*
The minimum number of phones in rural areas (if everyone in towns had them)	*3.4 million*



KENYA MOBILE: MORE INFORMATION	
SUBJECT	**URL**
MPESA M-Commerce Initiative	M-PESA: Mobile Money for the "Unbanked"
	Mobile Phone Payment System Blossoms in Kenya
Groots mobile mentoring	Groots Kenya Mobile Phone Mentoring Strategy
GENERAL MEDIA COVERAGE	
BBC	Micro-lending and phone card currency
Economist	A bank in every pocket?
Mobile Active	At election time it's mobile phone journalism in Kenya
BBC Online	BBC correspondent crosses Kenya looking at mobile phones
Sydney Morning Herald	Mobile phones boost Kenya's small businesses
Zephora	Mobile phone credits used as currency in Kenya
Triple Pundit	Mobile phone credit accelerates micro-lending in Kenya
Ecommerce Journal	Development of M-Banking in Africa

population. So in Kenya, 31% mobile phones – 24% household access to TV gives 7% of the population, or 39 million, giving 2.6 million, the upper end of the range. The lower end of the range, constructed to absorb a margin of error, is achieved by adding 20% to the estimates for TV access, in this case giving us 28.8%, and therefore an estimate of 2.2% of the population, or about 850,000 people.

Finally, links to further articles on the Internet are provided in a box. These are by no means exhaustive.

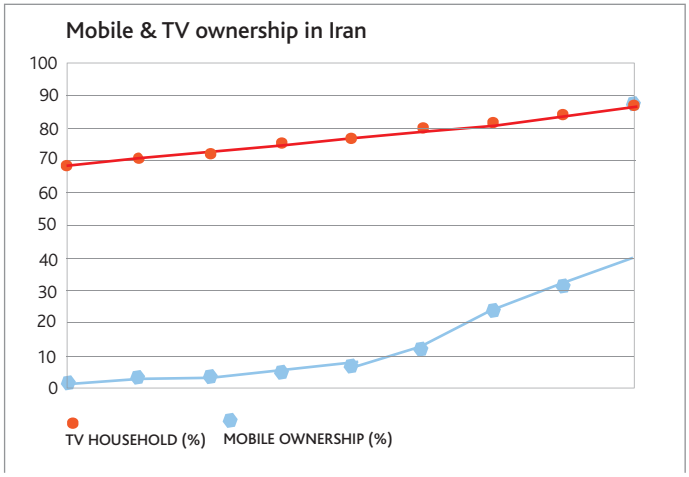
9.1. Middle East

IRAN (SOURCES: UN MDGS, WORLD BANK ICT, CIA FACTBOOK, UNSD)									
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
1. MEDIA REACH									
Mobile ownership (%)	2	3	3	5	7	13	24	32	40
TV household (%)	68	70	73	75	77	79	82	84	86
2. AFFORDABILITY									
Price Basket (% GNI per capita)					1.5	1.3	1.1		
3. TEXTING									
Texting (millions/month)									

a) Iran

Iran has also witnessed major accelerating growth in its mobile phone sector – this has led to over 30 million subscribers by 2007. An estimated 1/3 of adults over 15 now own a mobile phone, growth is expected to continue with 5 million new subscribers estimated for the first quarter of 2008 as the industry is further privatised and liberalisation increases competition.

Interestingly the Iranian government was planning to release its own mobile phone in partnership with Korean based LG under the brand name of



IRAN MOBILE: MORE INFORMATION

General media coverage
Persian Journal
URL
Cell phones dominate the markets in Iran

General media coverage
TGI Research
URL
Mob ile phone market b ooms in Iran

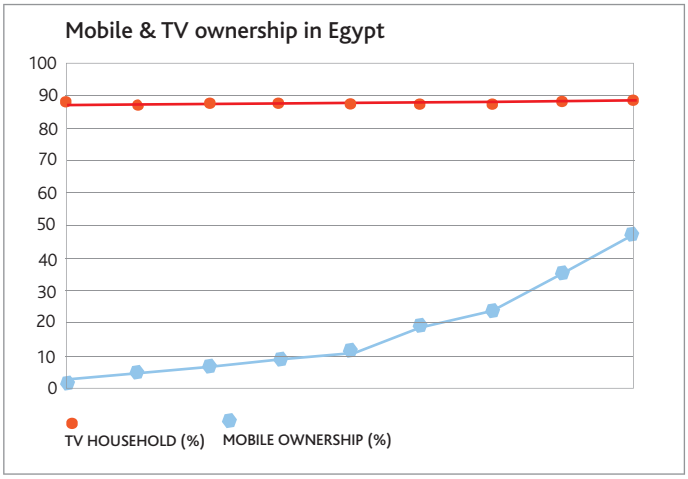
ITMC- it will begin making 1 million phones but will double in the next 2 years. An estimated 20 million SMS messages are sent every day, its ability to circumvent censorship, has led to the opening up of political and cultural discourse in a country lacking free and independent media.

b) Egypt

EGYPT (SOURCES: NATIONAL TELECOMMUNICATION REGULATORY AUTHORITY, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)	2	4	7	8	11	19	24	36	48
TV household (%)	89	89	89	89	88	88	88	89	89
2. AFFORDABILITY									
Price Basket (% GNI per capita)					4	4	5		
3. TEXTING									
Texting (millions/month)									

Egypt's strong mobile phone sector is set to continue its rapid growth over the next couple of years, increasing the existing teledensity of nearly 50% penetration in a country of almost 77 million. This is being helped by increased GDP and one of the cheapest rates in the world to make a mobile phone call (3 minutes at peak time).

The mobile phone is also being used to counter torture and human rights abuse. Issues that are ignored by the mainstream press are finding their way onto websites, such as *The Egyptian Consciousness*, and being distributed by and recorded on mobile phones.



BOP Mobile Reach – Egypt 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*3.5 million*

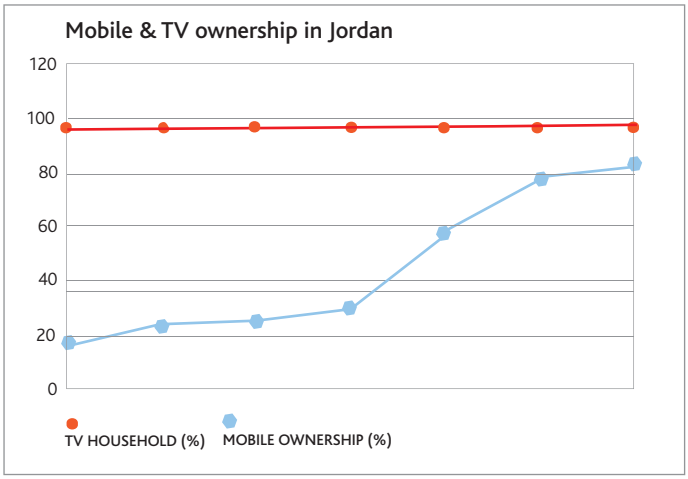
EGYPT MOBILE: MORE INFORMATION	
SUBJECT	**URL**
M-Banking	Arab Bank SMS Banking Service
GENERAL MEDIA COVERAGE	
Euromonitor International	More growth in store for Egypt's mobile phone market
Click Afrique	Egypt the Cheapest Country in the World to Make a Mobile Phone Call
Qantara.de	Fighting Torture with Mobile Phones and Blogs

c) Jordan

Jordan's telecoms market prides itself on being one of the most competitive in the world in terms of the number of operators, number and variety of services plus packages. This in part has led to continues steady growth, reaching the over 83% penetration by 2007. SMS banking services arrived in 2005 when Jordan Commercial Bank launched their M-banking platform allowing users to manage their accounts through their mobile phone.

The bank can also inform their customers of their bank balances, salary notifications and summary of their last transaction.

JORDAN (SOURCES: STATE REGULATOR, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)		17	24		5	30	57	78	83
TV household (%)			97	97		97	96	96	96
97									
2. AFFORDABILITY									
Price Basket (% GNI per capita)							5.3	4.1	3.1
3. TEXTING									
Texting (millions/month)									



BOP Mobile Reach – Jordan 2008

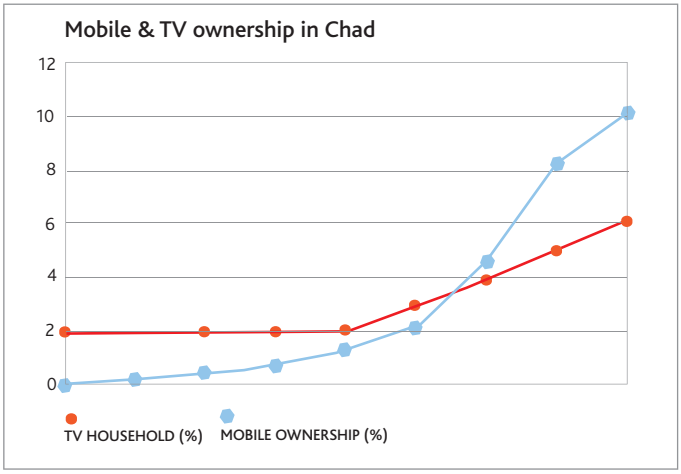
The minimum number of phones in rural areas (if everyone in towns had them)	*over 326 thousand*

9.2. Africa

a) Chad

Chad's telecom sector remains in need of major investment with low penetration rates for mobile, fixed line and Internet services. Despite this, as of March 2008, there are over 1 million subscribers (in a population of just over 11 million).

