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AFRICA REPORT

MOBILE MEDIA IN EMERGING ECONOMIES: OPPORTUNITIES AND ROADMAPS FOR AFRICA

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Introduction

THE VISION of an information-enabled globally-connected knowledge-based society is driven in large part by the smooth integration of new media (information and communication technologies or ICTs) with traditional media, coupled with technical skillsets, forward-looking government policies, an attitude of lifelong learning, and a desire to improve efficiencies and harness innovation in a humanely and environmentally sustainable manner.

This report explores connectivity and access dimensions in the information society vision in Africa by presenting a scaleable framework for comparing the maturity of different information societies as well as the progress that an individual country has made in its various national ICT initiatives. This framework is used to strengthen existing analyses of the information society and present new roadmaps for researchers and policymakers. A number of recent developments in wireless and mobile access are reviewed.

Africa "adds its own tone and tenor" to the diffusion of IT and communications services. Africa exhibits a wide diversity of telecom and broadcast environments, ranging from teledensity-poor regions to advanced info-societies in urban pockets.

For the diverse countries of Africa, focusing on the vision of the information society must occur in parallel with and buttress other socio-economic goals as well. After all, the digital divide is in part a reflection of other socio-political divides too. Overcoming the divide via means like mobile communications must therefore be concomitant to other targets such as the UN Millennium Goals regarding hunger, poverty levels, education, gender inequality, infant mortality, health services and environmental resources.

Frameworks for Analysing Mobile InfoStructure

THIS REPORT will use a comparative framework called the "8 Cs" of the mobile information society (parameters beginning with the letter C): connectivity, content, community, commerce, culture, capacity, cooperation and capital. There are two ways of looking at ICT: as an instrument, and as an industry. As an instrument, affordable and usable ICTs can indeed transform the way societies work, entertain, study, govern and live – at the individual, organizational, sector, vocational and national levels. As an industry, ICTs represent a major growing economic sector covering hardware, software, telecom/datacom and consulting services (see Table 1).

The "8 Cs" framework is used to tease apart some of the key challenges in implementing the vision of knowledge societies, such as increasing ICT diffusion and adoption in developing countries, scaling up ICT pilot projects, ensuring sustainability and viability of ICT initiatives, creating ICT industries, and systematically analysing research on the global information society. The role of local stakeholders, multilateral agencies, donor institutions and the development community is highlighted in this chapter.

Digital divide policies and projects are often included as part of wider action plans to harness ICT to benefit economies and societies. Development initiatives are often top-down and do not involve local partners and the business community. The private sector has slowly spread technology to middle income groups, but on the whole they fail to see the developing world and underserved populations as viable markets that require targeted products. Governments often tend to the short-term demands of their constituencies, but do not provide a coherent, long-term plan for prosperity and effective ICT integration, and a legal and regulatory framework that foster ICT use. All three failures need to be turned around in order to bridge the divides with practical applications of technology and sound policy-making.

Table 1: The "8 Cs" of the Mobile Information Society

	Mobile as an instrument	Mobile as an industry
Connectivity	How affordabl e and widespread are ICTs (eg. PCs, Internet access, software, mobile phones) for the common citizen?	Does the country have ICT manufacturing industries for hardware, mobile phones, software, datacom solutions and services?
Content	Is there useful content (foreign and local) for citizens to use in their daily lives?	Is content being generated in local languages and localised interfaces? Is this being accessed/used abroad?
Community	Are there onlin e/offline forums where citizens can discuss mobile media and other issues of concern?	Is the country a hub of discussion and forums for the world-wide mobile industry?
Commerce	Is there infrastructure (tech, legal) for m-commerce for citizens, businesses and government? How much commerce is transacted electronically?	Does the country have indigenous m-commerce technology and services? Are these being exported?
Capacity	Do citizens and organisations have the human resources capacity (tech, managerial, policy, legal) to effectively harness mobile communication for daily use?	Does the country have the human resources capacity (tech, managerial, policy, legal) to create and export mobile communications technologies, and set standards?
Culture	Is there a forward-looking, open, progressive culture at the level of policymakers, businesses, educators, citizens and the media in opening up access to mobile communications and harnessing them? Or is there nervousness and phobia about the cultural and political impacts of ICTs?	Are there techies, entrepreneurs and managers pro-active and savvy enough to create local mobile communications companies and take them global?
Cooperation	Is there adequate cooperation between citizens, businesses, academics, NGOs and policymakers to create a favourable climate for using mobile media?	Is there a favourable regulatory environment in the country for creating mobile companies, M&A activity, and links with the diaspora population?
Capital	Are there enough financial resources to invest in mobile infrastructure and education? What is the level of FDI?	Is there a domestic venture capital industry; are they investing abroad as well? How many international players are active in the local private equity market? Are there stock markets for public listing?

Literature Review

FROM an information society infrastructure point of view, some of the earliest accounts of the growth of computer networking worldwide come from *Quartermann* (1990) and *Aboba* (1993). Bandwidth-specific aspects of the global Internet economy are well covered by *Gilder* (2000). Within the Internet economy, the growth of specific technology markets is covered by *Blum and Litwack* (1993) for e-mail, *DiBona* (1999) for open source software, and *Kalakota* (2002) for the mobile Internet.

The role of geographical factors in regional innovation industries is well charted by *Saxenian* (1994) -- and on a global level by *Castells* (2001), who also offers a comprehensive overview of the impact of new media on global civil society, government regulation, and economic development. In addition to e-business and e-government, socio-political aspects of digital media impacts are addressed by numerous researchers: community networks by Gurstein (2000), international relations by *Perry* (1992), civil society by *Frederick* (1993), cyberculture by *Jones* (1995) as well as *Gibbs* and *Krause* (2000),

Challenges to accelerating global Internet diffusion and overcoming the digital divide are well charted in the annual reports of the UNDP and World Bank, as well as in special reports of UNCTAD, ITU, the Markle Foundation and the Digital Opportunity Task Force.

Together, these publications provide useful conceptual and implementation frameworks for charting and navigating the information society; other analyses of popular opinion and perceptions regarding ICT impacts can also be unearthed from news media coverage and the reports of development agencies.

Focusing more on the infrastructural and capacity constraints of developing nations, systematic attempts to characterise and categorise instances of ICT application in developing nations have emerged, as in the recent reports of the UNDP, Digital Opportunity Task Force, Markle Foundation, Regency Foundation and Bridges.org.

While analysing the impact and potential of ICTs by economic sector is a useful first step, it misses a crucial factor: ICTs like the Internet and mobile phones cannot be interpreted merely as digital forms of telecommunications, or as mere computers, or as media outlets. Many early well-intentioned ICT projects in developing countries failed because they were too technology-centric or stopped merely at the installation phase of computers.

The information society is not just about connectivity to the global information infrastructure, but about the content that is accessible, the communities that congregate online and offline, the embedded and emerging cultural attitudes, the commercial and other motives behind such activities, an attitude of cooperation and lifelong learning, and a capacity for creating and governing such information spaces. The information society is not just about passively using "black box" technologies, but about actively creating and shaping the underlying technical, information and service infrastructure.

Mobile in Africa

ACCORDING to ITU research, 4.1 billion people -- over half the world's population -- now use mobile phones. That's a sharp rise from the one billion reported in 2002, and represents about 60% of the world's population.

The greatest growth has been in Africa, where figures have risen from 2% to 28%. Developing

countries in general account for around 66% of all mobiles in use. Everywhere, mobiles have surged ahead, leaving landlines in the dust – figures for them have just risen from one billion to just under 1.3 billion in the last seven years.

"The spread of mobile cellular services and technologies has made great strides towards connecting the previously unconnected. Despite the economic downturn, current global ICT developments are unlikely to change drastically, given the pervasive nature of information and communication technologies," according to the ITU.

While the global economic slowdown has hit telecom firms in developed countries, Africa has so far been relatively unscathed by the crisis and consumers are still spending on cell phones while operators seek growth opportunities in new markets.

"Africa's mobile telecoms sector has enjoyed remarkable growth and despite the current global economic slowdown the continent's communications industry is expected to continue to grow faster than other developing markets," according to Apostolos Bantis, Associate Director at Fitch's European TMT Group.

Government intervention, uncertain regulatory and political regimes, and poor network infrastructure are some of the key issues that will continue to challenge most telecom players in the region.

