



MOBILE
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Mobile Africa Report 2012

Sustainable Innovation Ecosystems

by

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Overview

This report, the fourth annual Mobile Africa report produced by MobileMonday and released at the annual Innovation Africa Digital Summit, addresses the growing strength of mobile innovation practices in Africa. The material is drawn from interviews with over two dozen digital media experts as well as extensive research from news and market reports.

The focus of the Mobile Africa report this time is on the overall innovation ecosystem, which includes a range of stakeholders: industry, entrepreneurs, government, academia, civil society, donors and multilateral organisations. The report also addresses the crucial role of innovator networks and incubators.

Sustainability of the innovation ecosystem requires the right blend of bottom up entrepreneurial energy and top-down facilitation of investment policies and infrastructure. These roles are played by global+local networks of mobile startups and professionals, such as MobileMonday. They are also augmented by industry-government-academic incubator networks such as the infoDev m:Labs.

The report identifies best practices and emerging directions for mobile innovation in Africa, and highlights the increasing profile of award winners from Africa in mobile excellence competitions in the region and globally. Overall shifts in the mobile industry are tracked in areas ranging from connectivity options and apps to operator dynamics and political impacts. The report ends with in-depth analysis of the emerging opportunities, challenges and recommendations for ensuring the growth of the mobile industry in Africa in a sustainable and inclusive manner.

The questionnaire and analysis used in this report is based on the author's "8 Cs" framework of digital media, ie. the components of a digital ecosystem include connectivity, content, community, capacity, culture, cooperation, commerce and capital. In other words, holistic analysis of digital ecosystems should address not just connectivity devices and operator tariffs, but also localised content and services, payment options, knowledge-sharing culture, multi-stakeholder alliances, RoI models and human resource capacity in technology and socio-economic development.

This report, along with earlier annual Mobile Africa reports, will be useful and informative for innovators, incubators, policymakers, analysts and all those interested in the broader development processes and impacts of new media. The report also serves as a call to action and collaboration for other researchers interested in publishing regular insightful snapshots of mobile innovation dynamics in Africa.

Part I: Mobile Innovators and Trends in Africa

For two sections of this report, over two dozen experts on digital media in Africa were contacted in 2012 for their views on best practices of mobile innovation, the nature of startups entering the market, and their predictions for trends in mobile innovation in the coming years. Their viewpoints on mobile innovation are summarised in Table 1; their other perspectives on challenges, opportunities and recommendations for the overall mobile industry are summarised in Table 7 at the end of this report.

“As the mobile phone is such an integral ‘touch point’ in the average African’s life, innovations and the ensuing apps are therefore real game changers for their fellow citizens,” according to Sean Pashley, Chief Commercial Officer at Starfish Mobile. As smart-phone device prices decrease (e.g. Huawei Ideos) and mobile citizens can do more via their mobile phones, so to will productivity rise.

Mobile Innovation: Best Practices

Mobile social media are changing the way people interact with each other and their favourite brands, and how they access information. Mobile companies that find unique ways to make these central to their data offerings will have huge dividends, according to Ham M. Namakajjo of Google Uganda. The downward pressure on smartphone cost driven by OSs like Android can improve consumer experience and service uptake.

Mobile money has opened the floodgates to further innovation in financial services for the huge unbanked population in Africa but also has enormous potential for boosting the ecosystem by enabling local developers to monetise their applications, according to Ham M. Namakajjo of Google Uganda. There are also innovative and relevant mobile apps based on the Android platform like “Shopper’s Delight” that allows price conscious shoppers to locate products, compare prices and order between various supermarkets, and “MafutaGo” that allows users to locate petrol stations close to their locations as well as compare prices and find out more about the value added services at these stations.

Another good example is TV streams on mobile phones, e.g. Safaricom-DSTV partnership, which is popular for sports-obsessed markets like Kenya, allowing people to catch up with their matches on the go. The Community Knowledge worker initiative by the Grameen foundation and MTN App Labs is building a self-sustaining, scalable network of rural information providers who use cellphones to help close critical information gaps facing smallholder farmers. They will strengthen the information link to farmers by disseminating and collecting relevant information in these communities.