CHAD (SOURCES: UN MDGS, ZAIN, MILICOM, WORLD BANK ICT, CIA FACTBOOK, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)	0	0	0	1	1	2	5	8	10
TV household (%)	2	2	2	2	2	3	4	5	6
2. AFFORDABILITY									
Price Basket (% GNI per capita)					128	93	35		
3. TEXTING									
Texting (millions/month)									



BOP Mobile Reach – Chad 2008

People who own a mobile but do not have a TV in their house	*455 thousand*

These rates are significantly higher than television, fixed line, computer and Internet figures. The country remains desperately poor with low social indicators, including over half the population over 15 being illiterate. However, with the recent discovery of oil (bringing much needed investment in infrastructure) and average cost of mobile services dropping dramatically it is believed subscriber rates will continue to grow.

b) Kenya

KENYA (SOURCES: COMMUNICATIONS COMMISSION OF KENYA, ITU)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)	0%	2%	4%	5%	7%	15%	20%	30%	31%
TV household (%)	15%	16%	17%	18%	19%	20%	21%	23%	24%
2. AFFORDABILITY									
ARPU (% GNI per capita)		45%	41%	45%	35%	20%	16%		
3. TEXTING									
Texting (millions/month)					13	21	30	37	

Kenya is already one of the biggest, fastest growing and most dynamic mobile markets in Africa with approximately 11½ million subscribers (or a penetration rate of 30%). Even so, with new investment in infrastructure further explosive growth across the telecoms sector is expected. In a country with poor banking infrastructure, mobile banking (through services such as M-PESA) is already empowering the largely ***unbanked*** population. This has proved popular in a country where only 19% of adults have bank accounts either due to lack of access or insufficient funds to justify maintaining an account. It has also led to innovative social initiatives such as the Groots mentoring programme that focuses on protecting the land rights of women and AIDS orphans by providing and collating information on land-grabbing and property disinheritance in communities.

Mobile reporters, using SMS and video, also play a role in election monitoring (through Community Information Volunteers) and environmental reporting (through the Arid Lands Information Network).

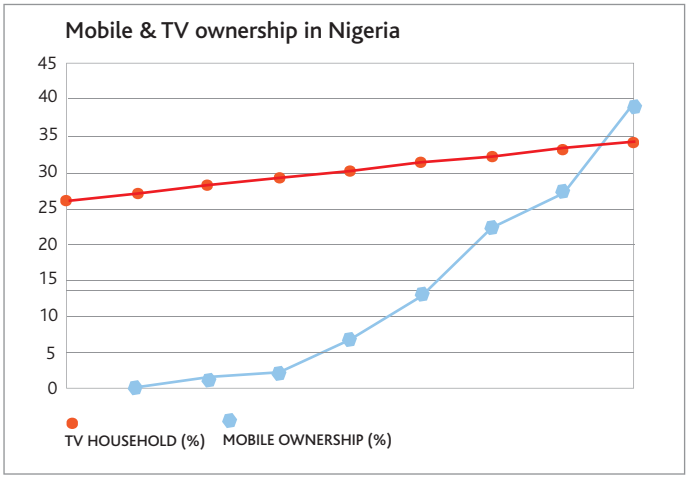
BOP Mobile Reach – Kenya 2008

People who own a mobile but do not have a TV in their house	*850,000 to 2.6 million*
The minimum number of phones in rural areas (if everyone in towns had them)	*3.4 million*

KENYA MOBILE: MORE INFORMATION

SUBJECT	URL
MPESA M-Commerce Initiative	M-PESA: Mobile Money for the "Unbanked"
	Mobile Phone Payment System Blossoms in Kenya
Groots mobile mentoring	Groots Kenya Mobile Phone Mentoring Strategy
GENERAL MEDIA COVERAGE	
BBC	Micro-lending and phone card currency
Economist	A bank in every pocket?
Mobile Active	At election time it's mobile phone journalism in Kenya
BBC Online	BBC correspondent crosses Kenya looking at mobile phones
Sydney Morning Herald	Mobile phones boost Kenya's small businesses
Zephora	Mobile phone credits used as currency in Kenya
Triple Pundit	Mobile phone credit accelerates micro-lending in Kenya
Ecommerce Journal	Development of M-Banking in Africa

NIGERIA (SOURCES: NIGERIAN COMMUNICATIONS COMMISSION, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	0	1	2	7	13	22	27	39	
TV household (%)	26	27	28	29	30	31	32	33	34
2. Affordability									
Price Basket (% GNI per capita)					30	26	21		
3. Texting									
Texting (millions/month)									



BOP Mobile Reach – Nigeria 2008

People who own a mobile but do not have a TV in their house	*Upto 7.7 million*

c) Nigeria

By early 2008 Nigeria had overtaken South Africa as the continent's biggest mobile market with 44 million subscribers - a penetration rate that increased to just over 34% by June 2008. Despite gaining a new customer every second, the enormous growth already witnessed is expected to continue. Mobile banking and commerce has taken root through services such as eTranzact and Glo, and created alternatives to branch banking through SMSbanking through GT, Zenith, UBA, Diamond and Intercontinental.

Its impact on the economy does not end there, as Christiana Charles-Iyoha in her book ***Mobile Telephony: Leveraging Strengths and Opportunities for Socio-Economic Transformation in Nigeria*** estimates 10,000 "direct" and 1 million "indirect jobs" have been created by the mobile telephony sector in the last 5 years.

Mobile phones have started to play an increasingly important role in Nigerian civil society too, through pro-democracy organisations such as the ***Network of Mobile Election Monitors*** and health programmes such as ***Learning About Living's*** HIV/AIDS initiative.

NIGERIA MOBILE: MORE INFORMATION	
SUBJECT	**URL**
M-Commerce	eTranzact
smsBanking	Sterling Bank (Nigeria) Push Services
Learning about Living	Combating HIV/ AIDs Through Mobile Phones
Election monitoring via SMS	Network of Mobile Election Monitors
General media coverage	
Sun News (Nigeria)	Mobile Banking in the Rise
ZD Net	Challenges of Nigeria mobile Banking
MobileActive.org	Strengths and Opportunities for Socio-Economic Transformation in Nigeria

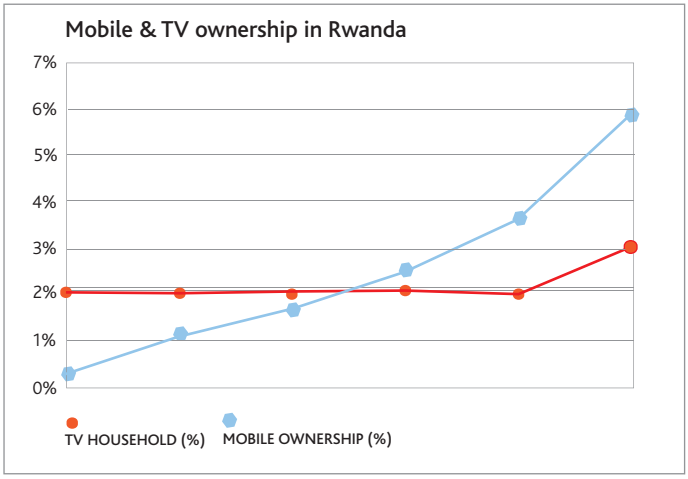
d) Rwanda

With initiatives and investment in infrastructure (as well as liberalisation of the telecoms market in 2006) Rwanda has forged ahead to become the hub of communications technology for sub-Saharan Africa. This owes a great deal to ***Vision 2020***, a government framework for rebuilding post-genocide Rwanda in 2000. This identified using ICT-based poverty reduction strategies as fundamental in developing its human and socio-economic capital.

Thanks to this, by 2007, it was also named East Africa's number one ICT country by the United Nations Conference on Trade and Development (UNCTAD) – a remarkable turnaround. Despite this, and affordability dropping over 50% between 2004-2006, mobile phones are still expensive and subscriber rates are low at 6%. However, banks such as Rwanda Commercial Bank (BCR) have recently introduced SMS and Internet banking, as well as SIMTEL and iVeri launching iVeri Voice, a new secure mobile payment system. Meanwhile the ***Phones for Health*** alliance has been using ***TRACnet***, which uses mobiles as an integral part of its national information and reporting system to combat HIV/ AIDS.