Mobile penetration still has to reach two-thirds of the population, and the development of fixed-line telephony has remained stagnant; only about 5.5% of Africa's population has access to the Internet. Clearly, the future of Africa's telecommunications development depends heavily on fixed-mobile converged technologies, according to Fitch.

"For mobile services to be sustainable in the developing world there needs to be a viable business model behind them. Service providers need to see the economic value in providing their service, or else they won't do it," according to Ken Banks, founder of kiwanja.net, an organisation specialising in using mobile technology for development.

Investor Dynamics, International Operators

THE MAIN PLAYERS in Africa's mobile market are MTN, Vodacom, Zain, France Telecom, Orascom and Millicom, who collectively control about 70 percent of the market, according to the Fitch report. France Telecom bought a 51 percent stake in Telkom Kenya in 2007; the government of Kenya holds a 49 percent stake. European, Middle Eastern and Asian mobile service providers are competing with African players for the remaining share of the lucrative African mobile market.

In Uganda, Orange has bought the license previously held by HIT telecom. Kenya is the first market for Orange outside Francophone Africa. There are other services in Egypt (Arab) and Mauritius. Dubai-based Oger Telecom controls Cell C Ltd., South Africa's third-biggest mobile-phone operator, after Vodacom and MTN. Other investors eyeing the region include Morocco's Maroc Telecom.

Pan-African mobile service provider Zain plans to extend its footprint to 23 countries in Africa and the Middle East. Zain, through a partnership with Al Ajail Investment Fund, has acquired a 31 percent stake in the Moroccan operator Wana, the third mobile telecom operator in Morocco, in order to consolidate its share of the African mobile market.

Zain's One Network service is a borderless mobile telecom network service launched in 2006 offering communication service across borders without roaming-call surcharges,

and it does not require customers to pay for incoming calls. The One Network service is operational in many countries in Africa and the Middle East including Kenya, Malawi, Nigeria, Saudi Arabia and Sudan.

China's mobile equipment company ZTE has a 51 percent stake in a mobile-phone company in the Democratic Republic of Congo called Congo-Chine Telecom. Congo-Chine, established in 2000 between ZTE and the Congo government and launched in 2002, has 13 percent of the nation's mobile-phone market after South Africa's Vodacom Groupand Kuwait-based Zain. ZTE's customers include Ethiopian Telecommunications Corp.

China's A-Link Technologies is also producing handsets in Rwanda and Zambia. Both Zambia and Rwanda are positioning themselves to be ICT hubs in east and southern Africa, respectively, outside South Africa.

Indian government owned operator Bharat Sanchar Nigam Ltd. (BSNL) has chosen Tunisia, as its stepping-stone into Africa. BSNL is planning to bid for a mobile license in Tunisia, as the country is auctioning fixed 2G and 3G license, all rolled into one.

Tunisia is a very well penetrated market with only 8 million users. Africa was expected to have 200 million subscribers by 2010 and that figure has already been surpassed. In fact, mobile markets in many African markets are growing at more than 30% every year.

MTN wants to start operations in Angola and Ethiopia. MTN has also bought Arobase Telecom, Ivory Coast's No.2 landline operator, and Internet service provider Afnet, which offers wireless broadband technology and data services in Ivory Coast. MTN aims to increase customers by a quarter this year and is eyeing acquisitions as demand in Nigeria and Iran helps it defy a global slowdown. It has over 90 million subscribers (including 17 million in South Africa and 16 million in Nigeria) and expects to add another 22 million this year.

MTN also plans to buy 17 Musica music stores from South Africa's New Clicks and use them to sell MTN products as it expands its retail footprint. A WiMax licence and spectrum in Iran may help it win customers, and MTN aims to launch wireless Internet services this year.

Launched in 1994, the MTN Group is a multinational telecommunications group, operating in 21 countries in Africa, Asia and the Middle East. In 2008, MTN recorded around 90 million subscribers across its operations in Afghanistan, Benin, Botswana, Cameroon, Cote d'Ivoire, Cyprus, Ghana, Guinea Bissau, Guinea Republic, Iran, Liberia, Nigeria, Republic of Congo (Congo Brazzaville), Rwanda, South Africa, Sudan, Swaziland, Syria, Uganda, Yemen and Zambia. The MTN Group is also a global sponsor of the 2010 FIFA World Cup South Africa and has exclusive mobile content rights for Africa and the Middle East.

In 2008, Vodafone bought 70 percent of Ghana Telecom. Uganda has five mobile operators, the latest being Orange. Telecommunications company Econet is launching its new mobile service – called "Yu" – into the Kenyan market this year. It will compete against the France Telecom Group which launched the Orange Kenya mobile service in September 2008. France Telecom Group also owns a majority stake in Telkom Kenya, the country's fixed line operator.

National Market Shares

NIGERIA has overtaken South Africa as Africa's biggest mobile market with more than 62 million subscribers, according to the Nigerian Communications Commission. With a mobile penetration rate of just 42 percent and a population of 150 million people, the strong growth is likely to continue over the next five years and is expected to trigger more intense competition among a

growing number of network operators, according to Pyramid Research.

According to Pyramid analyst Yejide Onabule, the Nigerian telecom market grew by 23 per cent (in US dollar value) in 2008, generating $8.4 billion in overall telecom service revenue. With mobile subscriber penetration at just 42 per cent, Nigeria's total telecom revenue is expected to increase at a Compound Annual Growth Rate (CAGR) of 5.7 per cent from US$8.42 billion in 2008 to $11.14 billion in 2013.

Since liberalisation of the market in 2003, Nigeria's telecom industry has experienced exceptional growth rates, which is attracting new operators. The bulk of service revenue will continue to come from mobile, which will generate 83 per cent of total service revenue over the next five years. "With 20 million bank accounts and 140 million people, Nigeria is looking more and more attractive to telecom service providers," Onabule says.

Mobile payment is poised to drive subscription uptake in coming months, as systems increasingly become part of the country's financial infrastructure. Mobile payment firms like Tagattitude, MTN and Zain are expanding their bases across Africa.

South Africa has a vibrant mobile market that has seen rapid uptake since competition was introduced to the sector 15 years ago. With market penetration around 100% and number portability available, the three network operators - Vodacom, MTN and Cell C - are increasingly forced to find innovative ways of distinguishing themselves from the competition in order to gain and retain customers, according to industry analysts

In addition, Virgin has entered the market as a mobile virtual network operator. 3G/HSDPA mobile broadband services now rival available DSL fixed-line offerings in terms of both speed and price, and consequently subscriber numbers. While emerging as the country's leading broadband providers, both major mobile operators are also aggressively entering the fixed-line market in a rapidly converging environment. Fixed-line incumbent Telkom SA has reacted by launching its own 3G network in 2008.

Kenya's telecom market will grow by 95 percent over the next five years. While Safaricom and Zain alone ruled the market until very recently, new companies such as Econet and Orange have entered the fray.

By the end of 2008, Kenya had more than 15.0 million mobile subscribers, with a mobile penetration rate of 39 percent. The subscriber base is expected to rise to 29.28 million, or 66.7 percent penetration, by year-end 2013, predicts Pyramid analyst Dearbhla McHenry. Total revenue of Kenya's telecom market will grow by 42 percent from $1.39 billion in 2008 to $1.98 billion by 2013. Among these, 78 percent of the total revenue will be generated by the mobile sector.

According to research by Business Monitor International, mobile penetration in Uganda will reach 44% at the end of 2009 and almost 93% by the end of 2013. In Kenya and Tanzania, penetration is predicted to surpass 100% by the end of 2013.

Democratic Republic of Congo's percentage of people owning mobile phones may rise to 47 percent in 2013 from 15 percent in 2008, while the region's wireless penetration will increase to 88 percent from 48 percent.

Malawi has recently announced a third operator license. Zain Malawi is thus preparing for competition after the Malawi Communications Regulatory Authority (MACRA) awarded G-Mobile a license to operate the country's third mobile network.

Malawians are calling for more competition to ensure efficient telecommunication services. G-Mobile is expected to invest US$40 million in the next five years. The existing networks, including Zain and Telecom Network Malawi (TNM), are characterised by high

prices and drop rates, according to MACRA.

Mobile and Telecom Infrastructure

ANNUAL mobile broadband sales will more than quadruple in the next five years globally, growing from the current $24.9 billion to $137 billion in revenue in 2014, according to Ovum, a global advisory and consulting firm. More than 2 billion people would use mobile broadband by 2014, but user growth will outpace revenue growth.