The simplicity with which TaxiRank (<http://www.taxirank.co.za/>) shakes a market by allowing comparisons among taxis is outstanding, according to Franco Papeschi of the World Wide Web Foundation. There is a lot of potential of changing the relationship between students and universities (eg. Pulse - <http://usepulse.com/>). Services like Toodu (<http://toodu.co.za/>), where friction between tasks to do and service providers is reduced to a minimum, have the potential to inspire new services also outside of Africa.

Table 1: Mobile innovators and trends in Africa

<i>Expert</i>	<i>Best observed examples of mobile innovation in Africa</i>	<i>Nature of startups entering the mobile market in Africa today</i>	<i>Outlook for mobile innovation in Africa in the coming years</i>
Sean Pashley, Starfish Mobile	1) mPesa 2) The rise of IM apps (MXit, 2GO, Zing) 3) ForgetMeNot	Predominantly messaging based apps, although there is still a huge demand for voice based services	1. Game-changing apps 2. Lower smartphone prices 3. Apps increasing productivity
Jussi Hinkkanen, Nokia Middle East and Africa	1. Crop insurance (e.g. Kilimo Salama) 2. Mobile Learning (e.g. Nokia Mobile Learning for Maths) 3. Logistics and supply chain management (e.g. Virtual City) 4. Social networking (e.g. MXit) 5. Market trading and agri-info (e.g. Esoko and Nokia Life)	1. Clear rationale for SMS-based services 2. Voice still remains an important solution 3. Urban population that has fiercely embraced apps	1. Invasion of international content and app providers 2. Education related services will boom over the coming 12-24 months 3. Urban population that has fiercely embraced apps
Ham M. Namakajjo, Google Uganda	1. Mobile money; has opened the floodgates to further innovation and app monetisation 2. Innovative & relevant mobile apps based on Android (eg. comparative shopping, store location) 3. TV streams on mobile phones e.g. Safaricom-DSTV 4. Community Knowledge worker Initiative by the Grameen foundation/ MTN App Labs	1. Financial services start ups based on the mobile money platform, both SMS and apps based 2. Mobile apps	1. Explosion of mobile apps, a plethora of small local VC entities 2. Infrastructure sharing/outourcing will free up operators to concentrate more on marketing and product development
Ken Banks, Kiwanja	1. WE CARE Solar 2. Ushahidi 3. M-Pedigree, 4. Frontline SMS 5. Medic 6. M-Farm	Voice and SMS in feature phones	1. Strong market growth 2. A rise in local talent 3. An African ICT sector leading the world socially relevant and environmentally responsible solutions
Alan Knott-Craig, MXIT	1. Mpesa 2. Mxit 3. Prepaid 4. Yeigo 5. Motribe	SMS, J2ME, Android apps.	Innovation will accelerate every year, and Africa will be the source of the game changing innovations in global mobile services
Jones Killimbe, RASCOM	1. M-PESA (money transfer) 2. One Network 3. Payment for utility(ies) charges through mobile 4. Direct access to commodity prices on the market (for farmers)	SMS and apps-based startups	The sky is the limit –expansion of facilities/ applications/ service solutions!
Hajo van Beijma, TextToChange	1. Mobile money transfers in Kenya 2. Verification of drugs in Nigeria via cell phones 3. Mobile chat systems in South-Africa 4. Data gathering systems via SMS in Uganda 5. Fake Nokia's that can carry two SIMcards!	1. Mobile price information systems for farming 2. Payment systems via mobiles for micro finance 3. Serious gaming, edutainment	African mobile innovations will hit the "developed" world. The innovations will be in healthcare, governance, farming
Arthur Goldstuck, World Wide Worx	1. Mashups (eg. Ushahidi) 2. Market information via SMS (eg. Cameroon) 3. Jamiix (counselling and support) 4. Mxit	The big focus is on apps-based startups, but the big opportunities lie in voice and instant messaging.	1. The real Africa-wide mobile payments market is still some years off. 2. Airtime as payment mechanism is going to become more significant 3. Apps with an African focus will explode
Fred Milosevic, NedBank Capital	1. M-pesa 2. Fairwind 3. USSD apps 4. Ushahidi	1. Content 2. Apps 3. Mobile cloud	1. More cloud 2. More speed 3. More social media 4. More meaningful apps for BOP segments
N. Arjun, Airtel Africa	VAS and content applications as in other developing countries	1. SMS 2. Location based apps	1. Content 2. Location based apps
Kai Wulff, KDN	1. AgriLife in Kenya (Mobipay) by PayG. 2. SPARC (Solar Powered Advanced Rural Communicator www.sparc.ae) 3. Butterfly (Loopnet: free Wifi) 4. Worldsupermarket.net 5. CanDo	Most try to replicate existing models (eg. Groupon). Many innovations are half baked and very focused on the urban market	Someone who is not an operator will get it right and earn the trust and loyalty of the users!
Jonathan Hoehler, MobileMonday Johannesburg	1. M-Pesa in Kenya 2. Motribe (www.motribe.com) mobile social networking platform 3. iCow in Kenya 4. Mimiboards by Umuntu 5. Mobile Banking services by FNB in South Africa 6. Virtual Credit Card Application (www.vcpay.co.za)	1. Cloud based mobile site product startups 2. Mobile Applications ("sexy" but not yet revenue generating) 3. M-Class services via SMS, USSD and voice	1. Cross platform mobile money transfers 2. Further growth of mobile Internet sites 3. Growth of social media platforms on mobile 4. Growth of price competitive high quality feature rich connected devices 5. Mobile advertising channels to explode