Mobiles are also playing a part in reconciliation and the demobilization of the FDLR (a Rwandan Hutu rebel group) based in DR Congo. Where Michel Sibilondire uses a combination of radio and SMS to communicate with the group to convince them to return peacefully. The growth of mobiles, with ownership approximately double that of television, has also created space for Rwandan based SMS Media to broadcast news via mobiles across the nation.

RWANDA (SOURCES: RWANDA UTILITIES AGENCY, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)	0%	0%	0%	1%	2%	3%	4%	6%	
TV household (%)	2%	2%	2%	2%	2%	2%	2%	3%	
2. AFFORDABILITY									
Price Basket (% GNI per capita)					135%	97%	59%		
3. TEXTING									
Texting (millions/month)									



BOP Mobile Reach – Rwanda 2008

People who own a mobile but do not have a TV in their house	*Up to 300 thousand*

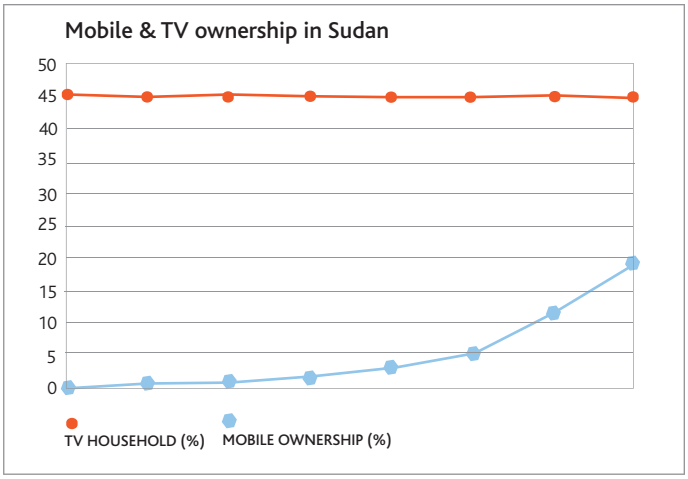
RWANDA MOBILE: MORE INFORMATION	
SUBJECT	URL
BCR m-Banking	BCR Brings Online, SMS Banking to Country
iVeri/ SIMTEL M-Payments	Mobile Credit Card Payment System
SMS Media	SMS Media in Rwanda
Phones for Health (HIV+ initiative)	Using Mobile Phones To Fight the HIV/ AIDS Pandemic
GENERAL MEDIA COVERAGE	
BBC	Radio and SMS used in demobilising Hutu rebels

e) Sudan

SUDAN (sources: UN MDGs, World Bank ICT, CIA Factbook)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	0	0	1	2	3	5	12	19	
TV household (%)	45	45	45	45	45	45	45	45	
2. Affordability									
Price Basket (% GNI per capita)					7.78	6.8	9 6		
3. Texting									
Texting (millions/month)									

Sudan is regarded by the telecom industry as one of Africa's most potentially lucrative markets, attracting millions of dollars in foreign investment in 2007. Reflected in mobile subscriber growth of nearly 400% in 2 years.

However, with relatively low penetration across the telecoms sector future potential remains great, especially if increased political stability is sustainable. Although M-commerce and M-banking are yet to make an impact in the country, new services are being launched such as MTN's voice SMS service.



SUDAN MOBILE: MORE INFORMATION

General media coverage
Developing Telecoms
URL
MTN Mobile Operator

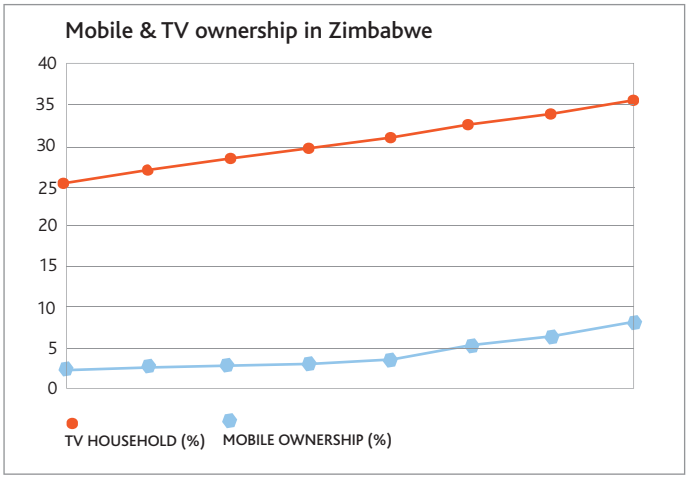
General media coverage
Congo and Sudan drive Africa cell growth
URL
Voice-SMS service launched in Sudan

f) Zimbabwe

The impact of political instability, falling income and hyperinflation has severely impacted on the Zimbabwean telecoms industry. Despite this, there is believed to be great pent up demand and mobile subscribers have continued to grow (doubling since 2004). This has also given rise to a number of interesting mobile phone based initiatives. Mukuru.com is a service set up by ex-Zimbabwean nationals in the UK.

From their website, you can buy goods such as petrol, food, cell phones, and even transfer money to friends and relatives in Zimbabwe – where they receive an SMS voucher and then collect the gift from local operators. This has expanded to include South Africa with the same to be launched in Malawi, Kenya and Zambia soon.

ZIMBABWE (SOURCES: UN MDGS, WORLD BANK ICT, TELEGEOGRAPHY, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	2	3	3	3	4	5	6	8	
TV household (%)	25	27	28	30	31	33	34	36	
2. Affordability									
Price Basket (% GNI per capita)					92	61	31		
3. Texting									
Texting (millions/month)									



The pro-democracy movement, under attack and censored by Mugabe, have also been using mobiles/ SMS to mobilise, campaign, organise and circumvent censorship. This has seen Kubatana, a local NGO, using FrontlineSMS software to open up a two-way dialog with the citizens of Zimbabwe.

M-commerce is also starting to make inroads with the launching of services such as eTranzact.

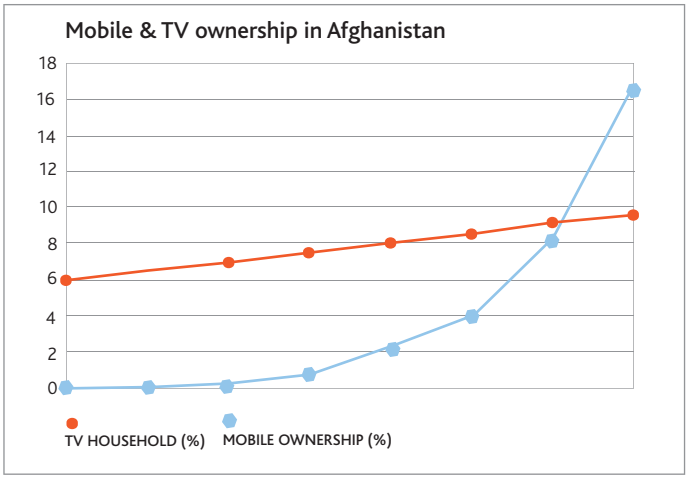
9.3. Central and South Asia

a) Afghanistan

AFGHANISTAN (SOURCES: UN MDGS, WORLD BANK ICT, ITU, CIA FACTBOOK, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	0	0	0	1	2	4	8	17	
TV household (%)	6	6.5	7	7.5	8	8.5	9	9.5	
2. Affordability									
Price Basket (% GNI per capita)							52		
3. Texting									
Texting (millions/month)									

BOP Mobile Reach – Afghanistan 2008

People who own a mobile but do not have a TV in their house	*up to 1.6 million*



Despite continuing unrest (which has seen the Taliban destroying mobile phone towers) and decades of security difficulties, Afghanistan has witnessed extraordinary growth in the use of mobile phones in recent years.

Between 2005 and 2007, the growth in mobile subscribers grew over 400%, which now equals well over 4 million users (or a penetration rate of 16.5 %). However, mobile phones are being used for far more than voice only communication.

This year M-Paisa was launched to help disburse MFI (microfinance institution)

loans, while TAMAS distributes market price information via SMS to farmers and market wholesalers. ICTs are set to play a major role in the future of Afghanistan.