By 2014, 258 million people around the world will access mobile broadband services through laptops with USB modems, data cards, or embedded mobile modules. The number of 3G and 3G+ technology users will grow from 181 million to more than 2 billion internationally.

Broadband is attracting attention in the African market, with mobile operators looking to 3G and HSPA for high-speed data services, and wireless technologies such as CDMA-WLL and WiMAX gaining momentum among ISPs.

Much of Africa's east coast is expected to get a boost in IP communications capability, thanks to SEACOM infrastructure from Tata Communications. SEACOM's cable has been laid from the edge of the South African waters to Mozambique, as well as in the Red Sea from Egypt towards the coast of Yemen – and an additional third cable from India toward Africa.

East Africa's biggest economy Kenya is set to link up with the rest of the world via broadband from June through three undersea telecoms cables. Kenya's government is fronting one fibre-optic cable worth $110 million that will link it with the United Arab Emirates.

Juniper Research predicts that by 2013, 23% of all new mobile phones globally will be smartphones, which allow Internet browsing and Skype. Global research company In-Stat forecasts more than 300-million Wi-Fi-enabled mobile phones will be sold in 2012 around the world and the number of mobile phones able to receive video content will exceed half a billion by then.

Intel is keen to roll-out its WiMax-enabled netbooks in Africa. It has sold more than three million WiMax-enabled devices in the EMEA region per quarter since it began its WiMax programme in 2007. "These devices will allow us to bridge the gap between those who are connected to the Internet and those who are not," according to Intel EMEA director of sales operations Jörg Finger.

Intel has been in talks with large telcos, such as Vodafone, Deutsche Telekom and TelefÐnica, to create PC bundles that are already prominent in Western Europe and could be emulated with local service providers in Africa.

The biggest impasse to Internet connectivity in Africa is the lag in handing out WiMax spectrum due to legislation. Intel's Finger believes Africa is poised to adopt the technology due to the fact the continent is not stuck with the legacy infrastructure which is predominant in Western Europe.

Kenya expects $5-$10 billion of foreign investment from communication technology firms by next year, according to Bitange Ndemo, permanent secretary at the Kenyan ministry of information and communication.

The number of fixed and wireless broadband connections in South Africa is expected to reach over 4.2 million subscribers, representing a compound annual growth rate (CAGR) of 32%, over the period 2008 to 2013, according to BMI-TechKnowledge.

As at December 2008, 3G HSPA subscribers accounted for 54% of total broadband connections and had overtaken ADSL connections which stood at 39%. A major wild-card in the broadband market remains the success of WiMax roll-outs. While iBurst, Neotel and Telkom already have

spectrum licences and have started rolling out, a number of other players have been given trial licences, and Icasa is expected to finalise the methodology soon in terms of which they will allocate the remaining scarce spectrum for WiMax-based services.

MTN acquired networking company Verizon SA, giving it 23 percent of South Africa's data traffic market. The company has begun the rollout of a 5,000-kilometer nationwide fiber-optic network.

SMS and data services

BASIC SMS text messaging will be a key revenue driver for mobile network operators in Africa and the Middle East over the next five years, helping to offset continuing declines in average revenue per subscriber (ARPS) for mobile voice services in the regions, according to Pyramid Research.

Peer-to-peer SMS in the region accounted for about 60 percent of total mobile data revenue in AME in 2008, and will continue to be the largest single contributor to data revenue over the forecast period.

The fast subscriber growth that operators in Africa and the Middle East are witnessing -- a 39 percent annual CAGR over the past four years and about an 8 percent annual CAGR over the next four years -- poses some serious challenges related to network efficiency and declining ARPS, notes Badii Kechiche, analyst at Pyramid Research and author of the report.

"Mobile voice ARPS has been declining at a rate of more than 10.5 percent annually over the past four years because of increasing competition and an expanding base of lower-income subscribers, pushing operators to focus on data services in order to translate subscriber growth into revenue growth," he says.

In Africa and the Middle East, SMS revenue is expected to almost double to nearly $12 billion in 2013, far exceeding the revenues of higher-end data services such as MMS or mobile broadband.

The significance of this development goes beyond the revenue opportunity coming directly from peer-to-peer SMS. Several operators have found ways to capitalize on subscribers' new familiarity with SMS to increase not only their data ARPS, but their voice ARPS, too. The growing popularity of SMS within the region will allow operators to use SMS-based value-added services, sometimes in conjunction with instant-message USSD services, to boost voice ARPS among the mass base of lower-income subscribers.

Internet firm Google Kenya has launched an SMS search service for mobile phone users via the shortcode GOOG. The service is free from Google, but carrier charges apply. Google has also entered into an agreement with Safaricom, allowing subscribers to own unique Google mail addresses linked to their mobile phone numbers, according to Joseph Mucheru, Google Kenya's Office Lead.

A report by Berg Insight, Mobile Internet 2010, shows that the largest interest for data services over mobile handsets is found in emerging markets, where undersupplied fixed infrastructure makes the portable phone a viable utility for many practical applications, not just communication but also banking, entertainment, and commerce.

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In an interesting case study, Zain announced that its subscribers raised more than $85,000 in SMS text messaging for Nelson Mandela's Foundation. The texts were sent in response to

the operator's call for mobile phone users to send birthday greetings to Nelson Mandela as he celebrated his 90th birthday. Responses came from mobile phone users in countries such as Nigeria, Kenya, Tanzania and Zambia.

Pyramid Research identified South Africa as one of the Top Ten emerging countries for mobile data revenue in a recent report, and also highlighted Uganda and Tanzania as fast-growing markets.

Mobile Banking, Payment and Financial Services

THE AFRICAN operating environment presents unique opportunities for mobile-based financial services, an optimal combination of necessity on the demand side and solid upside on the supply side, according to a recent Pyramid Research report. Payment models are driven by operators, banks, hybrid alliances or third party platform providers. The number of mobile money transfer users (especially mobile banking) in Africa will account for 11 per cent of the total mobile subscriber base by 2013, an estimated 64 million users.

Mobile banking technologies are powered by SMS, USSD (Unstructured Supplementary Service Data), WAP, Java and SIM toolkits. Players in this space include M-PESA (Kenya, Tanzania), MTN (South Africa, Nigeria), Celpay (Zambia), MoneyTextMe (Ghana), Sokotele (Kenya) and WIZZIT (South Africa).

The independent Consultative Group to Assist the Poor (CGAP), a World Bank-supported research center, has identified mobile phone banking as an important tool in Africa, Asia and Latin America. The current global financial crisis makes the need for widespread availability of safe alternatives to cash even more pressing.

Global mobile subscriptions surpassed four billion at year-end 2008 and are expected to approach six billion by 2013, making mobile services an extremely relevant platform for advertising and transactions for mass audiences.

Compliance with banking regulations and security of the networks have been cited as the major challenges in operating mobile money transfer services in regions like Africa. But given that wireless penetration in Africa could reach 50 per cent in 2012 (as predicted by firm Wireless Intelligence), the need to secure and promote the mobile platform for payments becomes an important priority.

Africa's largest mobile-phone company, MTN, has declared its intention to be the largest mobile money service provider on the continent, launching the service in 22 countries. MTN is ready to provide the service to 80 million subscribers with no access to banking services.

South Africa's MTN has launched a money transfer system for unbanked customers in Africa and the Middle East, aiming to boost subscriber loyalty and entice new users. Africa's biggest mobile operator by subscribers has signed a $9.7 million deal with Fundamo, a South Africa-based mobile banking and payment solutions group, to provide mobile banking facilities.

Only one in five African households in African has access to a bank account, according to the United Nations, but a much higher proportion have a mobile phone and many operators hope offering financial services will attract new customers.

The technology works like a mobile bank account, enabling MTN customers to make money transfers and payments. Users will also have an option to receive a branded MTN MobileMoney debit card, which can be used to withdraw money.

"We are seeing huge demand for basic financial services such as money transfer," according to Dare Okoudjou, head of MobileMoney International Development, in news reports.

MTN has already launched MobileMoney in South Africa and Uganda and has piloted the service in Cameroon, Ghana, Cote d'Ivoire and Nigeria. It is now working to deploy the service in the Middle East, including in Afghanistan and Syria. MTN expects the service to work well in Nigeria, where few of its 23.1 million customers have bank accounts. It is working with banking partners to comply with banking regulations.