Henning Brazer, Buzzcity	<ol style="list-style-type: none"> 1. Innovative mobile payment instead of cash in Kenya 2. Local language based social networks 3. Affiliate ads for airtime when consumer phone rings 	Still very mobile content-centric VAS	<ol style="list-style-type: none"> 1. Mobile banking 2. Mobile identity documents
Vanessa Clark, Mobiflock	Not too much wow stuff such as QR or AR, but effective SMS services (eg. FNB's mobile banking).	<ol style="list-style-type: none"> 1. Community-based such as Bozza and Motribe 2. Education such as Obami 3. Safety and security 	<ol style="list-style-type: none"> 1. More mobile communities emerging, such as the ones Motribe and Bozza 2. SMS is still going to be key 3. QR codes and LBS are going to be used cleverly 4. Local innovation on feature phones and smartphones
Khalil Al Hindwan, Acision	<ol style="list-style-type: none"> 1. Mobile Money 2. MXIT and mobile IM 3. Dynamic tariffing 4. SMS based Text-2-Win campaigns, and healthcare reminders 	<ol style="list-style-type: none"> 1. Apps and SMS Based Areas 2. Partnerships between the OTT and Social Networks with the Operators. 	Innovation will continue to occur and rapidly as long as we continue to put the humanitarian issue we are trying to fix into the mobility value chain and this has been the success of many services launched in Africa.

In terms of pricing innovations, dynamic tariffs have worked well with a few key operators to drive voice usage and can be replicated for data usage, according to Khalil Al Hindwan of Acision.

Africa is rich in innovation, especially when it involves mobile services targeted at the under-served segment of the social community, observes Carlyle Fernandez of Nokia-Siemens Networks. Some of these innovations are related to end-user services, some to localising the benefits of internet, and some on the infrastructure side. "The best known example of end-user related service innovation is probably mobile payment related innovations, such as M-Pesa in Kenya. This was the first-of-its-kind service in Africa, where users could conveniently receive and send money, and pay bills from their mobile phones without having to have a bank account. This type of service has been adopted by many other operators across Africa and has even given early-operator-adopters a competitive edge in terms of brand loyalty," according to Fernandez.