AFGHANISTAN MOBILE: MORE INFORMATION	
SUBJECT	**URL**
M-Banking	Afghanistan's First Mobile Money Transfer Service Launched
Communicating Market Prices	TAMAS - text messaging system launched
GENERAL MEDIA COVERAGE	
MSN BC	Cell-phone use booming in Afghanistan
Mobile Industry Review	Afghanistan - over 4 million wireless subscribers
LIRNEasia	Mobile phone is shaping a new Afghanistan
BBC	Afghanistan joins mobile age

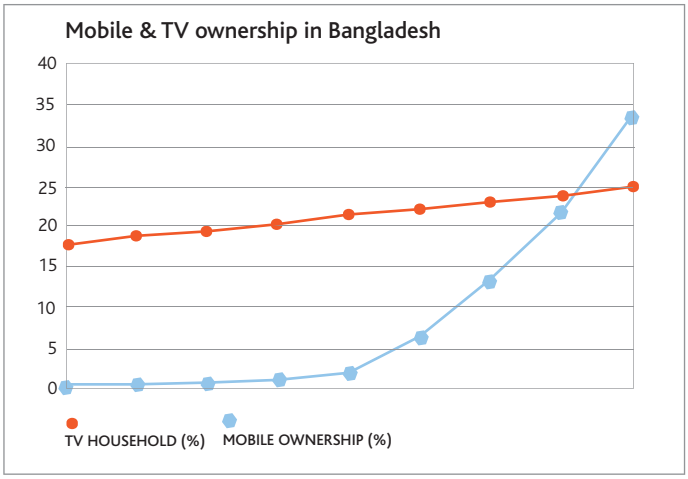
b) Bangladesh

Bangladesh has witnessed exponential growth in its mobile phone market over the last 3-4 years with penetration rates as low as 2% in 2004 to now well over 33%.

The widespread use of mobiles has led to innovative M-Commerce such as the CellBazaar. A ***Market in Your Pocket*** this popular SMS-based marketplace allows users to look at and post classified adverts for whatever it is they want to advertise or sell – objects, services, jobs, real estate, etc.

The microfinance institution Grameen, has also launched a ***Village Phone Program*** to connect rural Bangladesh, in particular women, with microfinance opportunities and banking services. The phones also effectively become small call centres as the owner charges a small fee for other villagers to use the phones. Over 200,000 phones have been distributed which it is estimated help bring communications to 60 million people in rural Bangladesh.

BANGLADESH (SOURCES: BANGLADESH REGULATORY COMMISSION, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
1. Media Reach									
Mobile ownership (%)	0	0	1	1	2	6	13	22	33
TV household (%)	18	19	20	21	21	22	23	24	25
2. Affordability									
Price Basket (% GNI per capita)					10	8.5	6.9		
3. Texting									
Texting (millions/month)									



BOP Mobile Reach – Bangladesh 2008

People who own a mobile but do not have a TV in their house	*4.8-12.9 million*
The minimum number of phones in rural areas (if everyone in towns had them)	*9.7 million*

BANGLADESH MOBILE: MORE INFORMATION	
SUBJECT	URL
Mobile Market Place	Cell Bazaar
M-Commerce	SMS Marketplace in Bangladesh
Village Phone Program	Grameen M-Banking for Rural Bangladesh
GENERAL MEDIA COVERAGE	
MobileActive.org	Mobile Phones Making Money in Bangladesh
BBC	Mobile money spinner for women
Star Weekend Magazine	Market in a Cell
ZD Net	Targeting Low-Arsenic Groundwater With Mobile-Phone
Technology	

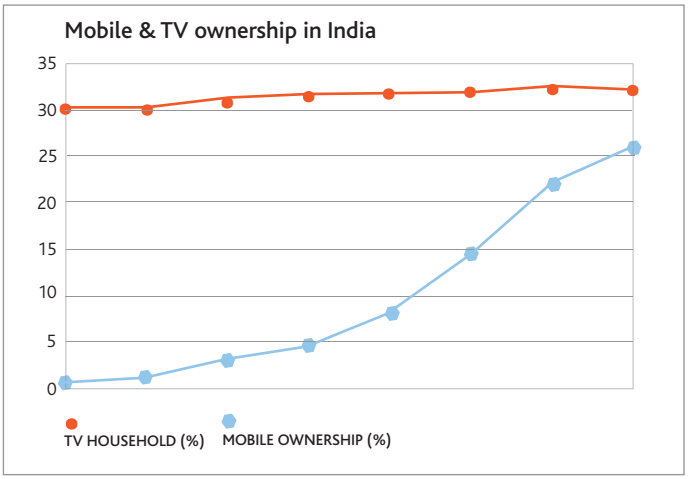
c) India

Already massive, India continues to be one of the fastest growing telecom markets in the world – from around 10 million subscribers in 2002 to over 220 million by the end of 2007. Despite this it is believed that 10,000 mobile phones are still sold every hour. This explosive growth has up to now been largely confined to the cities.

However, operators are now concentrating on opening up the rural market – where 70% of India's population live. Despite starting out as a status symbol and marketed heavily to a fashionable youth market, mobiles have also become essential for the self-employed and informal economy (which accounts for half of India's business). M-banking and M-commerce have also thrived whether through services such as PayMate or the major banks piloting and launching new mobile-based services.

There have also seen innovative projects for Indian farmers to provide them via SMS with accurate weather forecasting (in preparation for monsoons) and details of crop pricing (to help decide when and which markets to take produce to). Fishermen in the state of Kerala also adopted a similar project. The potential of the mobile to impact on social issues has also been recognised with the application of telemedicine. Through the ATNF (Apollo Telemedecine Networking Foundation) healthcare and education is being delivered to patients in remote rural regions.

INDIA (SOURCES: TELECOM REGULATORY AUTHORITY OF INDIA, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	1	1	3	5	8	14	22	26	
TV household (%)	30	30	31	32	32	32	32	32	
2. Affordability									
Price Basket (% GNI per capita)					6	5	4		
3. Texting									
Texting (millions/month)									



INDIA MOBILE: MORE INFORMATION	
GENERAL MEDIA COVERAGE	URL
Textually.org	Poorer workers ring in India's mobile phone revolution
TMCnet	IDC Research:10,000 Mobile Phones Sold Every Hour in India
Ericsson	M-commerce hits the big time in India
The Business Edition	Mobile Commerce coming of age in India
One World	M-banking to reach out to India's hinterland
TriplePundit.com	Empowering Indian Farmers With Mobile Phone Market Applications
NMS Communications blog	More on fishermen with mob ile phones in Kerala, India
DigitalDivide.net	Mobile Phones To Support Healthcare In Rural India
BBC	Youth drives India's mobile phone revolution
LIRNEasia	India can do better on mobile phone growth
TelecomPaper	74% mobile phone users in India use text messaging (PAID)

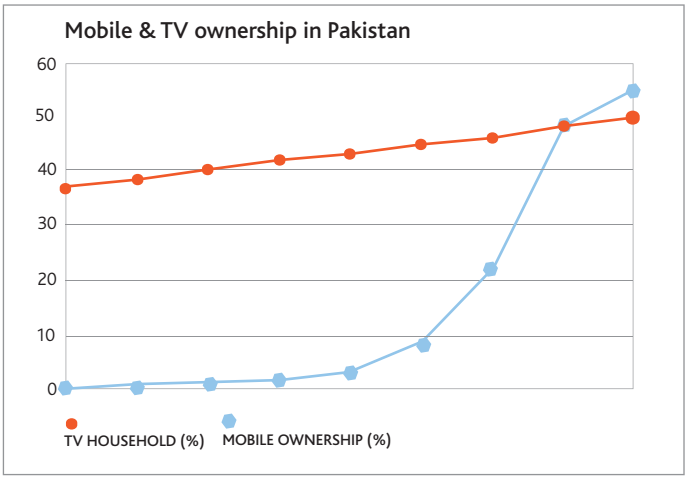
d) Pakistan

PAKISTAN (SOURCES: PAKISTAN TELECOMMUNICATION AUTHORITY, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	0	1	1	2	3	8	22	49	55
TV household (%)	37	39	40	42	43	45	46	48	50
2. Affordability									
Price Basket (% GNI per capita)					4.4	2.7	1.1		
3. Texting									
Texting (millions/month)									

Pakistan is another nation to experience explosive growth in its mobile phone sector – from 3.3 million by the end of 2003 to 80 million by early 2007. Strong annual growth of around 100% has continued with room for further expansion.

The mobile used as a social tool can be witnessed in the ***Tele Kissan*** project where vital information is relayed to farmers through SMS, which includes weather forecasts, commodity / product prices, agricultural remedies and news updates.

This is supplied by, mobile operator, Telenor, who as part of its corporate responsibility programme also provide the Apna PCO "business in a box" for rural entrepreneurs, which provides a robust mobile phone and training to set up a phone call service for the local villagers.