In a deal worth nearly US$10 million, MTN will use Fundamo's software technology to deliver secure services. MTN Mobile Money is a SIM-based version of Fundamo's Mobile Wallet Solution version 3.1, specifically designed to meet the needs of MTN's subscriber base. The system offers ATM-level security and a PIN system that allows sensitive information to be accessed by the user.

Before the launch, MTN conducted pilot projects in Uganda, Cameroon, Ghana, Cote d'Ivoire, Nigeria, Benin, Congo Brazzaville, Guinea Bissau, Guinea Conakry and Liberia.

Fundamo has also entered into a partnership with Accenture, and expanded into other emerging markets like Brasil via a reseller licensing agreement with BSI Technologia, a Brazilian banking solutions company. The Fundamo-backed service will allow people to move real money between the mobile accounts associated with handsets (as compared to moving airtime as a form of pseudo-currency).

Another successful service is M-PESA, a mobile money transfer service in Kenya offered by Safaricom, which has drawn more than 4 million users since its launch in March 2007. Zain has also launched its mobile cash transfer service, Zap, in Kenya and Tanzania. The Bill and Melinda Gates Foundation have also announced that it was putting $12.5m into a plan to create a mobile banking service.

In some nations such as Benin, about 18% of people have a mobile but only 1% have a bank account, observes Dare Okoudjou, head of MTN's mobile money development.

In February 2009, Monitise struck a deal with E-Fulusi Africa to set up mobile banking systems in East Africa. Standard Chartered and Citibank have also revealed a mobile banking service called Zap that they hope to take to more than 100 million Africans.

Mobile banking services provider Monitise and East African organisation Made in Africa have partnered to create a joint venture called Monitise East Africa. The service will be launched initially in Uganda, followed by Rwanda, Tanzania, Burundi, the Democratic Republic of Congo, Ethiopia, Kenya and Zambia.

The venture plans to create a mobile money multi-bank and multi-operator 'ecosystem' across the region. Aimed at both the banked and unbanked, the service will enable consumers to manage their money and make payments using financial accounts. Monitise East Africa is structured as a 50/50 joint venture between Monitise and Made in Africa.

The project involves multiple banks, mobile operators and service providers. Through its partnership with mobile wallet services provider E-Fulusi Africa, Monitise will integrate its mobile money manager with E-Fulusi's services to offer the service to users in East Africa. The service allows customers to save money, deposit and withdraw cash, manage a bank account, transfer funds and also to make payments through mobile networks, banks and mobile handsets.

Monitise East Africa has been awarded USD 1.5 million by the Africa Enterprise Challenge Fund, which is part funded by the UK's Department for International Development (DFID).

Belgian wholesale voice carrier Belgacom International Carrier Services (Belgacom ICS) and provider of smart communication and payment services eServGlobal have successfully tested their joint HomeSend international mobile money transfer service between Belgium and North Africa.

Some 175 million migrants currently use remittance services, sending money to around 800 million dependent recipients, according to the GSM Association. Remittance flows have reached USD 320 billion and are estimated to reach USD 700 billion by 2012.

Uptake of mobile technology for banking services is set to hit 900 million users worldwide by 2014, according to analyst Berg Insight. The predictions indicate a compound annual growth rate of 89 per cent from the 20 million users using mobile channels in 2008, with Asia being the fastest growing market and representing about 65 per cent of users.

Mobile technology will therefore play an important role in bringing financial services to people in the Middle East and Africa who do not use bank accounts. "Mobile handsets are in an excellent position to become the primary digital channel for providers of banking and related financial services on emerging markets," according to Berg Insight telecom analyst Marcus Persson.

MTN Uganda appointed Oscillyte, a consultancy firm to define the mobile money strategy and provide the project management expertise to bring the MTN Mobile Money service to market.

M-Pesa, the Kenyan m-banking system developed by Vodafone and the carrier Safaricom, offers 4,200 locations nationwide and a network of more than 7,000 shopkeepers and other agents who take deposits and issue cash from users who authorize the transactions on their phones using a PIN code.

M-Pesa supports transfers ranging from $1.25 up to $440 to any other cellphone, starting at about 40 cents per transaction (about 45% of traditional transfer services). The company claims its 5.5 million users — one-sixth of Kenya's population — transferred more than $50 million in January 2009.

M-Pesa's success has given birth to imitators in other developing nations, too. Vodafone has launched services in Afghanistan and Tanzania, and Orange plans to roll out offerings in Cote d'Ivorie, Mali and Senegal. Macalla, an Ireland-based mobile-banking firm, last week unveiled a partnership with Saudi Telecom Co. to deploy its platform, payments engine and applications in Kuwait. And Fundamo, a South African outfit, has deployed similar services in Africa, central Asia and Latin America.

Juniper Research forecasts the average revenue opportunity for carriers, for both national and international mobile money transfers combined (based on estimated commission levels that they will be able to charge), is in excess of $5 billion by 2013

M-Pesa competes against Zain, which partnered with Citigroup and Standard Chartered, and launched services in Kenya and Tanzania. The ambitious startup aims to bring its service, dubbed Zap, to 100 million people in Africa, building on a phone-to-phone airtime credit transfer service that launched in 2005 and is now available in 22 countries in the Middle East and Africa. Zain has a couple of interesting selling points, too, with a 13-cent-per-transaction price point and the ability to pay utility bills with Zap.

Emerging economies are fast emerging as crucibles of innovation in such areas as mobile banking, mobile money transfer, and mobile education and medicine, not to mention green initiatives, according to IDC.

Case study

WHOLE PLANET Foundation and Unitus have joined forces to accelerate microfinance in Kenya. With this combined support, the Jamii Bora Trust hopes to extend its reach into small farming communities through the latest mobile technology and develop new microfinance products specifically designed for rural farmers. Using existing telephone infrastructure, Jamii Bora Trust puts handheld POS (point of sale) devices in its branches throughout Kenya, allowing the institution to register new members on-site, immediately provide members with debit cards, and

track banking transactions in real time.

Through the use of this technology Jamii Bora Trust plans to increase its reach into rural coffee communities with financial tools coffee farmers need to support their businesses. By working together, Whole Planet Foundation, Unitus and Jamii Bora Trust hope to spur the development of innovation in the field and ensure the power of microfinance reaches those who need it most.

More than 25 million small-scale family coffee farmers around the world are dependent on their crop for survival. Kenya is the 17th largest producer of coffee in the world and an estimated six million people are employed in coffee growing and production industries. Without access to credit and other financial resources to stabilize income throughout a crop cycle, coffee farmers historically find themselves facing obstacles like the fluctuating global commodities market, climate change, political trends, and widespread rural poverty. With the support of Whole Planet Foundation and Unitus, Jamii Bora Trust plans on providing life-changing financial services to nearly 80,000 microentrepreneurs and their families and intends to double its reach in the region by 2010.

"By working together, Whole Planet Foundation, Unitus and Jamii Bora Trust can help spur the development of innovation in the field and ensure the power of microfinance reaches those who need it most," according to Ed Bland, President of Unitus.

More than 2.5 billion people -- nearly half the world's population -- live on less than two dollars a day, yet only 133 million people currently have access to microfinance services. Using a highly leveraged, impact-driven model, Unitus partners with microfinance institutions around the globe to connect them to the growth capital and business tools they need.

Fueled by social entrepreneurs, the Unitus network of microfinance partners aims to close the "poverty gap" and is currently providing access to financial services including microcredit loans, savings, and insurance products to more than six million of the world's working poor. By partnering with Whole Foods Market and Whole Planet Foundation, Unitus can help partners such as Jamii Bora Trust to expand.

"By increasing people's access to credit and other financial services, we can begin to foster wealth and prosperity in the emerging economies that need it most," according to Philip Sansone, President and Executive Director of Whole Planet Foundation. "Unitus was an obvious partner to help us expand microfinance in the communities that we support. As a 'microfinance accelerator' with experience on the ground in nine countries around the globe, Unitus has an approach that is high-powered, innovative, entrepreneurial, focused and smart."

Whole Foods Market shoppers will have the opportunity to empower the poor through microcredit by donating at the registers at all U.S.-based stores during the Whole Planet Foundation Prosperity Campaign in 2009. One hundred percent of contributions will go to microlending projects in Africa, Asia, Latin America and the US (www.wholeplanetfoundation.org).

Unitus, an international nonprofit organization, works to reduce global poverty by increasing access to microfinance services. The Unitus portfolio currently reaches more than 6 million families through 23 partners in India and Southeast Asia, East Africa, Mexico, and South America. Its goal is to reach more than 15 million of the world's working poor by 2010. Unitus received Fast Company magazine's Social Capitalist award for 2006, 2007, and 2008, and were awarded the 4-star rating for sound fiscal management from Charity Navigator in 2007 and 2008. Unitus is a 501(c)3 with offices in Seattle, Washington and Bangalore, India.

Jamii Bora Trust is a microlending organization headquartered in Nairobi, Kenya. It operates more than 100 branches across the country to reach its members with financial and social products and services. Jamii Bora Trust is one of the fastest growing microfinance institutions in

Kenya and plans to reach a half million people by the end of 2009.

In sum, microfinance is known by a range of names in Africa countries like Ghana (susu), Cameroon (tontines or chilembe) and South Africa (stokfel), and is receiving a significant boost via mobile platforms. Mobile technology is today showcasing African grassroots innovation at its finest, according to Ken Banks of kiwanja.net.

According to CGAP, mobiles phone in Africa are taking on the roles of virtual bank cards, POS terminals, ATMs and Internet banking terminals. Banks can leverage mobile payment channels to increase market penetration, sell more services to existing customers, retain the most valuable customers, and reduce cost of service provision. Mobile channels are thus becoming an important avenue for transformational branchless banking in Africa.

CGAP is supporting WIZZIT Bank to deliver banking services to poor people in South Africa's small towns and rural areas. WIZZIT is a division of the South African Bank of Athens. "Access to a bank account empowers poor people, giving them the security of not having to carry cash and the ability to store money safely for future use," according to Elizabeth Littlefield, CEO of CGAP.

The project's three key components use point-of-sale devices in combination with WIZZIT's mobile phone banking platform: a mobile banking payment service for the major wholesalers serving more than 500 microentrepreneurs (spaza shops) in the township of Motherwell, where three in five people are unbanked; a pilot program for easy account opening and preferred pricing at Dunns outlets -- a leading South African clothing retailer; and easy account opening using a direct sales model and the South African Post Office for distribution.

Mobile banking services in Africa will continue to evolve and differ from one another based on parameters such as geographic footprint, inter-operator compatibility, account-to-account transactions, inter-bank services, membership in card networks, usage with ATMs, and locations for depositing cash.

Mobile Healthcare in Africa

MARYLAND-BASED communications firm Danya International has used mobile video-enabled phones in meeting the requirements for monitoring medication adherence by tuberculosis (TB) patients during the 3rd East African Health and Scientific Conference. The Mobile Direct Observation Treatment (MDOT) Pilot Project received high positive ratings from the patients and health care workers who participated.

"Mobile phone technology offers opportunities to expand and enhance medical treatment where direct observation of patients is required," according to Danya CEO Jeffrey Hoffman.

The MDOT Pilot Project follows the experiences of 13 TB patients, their patient assistants, and health care workers over a 30-day period in Nairobi, Kenya. Patients were provided a mobile phone capable of sending and receiving video and text messages. Patients and their assistants video-captured the patient taking their prescribed dose of TB medication in their home and immediately transmitted it to a central database where health care workers viewed the video to assure compliance with the DOT protocol.

Patients also received health messages in video and text formats on their mobile phones. At the end of one month, the participants completed a brief questionnaire on their experiences. Participants expressed satisfaction with the procedures and the use of the mobile phone technology for remote medication monitoring, health education, and communication.

Other partners who supported the MDOT Pilot Project were Safaricom, Nokia Siemens Networks

and EPOS Health Consultants.

Project Masiluleke, a mobile health project in South Africa, is using cell phone text messages to reach people in even the most remote areas of the country to encourage them to get information and counseling on HIV/AIDS.

The project delivers about 1 million HIV/AIDS and tuberculosis texts each day to personal cell phones providing the number for the national AIDS helpline along with messages like: "Frequently sick, tired, losing weight and scared that you might be HIV positive? Please call AIDS Helpline."

Since the program began in fall of 2008, the messages have increased calls to the center from about 1,000 a day to between 3,000 and 4,000 a day, according to Gustav Praekelt of the Praekelt Foundation, which designed the technology behind the project.

"Increasingly in Africa we find that the mobile phone is the prime resource for finding information," according to Praekelt. "I think people often underestimate the penetration of these devices in Africa and what a difference it makes to a lot of people's lives."

Callers to the national helpline can ask questions about HIV, get information about where to get tested and receive counseling.

The project takes advantage of a popular form of texting across Africa, called a "please call me" message, that can be sent for free from a phone even if it is out of pre-paid minutes. The empty characters on the free text are used to convey the health message.

Future phases of the project will allow users to text health questions, if they prefer not to call the line, and will provide an internet portal of information accessible by cell phone for people to learn about HIV. The ultimate goal, says the group, would be to provide free home HIV testing kits that would be supported by mobile counseling, so that people who aren't willing to visit a clinic can find out their status.

Zinny Thabethe, an HIV positive South African and co-founder of the HIV/AIDS education organization iTeach, helped create the program for Project Masiluleke. She said opening a dialogue about HIV/AIDS is so important because the stigma surrounding HIV/AIDS in South Africa is still very strong.

An estimated 18 percent of South Africans between the ages of 15 and 49 are HIV positive, according to the World Health Organization.

"Because [the helpline] is confidential and anonymous they can phone in and talk to someone who doesn't know them, who is in another province, who can help them with their questions and they can be able to be honest," according to Thabethe. South Africa has 13 official languages, and the project sends messages in the major vernaculars.

Aside from initiatives for health outreach and education like Project Masiluleke, there are also pilot programs around the world working on monitoring patients and reminding them to take medications, using mobile technology to quickly collect data about outbreaks so that proper medical response can be deployed faster, and using mobile technology to connect health workers with the training and support they need.

In a world first in HIV education, Metropolitan Life one of South Africa's largest insurance companies has partnered with CellBook to present an information booklet on HIV and AIDS which can be downloaded onto a cellphone. Called "B the Future," the social initiative can potentially reach over 30 million mobile phone users.

"We want to educate South Africans to know their status and take personal responsibility for managing their health," says actuary Nathea Nicolay, Metropolitan AIDS Risk Consulting Manager. "If we are going to beat this epidemic, we need a widespread behaviour change. B the Future aims to educate people on how to live positively and also to prevent new infections."

In order to ensure that the information is accessible to everyone, not just those with the latest cellphones, the information has been compressed to below 300 kb so that the entire book can be easily and quickly sent in a single transaction to a mobile phone.

"At only R1 per SMS, it is affordable and takes less time than it would to download a ringtone. SMS the word HIV to 32907 and you'll get back everything you need to know about HIV and AIDS," explains Bertus Preller, Marketing Executive for CellBook.

Claire Thwaites, who heads the U.N. Foundation's work on mHealth, said the mobile phone technology is already in the hands of 64 percent of people in the developing world, and that number continues to grow.

By 2012, 50 percent of all individuals in remote areas of the world are expected to have mobile phones. But the field of mhealth technology needs to be strengthened by rigorous data collection about results before programs can be expanded.

Mobiles and social inclusion

MOBILE PHONES have been distributed to cooperative women's farming groups in different agro-ecological zones in Maseru district, western Lesotho, by the Regional Hunger and Vulnerability Programme (RHVP), which builds evidence to help policy-makers working on food security and social protection.

"The phone has transformed the women farmers' lives completely - they are able to market their produce, access information on prices, and it has made them so confident," according to Gladys Faku, national chairman of the Participatory Ecological Land Use Management (PELUM), a network of NGOs and civil society groups working with small-scale farmers in East, Central and Southern Africa.

RHVP ran the project as part of a pilot programme to see how vulnerable people benefit from cellphones, to disprove arguments against the use of mobile phones for cash transfers, and to prove that illiterate people are able to embrace technology.

"The pilot also took a step further to prove that not only are illiterate people able to handle technology, but also benefit from improved communications, both in terms of their farming activities and the reduced time and cost of staying in touch with each other," said Katharine Vincent of RHVP.