BOP Mobile Reach – Pakistan 2008

People who own a mobile but do not have a TV in their house	*Up to 8.4 million*
The minimum number of phones in rural areas (if everyone in towns had them)	*32 million*

PAKISTAN MOBILE: MORE INFORMATION	
SUBJECT	URL
M-Commerce	Expectations for Mobile Users In Pakistan
GENERAL MEDIA COVERAGE	
A Blog	State of Telecom Industry in Pakistan

e) Sri Lanka

SRI LANKA (SOURCES: SRI LANKAN REGULATOR, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	2 3	5 7	11	17	27	40	44		
TV household (%)	22	24	25	27	29	30	32	34	35
2. Affordability									
Price Basket (% GNI per capita)					4.4	2.7	1.1		
3. Texting									
Texting (millions/month)									

Despite the ongoing conflict between the Sri Lankan government and separatist *Tamil Tiger* rebels the telecommunications sector has flourished with the opportunity for further excellent growth.

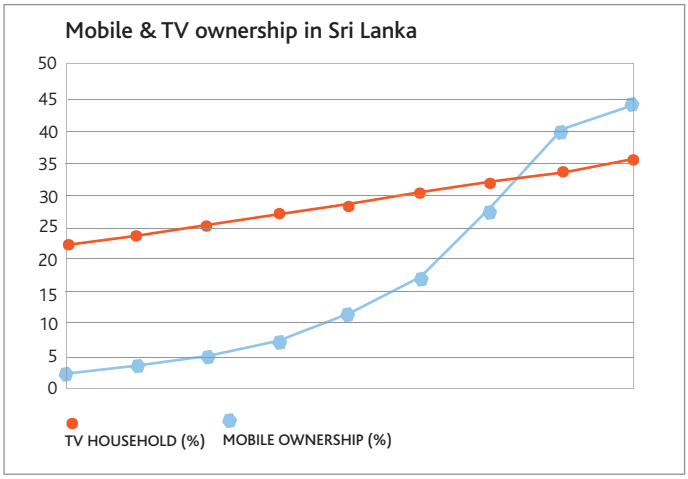
Widespread mobile penetration rates of 45% also don't necessarily tell the full story either as research by the International Development Research Center (IDRC) of Canada shows that 99.7% of Sri Lankans at the BOP had used a telephone in the last 3 months, while almost two-thirds (58%) of them did not own the phone they used.

M-commerce has also arrived through mobile operator Celltel offering services (such as CellWallet and mzone's SMS banking platform) which allows payments, fund transfers between accounts; account balance inquiries; account statement requests; cheque book and cheque status requests; cheque cancellation requests; and significant balance changes alerts.

Also, perhaps unsurprisingly considering the level of devastation wreaked in 2004 (some 35,300 dead, half a million displaced, 27,000 injured and 1,500 children orphaned), a mobile phone tsunami early warning system delivered via SMS now exists.

BOP Mobile Reach – Sri lanka 2008

People who own a mobile but do not have a TV in their house	*from 390,000 to 1.8 million*
The minimum number of phones in rural areas (if everyone in towns had them)	*5.9 million*



SRI LANKA MOBILE: MORE INFORMATION	
SUBJECT	URL
Wireless Banking	M-Commerce in Sri Lanka
CellWallet Mobile Payments	Secure mob ile wallet launched in Sri Lanka
SMS Tsunami Warning System	Text messages help get tsunami alert out
General media coverage	
Next Billion	High Levies May Dampen Mobile Growth in Sri Lanka

9.4. East Asia

a) Cambodia

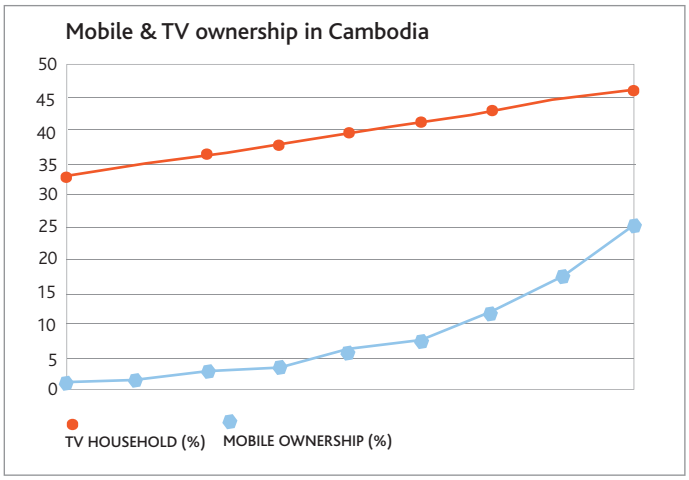
Cambodia was one of the first nations to have more mobile phone than fixed line telephones. However, this can be seen as a reflection on the exceptionally poor fixed line telephony services that existed which mobiles offered an easy alternative to.

This was coupled with recovery from civil war and subsequent political turmoil - all impacting on Cambodia's ability to attract foreign investment, which is now finally starting to flow into the telecom sector.

Even so, there is a burgeoning mobile phone sector taking off in Cambodia with an annual growth rate of around 50% that is expected to continue.

CAMBODIA (SOURCES: UN MDGS, WORLD BANK ICT, CIA FACTBOOK, BHARAT BOOK BUREAU, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. MEDIA REACH									
Mobile ownership (%)	1	2	3	4	6	8	12	18	26
TV household (%)	33	35	36	38	40	41	43	45	46
2. Affordability									
Price Basket (% GNI per capita)					15	14	12		
3. Texting									
Texting (millions/month)									



BOP Mobile Reach – Cambodia 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*500,000*

b) Indonesia

Emerging from a period of economic difficulties Indonesia's telecom sector continues to grow, with the mobile phone sector particularly strong in recent years. This has led to almost 120 million mobile subscribers (or penetration rates of over 50%).

A new mobile phone boom is being predicted brought on by fierce competition between 11 operators with massive advertising campaigns, prices slashed, investment in infrastructure and networks being deepened to take in more of the Indonesian archipelago. M-Banking has also been gaining ground since being launched in 2003 by Bank Danamon and Citibank.

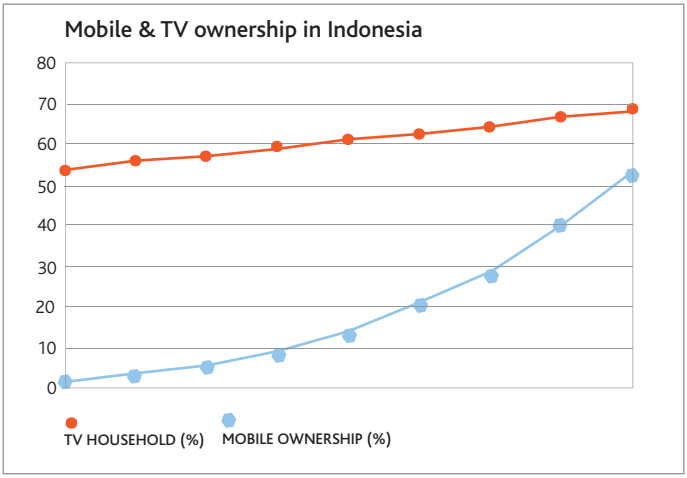
INDONESIA (SOURCES: STATE REGULATOR, UN MDGS, WORLD BANK ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	2	3	6	9	14	21	28	40	52.5
TV household (%)	54	56	58	60	61	63	65	67	68.67
2. Affordability									
Price Basket (% GNI per capita)					5	4	4		
3. Texting									
Texting (millions/month)									

After the 2006 Java earthquake, mobiles were also used by the Internews organisation when it worked with more than 180 journalists through a quick, low-cost text messaging service that enabled local radio stations to give out vital information on emergency services – such as vaccinations, health warnings such as tetanus outbreaks, etc.

BOP Mobile Reach – Indonesia 2008

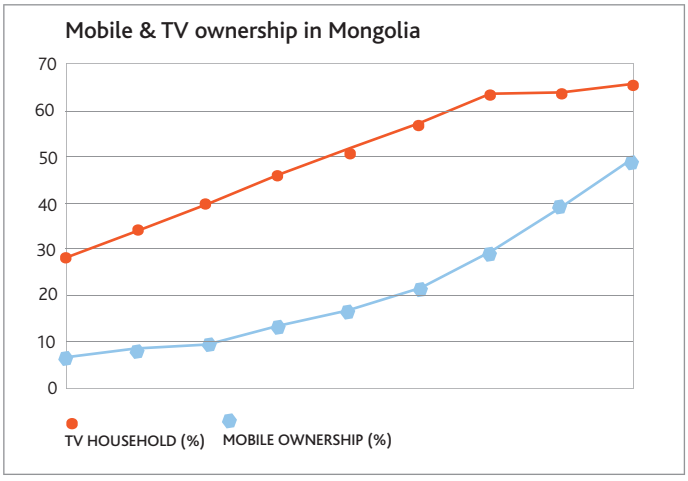
The minimum number of phones in rural areas (if everyone in towns had them)	*1.2 million*