The women managed to use the mobile phones as a tool to generate income by selling airtime on their phones, and extended their mobile network by using the money from selling airtime to purchase more phones. One of the groups also used the money to buy piglets, which were sold to generate more money.

Saving in time and travel costs have also been realised in mountainous Lesotho, which has enormous distances and a poor public transport system. In Maseru district in western Lesotho, the distance between cooperative groups can be up to 200km - a 16-hour round trip by taxi costing about $13, with an overnight stay.

However, Richard Heeks, director of Manchester University's Centre for Development, cautions: "We talked a few years back about the 'digital divide', now we are recognising the mobile divide."

In a study of a group of workers in Nigeria's informal cloth-weaving sector, it was found that weavers without a mobile were forced to go on costly and sometimes dangerous journeys, making it increasingly hard to obtain orders.

Along with the contribution mobiles can make to securing livelihoods, they are also important

in reducing the vulnerabilities that people face as a result of lack of information and isolation, according to Abi Jagun from Strathclyde University's Department of Management Science.

Policy, Regulations and Taxation

AFRICA has a range of mobile connectivity options, and over 30 CDMA operators as well. The obtaining of universal service licenses is a challenge facing CDMA2000 rollout in Africa, according to Director, African Government Affairs for Qualcomm, Elizabeth Migwalla.

In some countries, regulators such as the Nigerian Communications Commission (NCC) have helped in opening the market through the Unified License it granted Private Telecommunication Operators (PTOs) like Starcomms, Multilinks-Telcom and Visafone.

According to a study: Taxation and the Growth of Mobile in East Africa, carried out by Deloitte and Touche, a global financial services firm, for the GSMA, Uganda levies the highest excise tax on telecommunication services and products like airtime. In comparison, Uganda's neighboring countries Kenya and Tanzania charge 10 per cent, while Rwanda charges a paltry three per cent as excise tax.

The report suggests that Uganda, Kenya, and Tanzania should harmonise their excise tax requirements to match the low rate that Rwanda levies on mobile phone usage.

"By lowering the excise duty on mobile services, governments can expect higher levels of tax and extend the essential mobile franchise to poorer sections of society," advises GSMA Senior Vice President Gabriel Solomon.

In addition, the report predicts that more East Africans would embrace more mobile phone usage at lower costs and telecom companies would become more profitable immediately.

The positive impact on the economies was realised as a result of increased investment in the sector which resulted into more jobs for East Africans. The report cites that the industry generated about 150,000 full time jobs in Uganda, about 230,000 in Kenya and 70,000 in Rwanda.

For Uganda, statistics from the ICT ministry indicate that mobile subscribers now top eight million representing a penetration of 24 per cent of the 30 million Ugandans. Following heavy investment into the sector, population coverage is also estimated at 97 per cent yet the number of mobile connections in Uganda out numbers fixed lines by about 30 to one.

Startups and Innovation

THE MOBILE ECOSYSTEM continues to grow around the world thanks to a steady infusion of startups and entrepreneurs, with heavy investment by the major vendors as well. For instance, Nokia has announced it would funnel an additional $70 million into the startup Obopay in exchange for a minority stake in the company.

1. In Africa, cellphone entrepreneur Nathan Eagle from MIT hopes to enlist cellphone users in developing countries to perform small text-based tasks in return for micro-payments. If successful, Txteagle could provide an important source of income to rural and low-income populations.

Safari Com in Kenya has a well-developed payment system called MPesa that can be used to pay for a taxi or water from a remote village's well. Electricity is sold on a pay-as-you-go basis in Kenya, and a startup there lets people buy prepaid cards and authorise them using their phone.

Thirty percent of the population now pays that way, instead of standing in line.

Kenyans in the trial — security guards, taxi drivers and high school students — have already translated more than 15 local languages into English for Nokia, which will use the results to make phone menus. Eagle has also got partnerships lined up to deploy Txteagle in the Dominican Republic and Rwanda. The real challenge will be in finding work that can be broken into little chunks. Cheap airtime would let Txteagle tap into the medical transcription market.

2. Thabo Olivier, a South African linguistics expert, has developed a mobile phone application that allows users to quickly learn basic communication phrases in different languages. A user can type a range of phrases to ask for help, get directions, order from restaurants and ask almost any other tourism related question, and get the target language translation in both text and audio form.

Currently there are multiple language modules available, including French, Portuguese, Swahili, Arabic, and all eleven of South Africa's official languages. Olivier sees particular application of the translation software for the upcoming FIFA 2010 World Cup, as it would enable travelers to South Africa to communicate without speaking a South African language or making use of a translator.

Cape Town based development company Fusion Technologies has partnered with Mr Olivier to develop the application, bringing the technical capabilities to quickly add additional language modules to the software as is required.

Awards and policies

RESEARCH AND ANALYSIS firms and IT giants regularly hold innovation competitions in Africa and fund entrepreneurs. For instance, Frost & Sullivan had its inaugural African Excellence Awards competition to celebrate the positive impact that innovative products and services are making across a range of markets, including energy, healthcare, ICT and industrial automation. The Frost & Sullivan Best Practices Awards Programme is a leading platform for recognising both international and local companies active on the continent. Mobilitrix, a leading South African mobile solutions provider, won a recent award of this nature.

According to an assessment conducted in Rwanda by the Ministry of Trade and Industry (MINICOM) in order to design the country's first Industrial Master Plan, it was lamented that more than fifty per cent of Rwandan Micro, Small and Medium Enterprises (MSMEs) in the manufacturing sector duplicate products instead of innovating new ones – thus calling for a spur in innovation programmes.

The World Economic Forum announced 34 technology pioneers in 2009, for which it received more than 320 applications from around the world that were evaluated by 44 global technology experts. African countries Ghana and Nigeria were selected for the first time ever.

South Africa has launched a South African Innovation Fund. The Technology Innovation Agency Bill has been signed into law by President Kgalema Motlanthe, making way for the establishment of an agency to help stimulate scientific innovation in the country, the Department of Science and Technology (DST) said. South Africa would now establish the Technology Innovation Agency (TIA), a public entity aimed at bridging the innovation gap between the local knowledge base and productive economy.

The Annual African ICT Achievers Awards, recognising contributions to the ICT industry, were held recently. The awards – organised by ForgeAhead, in partnership with the Department of

Communications, the State IT Agency and EOH – recognise companies and individuals who have had a significant impact on the ICT industry in Africa.

Speaking at the awards ceremony, ForgeAhead MD Jane Mosebi called for increased collaboration across the continent, saying: "We need more collaboration in innovation to inspire youth and enhance the quality of life of people. Economic growth rates in Africa haven't reached global standards. We need to look towards creating a knowledge economy and become producers of ICT. We need to integrate ICT into early education and connect schools to a broadband network and maintain those structures."

Winners in the organisation categories included IBM Africa, which won both the top ICT company in Africa and the top company in Africa to work for awards; Netsurit, winner of the top ICT SMME; Intergr8 IT, which was named the most innovative ICT company; Computers for Schools Kenya, winner of the top civil society/NGO; and the Department of the Premier of the Western Cape, which received the award for the top ICT innovation project in Africa.

Newly appointed CTO of IBM Clifford Foster has also announced that he will focus on driving innovation through its African Innovation Centre (AIC) and partnerships with universities across Africa. "My external focus for 2009 will be on driving the AIC concept further into Africa. This is not a South African-centric statement; IBM will be tapping into innovation wherever it happens, foster its growth and turn these ideas into key business concepts," he explained.

Another key project Foster will drive in 2009 is the creation of "speed teams" in universities across the country. This concept will see students – partnered by an experienced professional – devise an innovative concept and create a program to manage and implement their concept. The project will be unveiled mid-year 2009, says Foster.

Overcoming Gaps in Africa

The digital divide in the developing countries of Africa is most evident at the phase of connectivity, i.e. lack of affordable access to PCs, Internet devices, modems, telephone lines, mobile phones and Internet connections. A key challenge lies in creating a level playing field between government-owned and private sector operators (in terms of operating licenses, tariffs, cross-subsidies, and setting up international gateways). Special concerns arise in cross-country wiring for regions with mountainous terrain, large arid tracts, or with a high density of island space. Interesting developments to track on this front include the increasing feasibility of wireless access, ranging from cellular telephony and wireless in the local loop (WLL) to WiFi/WiMax networks and satellite links for voice and data traffic.