INDONESIA MOBILE: MORE INFORMATION	
GENERAL MEDIA COVERAGE	URL
Next Billion	Major Boom Expected in Mobile Subscriptions in Indonesia
Jakarta Post	M-banking to go beyond checking balance
Internews	Post-earthquake Text Messaging Service for Indonesian Journalists

c) *Mongolia*

MONGOLIA (SOURCES: CELLULAR-NEWS, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	7	8	9	13	16	21	29	39	49
TV household (%)	28	34	40	46	51	57	63	64	65
2. Affordability									
Price Basket (% GNI per capita)					20	13	6		
3. Texting									
Texting (millions/month)									



MONGOLIA MOBILE: MORE INFORMATION	
SUBJECT	URL
Mobile Banking	XacBank/ Consultative Group to Assist the Poor (CGAP)
GENERAL MEDIA COVERAGE	
MicroCapital.org	Mongolian Microfinance Insitution Launches Cellphone Banking
CGAP	Mobile Phone Banking to Reach Rural Mongolia

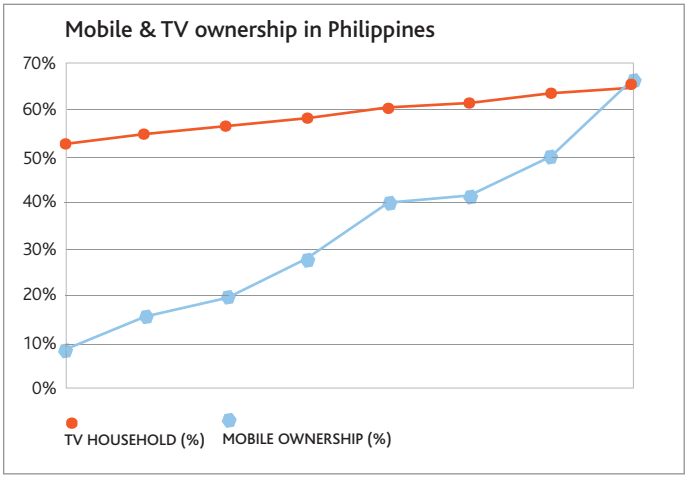
Aided by increased competition through privatisation and an independent regulator, Mongolia's mobile telephony sector has enjoyed remarkable growth reaching almost 50% penetration by 2008. M-banking is being brought to the country through the Mongolian microfinance institution XacBank.

Supported with technical assistance and funding from Consultative Group to Assist the Poor (CGAP) the project is also aiming at targeting the rural population of Mongolia. The country has one of the lowest population densities in the world, which partly explains why 40% of the population only use cash.

The project aims to give farmers and nomadic herders access to safely storing money and other financial services.

d) Philippines

PHILIPPINES (SOURCES: FILIPINO REGULATOR, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	8.4%	15.5%	19.4%	27.8%	39.9%	41.3%	49.9%	65.5%	
TV household (%)	53.0%	54.7%	56.3%	58.0%	59.7%	61.3%	63.0%	64.7%	
2. Affordability									
Price Basket (% GNI per capita)					4.1	4.4	4.6		
3. Texting									
Texting (millions/month)									



BOP Mobile Reach – Philippines 2008

People who own a mobile but do not have a TV in their house	*Up to 700,000*
The minimum number of phones in rural areas (if everyone in towns had them)	*Up to 400,000*

Dubbed the "texting capital of the world" the Philippines sends around 1.39 billion SMS messages every day. This is the largest SMS volume in the world and accounts for more than 10% of global SMS.

Growth in mobile subscribers has grown almost tenfold since 2000 with over 60 million subscribers. Within this context it is unsurprising that M-commerce and M-Banking are proving popular through services such as Smart Mobile Banking Solutions and the Rural Bankers Association of the Philippines.

It has also proved exceptionally valuable to the 8 million Filipinos (10% of the population) who work overseas and send money home – as it is both much faster and cheaper than bank wire transfers.

PHILIPPINES MOBILE: MORE INFORMATION	
SUBJECT	URL
Smart M-Commerce & M-Banking	Examples of innovative M-Commerce Applications
M-Banking for Rural Banks	Rural Bankers Association of the Philippines
GENERAL MEDIA COVERAGE	
SIDA	The Innovative Use of Mobile Applications in the Philippines
LIRNEasia	Mobile money in the Philippines
Pinoy & Pinay	Philippines Reaffirms Status As "Text Messaging Capital Of The World"
The Hindu	Philippines is "SMS capital of the world"
ShareIdeas.org	Rural Banks Using Mobile Phones for Microfinance
Sun Star Manila	70% of Pinoys use Mobile Phone

e) Vietnam

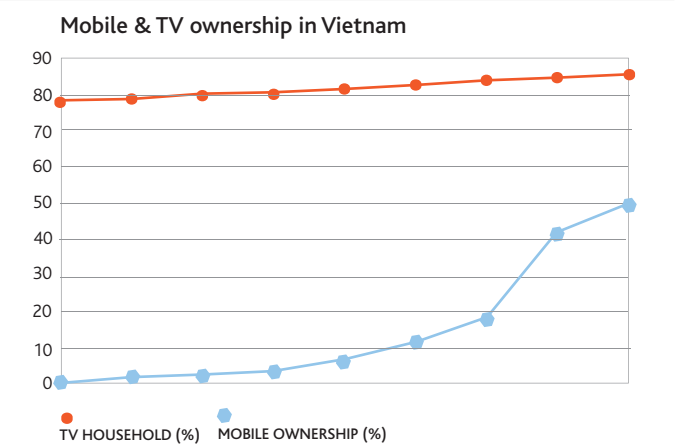
Having already witnessed the beginning of a boom in mobile phone even greater expansion is expected over the next 5 years as prices continue to fall and services improve.

With government commitment to expansion and restructuring the market, Vietnam's telecom sector's growth will continue building momentum.

VIETNAM (SOURCES: ITU NEWSLOG, UN MDGS, WORLD BANK ICT, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	1	2	2	3	6	11	18	41	49
TV household (%)	78	79	80	81	81	82	84	85	86
2. Affordability									
Price Basket (% GNI per capita)					15	13	11		
3. Texting									

BOP Mobile Reach – Vietnam 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*11.5 million*

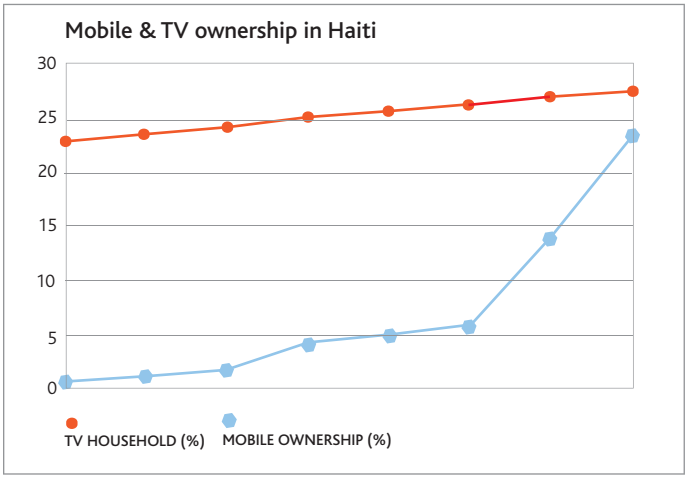


VIETNAM MOBILE: MORE INFORMATION	
GENERAL MEDIA COVERAGE	URL
VietNamNet Bridge	Vietnam's mobile phone charges close to cost price
People's Daily (China)	Vietnam's mobile phone market booms
Vietnam Development Gateway	New company dials up firm m-commerce foundations
Hong Kong TDC	Vietnam mobile phone bonanza

9.5. the Americas
a) Haiti

HAITI (SOURCES: UN MDGS, WORLD BANK ICT, CIA FACTBOOK, UNSD)									
	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Media Reach									
Mobile ownership (%)	1	1	2	4	5	6	14	24	
TV household (%)	23	24	24	25	26	26	27	28	
2. Affordability									
Price Basket (% GNI per capita)							13		
3. Texting									
Texting (millions/month)									

Despite the lack of reliable detailed statistics and also remaining the poorest country in the Western hemisphere, Haiti's telecom clearly has shown incredible five-fold growth between 2000 and the end of 2007. This translates to 2.2 million mobile phone subscribers in a nation of 9.75 million.



HAITI MOBILE: MORE INFORMATION

General media coverage
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Even the Poorest Can Be a Thriving Market

Appendix A – Glossary

- 2G – meaning 'second generation', the wireless protocols introduced with the GSM and CDMA platforms for mobile phones. It is digital, unlike first generation or '1G' mobile services which were analog.
- 2.5G – is a phrase coined to describe mobile phone networks which run packet-switch networks as well as the more traditional circuit-switch networks, allowing them to carry data as well as voice calls, and data protocols such as GPRS are used on 2.5G networks.
- 3G – or 'third generation', a high-bandwidth specification for mobile phone networks which allows easy integration of voice with rich data services. Although 3G is not a bandwidth specification, speeds of several megabits per second both up and down can be achieved, enough for live video, for example. The first 3G networks were implemented in Japan and South Korea in 2001 and 2002, and as of December 2007 3G networks were operating in 40 countries.
- AMPU – Average Margin Per User, a measurement of profitability which is gradually replacing ARPU as mobiles approach ubiquity and lower income subscribers on pre-paid plans lead to reduced ARPU.
- ARPU – Average Revenue Per User, the traditional means of measuring profitability among mobile network operators. Simple ARPU means the average monthly bill of a subscriber in any given network, but 'blended ARPU' is the more normal measure, which also includes revenues which accrue to the network from receiving incoming calls, roaming charges, and other services, averaged across the number of subscribers in the network.
- GPRS – Global Packet Radio Service, the first protocol for data services over mobiles in widespread use. Speeds typically resemble modems for the Internet in the 1990s, with high latency, meaning connections often freeze or drop. GPRS access is usually measured by data download. In industrial countries it is gradually being replaced by 3G networks with flat-price data plans.
- GSM – the Global System for Mobile communications is the widest used standard for mobile phones. Originated in Europe in the 1980s, over 80% of mobile phones in the world are on the GSM standard, a factor which created easy interoperability of handsets and SIM cards worldwide and probably accelerated adoption in the developing world. GSM evolved the SMS texting facility which is now available on other standards.
- CDMA – Code Division Multiple Access, the second major mobile phone standard, was the basis of most early mobile networks in North America. As of December 2007, CDMA phones were estimated to be 13% of the worldwide total.
- WiMax – is a high-speed wireless data technology, based on the IEEE 802.16 standard. Despite the similarity of the names it bears little resemblance to Wifi. It operates over ranges of tens of kilometers, for example, and encompasses both access from mobile devices and fixed points.
- Keyword Response - In texting, or SMS, keyword response is when a user sends a keyword up to an SMS server and receives a message in response to that particular word. A sports service, for example, might have the keywords 'soccer' or 'rugby'. Keyword response allows several different services to share the same phone number, or short code.
- 'Push' – Push communication is when the sender, or publisher, initiates an exchange as in, for example, sending an email, starting an Instant Message chat. The 'push' of individual items usually takes place within a broader context of subscription, where a user has asked to have content meeting an agreed definition sent to them.
- 'Pull' - Pull communication is when the user herself initiates communication, such as visiting a website, or retrieving email from a server.
- UGC – User Generated Content refers to various kinds of content publicly available on the Internet created by end users, as opposed to media professionals. Sites such as Youtube and Flickr host user generated content from millions of users.
- Network economics – is the growing discipline of studying network effects, or the cumulative impact of behaviour within and across networks. It is a key element in considering how any digitally-produced communications channel, such as the mobile phone, will evolve.
- MNO – Mobile Network Operators, the companies who provide and charge for mobile phone connectivity, such as Vodafone, Sprint, Orange etc.
- IVR – Interactive Voice Response is a phone technology which allows a computer

to 'read' touch tones or voice during a normal voice call, and so offer structured information services. It is widely used by call centres and other customer support services.

- PBX – formally stands for Private Branch Exchange, as opposed to a public network on a telephone system. But it has come by extension to represent the range of functionality in telephony that has traditionally been available only in private exchanges, such as call forwarding, call waiting, dynamic teleconferencing, voice mail and voice message broadcasting, and automated attendant, among others.
- VoIP – Voice over Internet Protocol, is the standard used to make voice calls across the Internet. Many international calls are now handled at least in part by VoIP to reduce international charges within the switched circuit telephone network and VoIP combined with the increasing availability of data networks leads many experts to think all voice calls will eventually be available worldwide at flat prices.
- SIM – Subscriber Identity Module, is the tiny card which carries the mobile phone number, and an address book, installed on GSM phones. SIM cards also carry other information not normally available to the user, such as a Location Area Identity.
- Pre-paid – is the newer kind of mobile phone subscription, and dominates in the growth of mobile telephony across the developing world. A pre-paid subscription is where a user buys credit to use for phone calls and texts up front. Originally such purchases were of physical cards with scratch numbers, but increasingly credit is transferred across the network virtually, from an accredited agent.
- Post-paid – Most early mobile phone subscriptions were post-paid, meaning the user entered into a long-term relationship with the network operator and agreed to be billed every month, either at a physical address, or by standing order from a bank account.
- SMS – Short Message Service is a standard for exchanging short text messages between mobile phones. An estimated 2.4 billion people on the planet have sent or received an SMS message.
- MMS – Multimedia Messaging Service, a standard designed to replace SMS by enabling sending of messages between mobile phones that can include sound, graphics and video as well as just text. It requires data networks to support it. Although MMS has been touted by network operators since the early 2000s its level of use as of 2008 was orders of dimension less than SMS.
- IM – Instant Messaging, a series of applications which evolved on the Internet with programs such as Yahoo Messenger and Skype but which are increasingly migrating also to mobile phones.
- Voice Recognition – Technology which allows a computer to understand human speech and render it into text, either for transcription or for processing as part of a logic flow in an application. Voice Recognition has long been considered interesting in the context of the developing world and the Digital Divide because of its potential to overcome barriers of literacy and keyboard proficiency. However it has yet to reach a stage where it can be easily deployed to mass markets in developing countries.
- Text-to-Speech – Technology which renders text into a computerised approximation of a human voice. TTS is easier to create algorithmically than its counterpart technology voice recognition and is now used in telephony applications in many languages.
- callerID – Caller Identification displays the incoming number on a phone call. Within phone networks, callerID can also by permission of the operator be alphanumeric instead of a number, allowing brand for an information service to be displayed on a call or a text message.
- Shortcode – A phone number which might be normally from 3 to 5 digits to allow information services to be more easily captured or memorised. The fewer digits a short code has, the more valuable it is. Most shortcodes are specific to a particular mobile network.
- Cell broadcast – The sending out of a text message to all mobile handsets within range of one, or a series of base towers. This is a rare broadcast use of SMS, which is more normally considered a narrowcast medium, but highly useful in emergency situations.
- GPS – Global Positioning System, like the Internet, devised by US military but now adapted to worldwide civilian use. GPS provides spatial coordinates to within millimetres, facilitating the provision of information services that are highly context-specific. GPS chips were being standardly included as of 2008 in high-end smartphones.

- Location-based services – Services which are delivered based on an awareness of the end user's geographic location.
- Smartphone – A mobile phone offering functionality beyond a traditional phone to the point where it begins to resemble a personal computer running a software operating system such as Windows CE, Linux, or Android. Smartphones include the iPhone, Blackberry and the Nokia N- series of mobile phones.
- Network latency – The lapse of time between one caller speaking and the voice carrying to the other one listening. Humans are normally considered to start to getting disoriented at latency above 1/10 of a second. Latency is a critical issue in the scaling of any voice application in scale.
- CRM – Customer Relationship Management, the process of creating information systems that automate how to handle a customer in many situations based on details from that same customer's user patterns, subscription history, location, expressed interests and many other details.
- CMS – Content Management System, software which allows people to publish information according to hierarchies and structures in their own institutions, classify that information and archive it, as well as meta-data about how it was created and the media institution itself.
- POTS – Plain Old Telephone System, the phone network as it was before mobile telephony and the Internet transformed communications systems. POTS lives on in legacy landline systems in many countries, with which mobile networks need to connect.
- AHAN – Any Handset Any Network, the distinction in mobile telephony between those services potentially available to all 3.8 billion users of mobile phones in the world, and other services which require something in addition, such as a particular network, data network or handset.
- app – the short-term for an application, or software program, written for a mobile phone. Apps have had a weak history of adoption by mobile phone users.
- Handset – the physical equipment of a mobile phone, into which a SIM card is inserted.
- ITU – International Telecommunications Union, the leading international body establishing standards of telephony and radio. The ITU was established in 1865 as the International Telegraph Union, and later absorbed into the UN structure. It is the source of many reports, data and estimates of telephony use around the world.
- GSMA – the GSM Association, is the industry association of network operator companies using the GSM standard. The GSMA represents its members on industry-wide issues such as taxation, handset standards and many areas of public policy relating to mobile phones.
- ULCH – Ultra Low Cost Handset, the drive by handset manufacturers to produce mobile phones which are buyable by the poor. In 2005, the GSMA declared an initative to make handsets widely available at under $30.