The digital divide between nations arises not just in number and density of Internet service providers (ISPs), mobile subscribers, hosts connected to the Net, proportion of individual users online, Internet diffusion ratios, and number of organisations with leased line connections.

Emerging economies in Africa need to increase activity along each of these seven dimensions in order to help reduce the content gap. News media, public health services, government-citizen resources, NGOs, SMEs, and emergency relief organisations need to make more content and services available online. It is important for developing countries, especially in content and online service domains like education and healthcare, to not just access content from overseas but also generate high-quality digital content locally.

On the creativity and usability fronts, numerous design considerations also need to be taken into account, such as timestamping of sites, frequency of updates, interactivity of services, response

time to email/SMS/IM feedback, back-end integration of workflow, payment/logistics gateways, indexing and search services, and offline help mechanisms (thus seamlessly weaving Internet, Intranet and Extranet sites on the wider and mobile Web).

For developing nations, the extent of community stretches beyond local borders to the global diaspora population; indeed, Asian countries are great examples where involvement from the diaspora community has helped bootstrap and globalise the domestic ICT industries.

No single sector, particularly in LDCs can take on the Internet and mobile economy by itself; much cooperation at the national level is needed to overcome the sectoral gaps between government, academia, private sector, civil society, and international organisations. This should happen at the state/provincial, national and regional levels; it can also extend to groupings based on culture or language.

A better characterisation would perhaps be the term "coopetition," where traditional competitors team up to a certain degree to grow the entire mobile pie instead of fighting over small slices. Activities like forming mobile advertising bureaus, national cellular industry associations, chapters of the Internet Society and other public-private partnerships fall in this category.

The role of government should include creation of open investment climates for incubation, launch, acceleration and IPO phases of mobile start-ups. The government need not spend excessive funds on incubation projects of its own; it should create conditions and safeguards conducive for the movement of domestic and international capital into new media companies.

Domestic venture capital funds and skills must be promoted, otherwise the "capital gap" in many emerging economies may lead to an excessive and unhealthy dependence on the umbilical cord of high-technology exchanges in the West.

As for capital investments in software, use of freeware and shareware packages and tools should be encouraged where possible, instead of relying on costly proprietary software solutions, such as in the use of the Linux operating system and Apache Web server for digital publishing. Such a focus on sustainability based on economics as well as social models, access as well as content, and technology as well as people, will enable these ICT access points in Africa to evolve from beyond technology showpieces to fully-integrated local knowledge centres.

Emerging ICTs and Access in Africa

ACCORDING to the Global Information Technology Report for 2007-2008 published by the Geneva-based World Economic Forum (WEF), developed countries are striding rapidly ahead with an increased recognition of connectivity as a key component of public infrastructure in general.

Fortunately many developing countries are also now adopting next generation technologies such as WiFi and WiMAX to boost connectivity and leapfrog past technologies dependent on copper wires. WiMax has been promoted as the answer to last-mile connectivity issues, which have hampered Internet take-up in many LDCs.

"We believe that wireless broadband is the most affordable way for the people in the Philippines to be able to receive reliable, high-speed Internet connectivity. We live in a country that makes fiber and wired alternatives cost prohibitive to deploy," according to Rene Dos Remedios, president of Meridian Telekoms, a subsidiary of SMART Communications that is focused on the Broadband Wireless Access (BWA) service.

According to ITU findings, the majority of broadband Internet subscribers worldwide are

in the developed world. The Internet in the developed countries is approaching the status of a mainstream medium, but has a long way to go in attaining similar levels of penetration in developing countries. Still, some of the applications and benefits of the information society are becoming evident in developing countries as well.

Improving teledensity in Africa requires allocation of spectrum for wireless broadband via technologies like WiMax on a priority basis. In some countries, bidding has been used for awarding contracts for passive infrastructure (towers) as well as active infrastructure (for electronics and running the services). Mobile operators and ISPs are beginning to share infrastructure to keep costs down.

On the WiMax front, the governments in some developing countries are planning to set up a national working group consisting of all stakeholders — government, service providers, equipment manufacturers and test equipment suppliers. The group will formulate strategy for active participation in the global WiMax Forum.

Handset cost will continue to be a barrier in Africa, and it is key to break the psychological "$10 barrier" for affordability. Mobile telephony operators are going deep into Africa with bundled offers of connection and handsets. The only way to penetrate those regions is by ensuring affordability.

Key to growing rural mobile access is not just creating networks and making handsets available, but also providing a wide range of applications such as news, commercial content, and transactional services. Other strategies include providing local content in various languages, and creating simpler tariff plans.

Regional Comparison: Digital and Broadband Divides

THE GROWTH of Internet users in the Africa is gaining momentum as emerging markets leverage mobile phones as a new and widely available form of access. However mature markets have further widened the digital gap with the deployment of high-speed broadband services, according to the ITU Asia Pacific Telecommunication/ICT Indicators 2008 report (http://www.commsday.com/node/258).

Broadband and Internet access in Africa is currently characterized by two distinct scenarios. In upper-middle and high-income pockets, ubiquitous access is progressing through a competitive race to provide ever faster fixed broadband speeds and the deployment of mobile broadband technologies at ever lower prices. At the other extreme, in most of the region's low and lower-middle-income economies, mobile phones have become a substitute for the shortage of fixed lines and fixed broadband access.

In the region's low and lower-middle-income economies, fixed broadband Internet access is very limited beyond the main urban centres and broadband subscriber penetration is low or negligible.

A similar divide exists in the speed that is available for broadband services between the two sets of economies. Mobile phones are being used to access the Internet among developing countries with less developed fixed infrastructure. Land-locked nations have limited access to international fibre connectivity, which is exacerbated by a lack of competition in the international gateway market.

High import duties and obstacles to deploying used computers are hindering efforts to increase access to mobile phones in many least developed countries.

Emerging ICTs like wireless media can play an important role here, eg. WiFi, roaming GSM networks, VSATs, WLL, Worldspace. At the same time, efforts should be taken to overlap

government initiatives on the ICT infrastructure front – infrastructure should not be wastefully duplicated. Government departments (e. telecom, education, agriculture) should talk to one another to synergise ICT and content initiatives for rural areas. Open source platforms and tools should be actively embraced.

Care should be taken to avoid the "IT first" or "IT only" traps, and connectivity initiatives should be coupled with content and services. In designing connectivity infrastructure and services, adequate attention needs to be paid to back-end integration of processes and tools, and not just pretty front-ends.

Creativity will be needed in devising a range of user-friendly ICT tools for village users, including community radio (eg. cable audio, handhelds), individual info-kiosks, and networked PCs. Solutions like solar energy can be used to address problems related to lack of electricity.

This will require a very serious focus on and commitment to high-quality ICT infrastructure by governments and private sector players. Policy considerations will have to include multiplier effects of this infrastructure for the whole economy.

Needs assessment of information and knowledge requirements and aspirations in rural communities should be at the heart of any rural ICT4D initiative. Needs assessment needs to done repeatedly throughout the evolution of the ICT4D project and not just at the time prior to launch.

Issues related to design of the user interface, information architecture, language of presentation and communication of the information via alternative media should occupy a key position. Rural users should be allowed to not just access but create content as well. Digitisation of crucial content (eg. government services) should occupy priority. Portal templates for content and services can be successfully leveraged, but proper evaluation of these portals and their usability is called for.

In terms of educational content, child-centric rural animation and multimedia games can play a useful role in easing early fears about new media, but care should be taken to avoid excessive obsession with idle gaming and entertainment.

Numerous examples exist of information services successfully delivered to a variety of communities: agricultural (eg. sugarcane growth patterns, soil health, vermiculture, horticultural crops, crop rotation, gap between paddy rows, afforestation, rainfall patterns, pest calendars), fishing (eg. weather patterns) and livestock (veterinary information).

Mobile media can play a potentially significant role for providing rural women with health content regarding sexual health information, particularly in conservative communities. Local forums are needed to air out the concerns and issues faced by communities and stakeholders on the mobile front, and to tackle possible political obstacles that may arise. Online forums play an important role in networking local communities with key professionals like healthcare workers. National online forums can take these discussions and best practices to communities of interest across each country, and global forums can facilitate valuable south-south exchanges. Local forums structured in formats like Mobile Monday can play an important role here.

Due to poor infrastructure of payment and online trust, hybrid models of payment (eg. pre-paid accounts, cash on delivery, mobile commerce) may be necessary to facilitate e-commerce in rural areas.