Appendix B - Country Info – Stats

a) Algeria

ALGERIA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	0	1	5	15	42	63	81
TV household (%)	79	81	83	85	86	88	90	90
2. Affordability								
Price Basket (% GNI per capita)					5	4	3	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Algeria 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*5.6 million*

b) Angola

ANGOLA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	1	1	2	5	10	14	19
TV household (%)	9	9	9	9	9	9	9	9
2. Affordability								
Price Basket (% GNI per capita)				13	10	7		
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Angola 2008

People who own a mobile but do not have a TV in their house	*from 1.5 to 1.8 million*

c) Azerbaijan

AZERBAIJAN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	5	9	10	13	17	27	39	51
TV household (%)	99	99	99	99	99	99	99	99
2. Affordability								
Price Basket (% GNI per capita)					13.3	11.6	10	
3. Texting								
Texting (millions/month)								

d) China

CHINA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	7	11	16	21	26	30	35	41
TV household (%)	86	87	87	88	88	89	89	90
2. Affordability								
Price Basket (% GNI per capita)					3.4	2.6	2	
3. Texting								
Texting (millions/month)								

e) Brazil

BRAZIL (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	13	16	20	26	36	46	53	63
TV household (%)	89	89	90	90	90	91	91	91
2. Affordability								
Price Basket (% GNI per capita)					7	7	7	
3. Texting								
Texting (millions/month)								

f) Colombia

COLOMBIA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	5	8	11	14	23	48	64	74
TV household (%)	94	93	93	92	91	91	90	91
2. Affordability								
Price Basket (% GNI per capita)					5	5	4	
3. Texting								
Texting (millions/month)								

g) Congo DRC

CONGO DR (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0.0	0.3	1.1	2.3	3.6	4.8	7.4	10.5
TV household (%)	1	1.5	2	2.5	3	3.5	4	4.5
2. Affordability								
Price Basket (% GNI per capita)					104	103	102	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Congo DR 2008

People who own a mobile but do not have a TV in their house	*From 3.3 to 3.9 million*

h) Cuba

CUBA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	1.0	0.1	0.2	0.3	0.7	1.2	1.4	1.8
TV household (%)	70	70	70	70	70	70	70	70
2. Affordability								
Price Basket (% GNI per capita)					20	21	23	
3. Texting								
Texting (millions/month)								

i) Eritrea

ERITREA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	0	0	0	0	1	1	1
TV household (%)	11	12	13	14	14	15	16	17
2. Affordability								
Price Basket (% GNI per capita)								
3. Texting								
Texting (millions/month)								

j) Ethiopia

ETHIOPIA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0.0	0.0	0.1	0.1	0.2	0.5	1.1	1.5
TV household (%)	2	2.33	2.67	3	3.33	3.67	4	4.33
2. Affordability								
Price Basket (% GNI per capita)					37	30	23	
3. Texting								
Texting (millions/month)								

k) Ghana

GHANA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	1	1	2	4	8	13	23	32
TV household (%)	22	23	23	24	25	25	26	27
2. Affordability								
Price Basket (% GNI per capita)					35	26	16	
3. Texting								
Texting (millions/month)								

l) Iraq

IRAQ (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	0	0	0	2	6	32	48
TV household (%)	?	?	?	?	?	?	?	?
2. Affordability								
Price Basket (% GNI per capita)					?	?	?	
3. Texting								
Texting (millions/month)								

m) Kazakhstan

KAZAKHSTAN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	1	4	7	9	16	36	53	82
TV household (%)	92	93	93	94	94	95	95	96
2. Affordability								
Price Basket (% GNI per capita)					6	5	4	
3. Texting								
Texting (millions/month								

BOP Mobile Reach – Kazakhstan 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*4.6 million*

n) Kyrgyzstan

KYRGYZSTAN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0.2	0.6	1.1	2.8	5.2	10.3	23.7	40.5
TV household (%)	84	84	84	85	85	86	86	87
2. Affordability								
Price Basket (% GNI per capita)					32	24	15	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Kyrgyzstan 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*240.000*

o) Lebanon

LEBANON (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	23	23	23	23	25	28	31	31
TV household (%)	92	93	93	94	95	95	96	96
2. Affordability								
Price Basket (% GNI per capita)					5	5	4	
3. Texting								
Texting (millions/month)								

p) Libya

LIBYA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	1	1	1	2	9	34	66	73
TV household (%)	?	?	?	?	?	?	?	?
2. Affordability								
Price Basket (% GNI per capita)					?	?	1	
3. Texting								
Texting (millions/month)								

q) Madagascar

MADAGASCAR (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	1	1	2	2	3	5	11
TV household (%)	7	8	8	9	9	10	10	11
2. Affordability								
Price Basket (% GNI per capita)					16	25	35	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Madagascar 2008

People who own a mobile but do not have a TV in their house	*160,000*

r) Malaysia

MALAYSIA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	22	31	37	44	57	75	75	88
TV household (%)	82	84	86	89	91	93	95	95
2. Affordability								
Price Basket (% GNI per capita)					1	1	1	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Malaysia 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*1.4 million*

s) Mexico

MEXICO (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	14	22	26	29	37	44	53	64
TV household (%)	87	88	89	90	91	92	93	94
2. Affordability								
Price Basket (% GNI per capita)					2	2	2	
3. Texting								
Texting (millions/month)								

t) Morocco

MOROCCO (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	8	17	21	25	31	41	52	64
TV household (%)	77	77	77	78	78	78	78	78
2. Affordability								
Price Basket (% GNI per capita)					13	11	9	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Morocco 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*2.6 million*

u) Peru

PERU (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	5	7	9	11	15	20	31	55
TV household (%)	67	68	68	69	70	70	71	72
2. Affordability								
Price Basket (% GNI per capita)					11	10	9	
3. Texting								
Texting (millions/month)								

v) Senegal

SENEGAL (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	3	3	5	8	11	15	25	33
TV household (%)	26	27	28	29	29	30	31	32
2. Affordability								
Price Basket (% GNI per capita)					24	20	15	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Senegal 2008

People who own a mobile but do not have a TV in their house	*up to 190,000*

w) South Africa

SOUTH AFRICA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	18	23	29	36	44	72	83	87
TV household (%)	55	56	56	57	58	58	59	60
2. Affordability								
Price Basket (% GNI per capita)					4	4	3	
3. Texting								

BOP Mobile Reach – South Africa 2008

People who own a mobile but do not have a TV in their house	*7.5 - 13.4 million*
The minimum number of phones in rural areas (if everyone in towns had them)	*12.7 million*

x) Syria

SYRIA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	1	2	7	13	15	24	34
TV household (%)	72	76	80	84	87	91	95	96
2. Affordability								
Price Basket (% GNI per capita)					50	28	8	
3. Texting								
Texting (millions/month)								

y) Tajikistan

TAJIKISTAN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0.0	0.0	0.2	0.7	2.1	4.1	4.1	4.1
TV household (%)	80	80	80	80	79	79	79	80
2. Affordability								
Price Basket (% GNI per capita)					53	62	72	
3. Texting								
Texting (millions/month)								

z) Thailand

THAILAND (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	5	12	16	35	43	48	63	80
TV household (%)	91	91	91	92	92	92	92	92
2. Affordability								
Price Basket (% GNI per capita)					3	2	2	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Thailand 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*30 million*

aa) Turkey

TURKEY (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	23.6	28.3	33.2	39.1	48.1	59.6	71.0	82.8
TV household (%)	96.0	95.3	94.7	94.0	93.3	92.7	92.0	92.7
2. Affordability								
Price Basket (% GNI per capita)	2	2	3					
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Turkey 2008

The minimum number of phones in rural areas (if everyone in towns had them)	*10.5 million*

bb) Turkmenistan

TURKMENISTAN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	0	0	0	1	2	4	16
TV household (%)	93	93	93	93	93	93	94	94
2. Affordability								
Price Basket (% GNI per capita)					18	13	7	
3. Texting								
Texting (millions/month)								

cc) Uganda

UGANDA (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	1	1	2	3	4	5	7	14
TV household (%)	4	5	6	7	8	9	10	11
2. Affordability								
Price Basket (% GNI per capita)					35	36	38	
3. Texting								
Texting (millions/month)								

BOP Mobile Reach – Uganda 2008

People who own a mobile but do not have a TV in their house	*Up to 1.3million*
The minimum number of phones in rural areas (if everyone in towns had them)	*over 500,000*

dd) Uzbekistan

UZBEKISTAN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	1	1	1	2	3	9	23
TV household (%)	93	93	93	93	93	93	93	93
2. Affordability								
Price Basket (% GNI per capita)					12	7	4	
3. Texting								
Texting (millions/month)								

ee) Yemen

YEMEN (sources: ITU, UN MDGs, World Bank ICT, UNSD)

	2000	2001	2002	2003	2004	2005	2006	2007
1. Media Reach								
Mobile ownership (%)	0	1	3	3	7	11	14	14
TV household (%)	43	43	43	43	43	43	43	44
2. Affordability								
Price Basket (% GNI per capita)					12	10	7	
3. Texting								
Texting (millions/month)								