In addition to access and content, rural ICT4D initiatives must focus on human resources capacity-building in rural communities on multiple fronts: technology, management, strategy, user research, business models, security, digital publishing, information services design, metrics, project management, content management, creativity, and community dynamics. Depth-oriented capacities (eg. research, knowledge frontiers) and breadth-oriented capacities (eg. scaling up

infrastructure) need be developed in tandem.

A forward-looking, open, progressive culture is needed at the level of policymakers, businesses, educators, citizens and the media in opening up mobile media channels and harnessing them. This can call for innovative strategies and persistent efforts in change management.

Mobile media carry with them an associated culture with significant departure from previous technology trends, and it is important to be develop new holistic perspectives to understand how to leverage such channels. Care should be taken to avoid a "tech only" or "quick fix" approach to ICT4D; development considerations and long-term goals should be accorded first priority.

Stakeholders in ICT4D tend to come from different backgrounds: technology, civil society, academia, government and the private sector. Each of these tend to have strong cultures of their own, which need to be aligned and synergised for full effect. For-private-profit and for-public-good cultures need to be balanced as well.

Cultural values like social responsibility, accountability, transparency and altruism need to be promoted among ICT4D stakeholders. A culture of decision-making based on field research, evidence and long-term social gains should be sustained, rather than short-term personality-driven projects. It is important to have a culture of sensitivity as well towards the concerns and plight of the most marginalised communities so that they are also included in the fruits of progress, rather than addressing only the concerns of more privileged communities.

It is almost impossible for only a single sector to take on the entire gamut of mobile media: cooperation is therefore needed between citizens, businesses, academics, NGOs and policymakers to create a favourable climate for using ICTs in rural areas.

The ability to partner and form alliances should be built into most ICT4D initiatives. This skill is so important that an entire section of this report is devoted to alliancing.

One of the key challenges to ICT4D has been lack of significant investment. There is also a paucity of research on working models, business plans, sustainability strategies and return on investment on village information centre models. Policymakers have tended to invest more in basic social needs rather than ICT4D initiatives, failing to make the connection between the two. Finding low cost ICTs and shared access models will continue to be a key concern for many in the ICT4D movement. Mechanisms to promote and coordinate donations for ICT4D should be encouraged.

With adequate vision, planning and networking, the countries of Africa can effectively harness ICTs like mobile media for development and participate in the global economy while also boosting local strengths in education, culture and human resources.

Regulatory Obstacles

Some African countries have needlessly capped the number of private wireless operators. Key issues need to be addressed to ensure a level playing field for all stakeholders. How will VoIP services be legalised, supported and promoted? How exactly is the mobile regulatory body going to function? How long will arbitrations and disputes take to get resolved? How will ISP associations and mobile operator associations function to serve the broader societal interests? How mature are consumer advocacy organisations in the region to lobby for better and fairer pricing regimes for the citizens?

How can m-commerce fundamentals be protected? These include consumer protection, online payment systems, digital certification authorities, movement of money across borders, and

relaxation of regulations on purchase of software, information, and other services.

African operators need to seriously look at ease of installation and rapid scaleability of their infrastructure to accommodate diverse and divergent subscriber bases. Performance reliability and service level agreements of a number of operators have a long way to go to match levels in more advanced economies.

For most of the developing nations of Africa, wireless technologies can play a key role in providing telecom connectivity. But the multiplicity of technologies and standards as well as their rapid pace of evolution can pose challenges to policymakers in terms of investing in sustainable and state-of-the art infrastructure.

In the interests of fair competition, it is recommended that a distinction be made between wholesale and retail mobile access services, and that government telcos with a monopoly in one area of access services (eg. phone lines, international gateways) should not use this to wipe out or threaten players in another sector (eg. dialup Internet access).

Mobile Monday: Africa Advantage

Much of the discussion on mobile advantages in Africa needs to take place in local forums, with appropriate channels of bringing in international inputs and also taking local innovations global. A combination of online and offline forums is needed, an area in which the global Mobile Monday network excels.

Founded in 2000 in Helsinki, the network now has a presence in over 60 cities around the world, in every continent – with Africa being planned by the end of 2009. Its key focus is on knowledge sharing in mobile innovation (new startups, emerging opportunities, investor dynamics), community building (strategy recommendations for private and public sector players, governance models) and cross-sector lessons for other industry categories and clusters, including policymakers and national innovation councils. Key stakeholders include chapter founders, heads, developers, members; industry leaders; sponsors; NGOs; and policymakers.

The monthly gatherings are useful places to gather and disseminate market stats om penetration, operator dynamics, device players, content market, communities, mobile marketing, m-commerce, startups, VCs, industry lobbies, regulatory issues, industry events, and media (print/online).

Conclusion

The UNDP's Human Development Index, the ITU's telecommunications indicators, the e-Readiness Index, the market research reports of Gartner and IDC, and the e-government index of UNPAN are useful combinations of qualitative and quantitative lenses with which the information society can be viewed. Measures of the digital divide in developing nations exist in number and cost (absolute and relative) of PCs, phones, Internet hosts, Web sites, Internet users, residential/organizational/international Internet bandwidth, technical capacity, and advanced applications like e-commerce.

The "8 Cs" framework can be used not only to analyse ICT initiatives within a sector, community or country, but also to compare and categorise different information societies. Based on a combination of the "instrument" and "industry" aspects of parameters like connectivity, content, capacity and culture, the countries of the world can be divided into eight categories: restrictive,

embryonic, emerging, negotiating, intermediate, mature, advanced, and agenda-setting. ICT diffusion for the populace, strength of online content and cultural sectors, and the projection of domestic ICT industries progressively increase along the spectrum, as does openness of political expression (see Table 4).

Table 4: Classification of Information Societies based on the "8 Cs" framework

Type	Characteristics
Restrictive	1. ICT infrastructure is very limited
	2. ICT usage is tightly controlled by government
	3. Awareness of ICT among general population is very low
Embryonic	1. ICT infrastructure is just being rolled out
	2. Donor agencies are active in funding and providing human resources
	3. Most ICT activity is driven by diaspora, NGOs
Emerging	1. Internet infrastructure exists in urban areas
	2. Local capacities exist for ICTs, policy bodies are being formed
	3. Widespread digital divide exists, e-commerce is not yet widely prevalent
Negotiating	1. Widespread Internet/wireless infrastructure exists
	2. Local capacities and markets exist for ICTs, e-commerce
	3. Government is "negotiating" benefits and challenges of new media; authorities exercise strong control over online content, search engines; political and cultural censorship of Internet is practised
Intermediate	1. Sizeable markets for Internet, e-commerce, wireless exist
	2. Digital divide is still an issue, donor agencies are active
	3. Political climate is generally free of censorship for traditional and online media
Mature	1. Large-scale penetration of Internet, wireless
	2. Mature business models for online content
	3. Political climate is generally free of censorship for traditional and online media
Advanced	1. Large-scale penetration of broadband and wireless Internet (including 2.5G, 3G)
	2. Political climate is generally free of censorship for traditional and online media
	3. Some ICT companies are major players in global markets; wireless content models are being exported

Despite recent turbulence in the so-called "new economy", it is undeniable that ICTs like the Net and mobile phones have transformed businesses and markets, revolutionized learning and knowledge-sharing, generated global information flows, empowered citizens and communities in new ways that redefine governance, and created significant wealth and economic growth in many countries.

The challenge for developing nations is to move at least to the "mature" stage on this spectrum. The goal should be to not just be able to tap the world's pool of collective knowledge, but contribute actively in increasing the pool in the Information Age.

Other associated infrastructure -- like reliable sources of electricity -- should also be ensured. Where necessary, access discounts and tax breaks should be given on a priority basis to needy sectors like education and healthcare.

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About Mobile Monday

MOBILE MONDAY (www.mobilemonday.net) is a global community of mobile industry visionaries, developers and influentials fostering cooperation and cross-border business development through virtual and live networking events to share ideas, best practices and trends from global markets.

Mobile Monday is organised by a group of dedicated volunteers from around the world. Originating in Helsinki, Finland, in the year 2000, Mobile Monday has grown into the world's leading mobile community. It is present in locations ranging from Tokyo and Silicon Valley to Bangalore and Caracas. Mobile Monday is now the world's leading mobile community.