Another example is the virtual SIM, which is a convenient way to offer affordable mobile services to underserved segments, where users do not even have their own phones. It allows a user to have a subscription but utilise someone else's phone to access mobile services, like making calls or sending messages. Simply put, users have their own phone number and virtual phone account but do not require a phone, says Fernandez.

Innovation in the application space is also very active. Companies, in many instances, are teaming up with local application developers for services that are relevant for the African market. According to Fernandez, these applications cover multiple areas such social media and network, ecommerce, healthcare and news. Many of these apps are even targeted to solve some of the key social problems faced in African countries, like healthcare.

"I have not seen too much 'wow' stuff such as great use of QR codes or location-based services, or any augmented reality applications," admits Mobiflock's Vanessa Clark. But sometimes the basics are the most effective for the end-users, such as using SMS to make a static medium more interactive, although the follow-through on these types of campaigns is usually non-existent.

Clark commends the stealthy mobile marketing campaign of FNB's mobile banking service. "Although very handy, it does not really offer anything new apart from locating nearby ATMs to Internet banking users. What it has done is to form the basis for a radio campaign, achieve loads of column inches, and is a great platform to demo the FNB

connect service," observes Clark. Janice Allem of SilverStoneCIS also identifies FNB mobile wallet app as a notable success story. FNB has integrated mobile for all LSM groups very efficiently and effectively, and are the banking leaders in South Africa.

Local language based social networks and affiliate ads for airtime when consumer phones ring are other notable mobile innovations, according to Mobiflock. As for mobile banner ads, they are "a disaster," according to Clark, who has heard horror stories of children's apps being served with ads for adult content, and other users getting offered iPhone apps on their Android devices. An equal disaster is SMS campaigns that do not allow users to quickly, easily and cheaply opt out.

Arthur Goldstuck of World Wide Worx sees unique innovation in mashups, in the form of overlaying data on digital maps, specifically the way Ushahidi in Kenya has shown the way in crisis tracking. Other notable mobile innovations in Africa are market information via SMS for small-scale farmers, first demonstrated in Cameroon; and JamiiX a mobile platform for counselling and

support services across Africa, Europe and Asia, started in Cape Town. JamiiX founder Marlon Parker was earlier using IM platform Mxit for drugs counselling.

Jussi Hinkkanen of Nokia Middle East and Africa identifies other successful mobile innovations: crop insurance (e.g. Kilimo Salama), mobile learning (e.g. Nokia Mobile Learning for Maths), logistics and supply chain management (e.g. Virtual City), social networking (e.g. Mxit), and market trading and agri-info (e.g. Esoko and Nokia Life).

Kai Wulff of KDN identifies Agrilife in Kenya (Mobipay) by PayG, SPARC (Solar Powered Advanced Rural Communicator www.sparc.ae), Butterfly (Loopnet: free Wifi)

Worldsupermarket.net, and CanDo as innovative mobile services from Africa. Other notable startups are iCow in Kenya, Mimiboards by Umuntu and Virtual Credit Card Application (www.vcpay.co.za), adds MobileMonday Johannesburg's Hoehler. Nedbank's Milosevic also adds Fairwind, USSD apps and Ushahidi to the list.

Mobile Innovators: New Players

A number of financial services start ups are emerging in Africa, based on the mobile money platform; these are both SMS and apps based, according to Ham M. Namakajjo of Google Uganda.

Emerging startups are community-based such as Bozza and Motribe, or address education, such as Obami. Mobiflock offers parental control services as well as individual and business mobile security.

Cloud based mobile site product startups are another category of emerging mobile apps. "It should be noted the start-ups from 5-8 years ago are still doing voice, SMS and USSD services as they are still the biggest revenue generators across the continent. New startups are focusing on new technologies like mobile apps because it is "sexy" and "rich" but at this stage not necessarily going to great revenue generators," observes Jonathan Hoehler of MobileMonday Johannesburg.

Voice, SMS and apps based startups are all entering the mobile market in Africa. "There is clear rationale for SMS-based services still for the coming 24-36 months in many African countries, which is the tool for reaching the previously underserved population. Voice still remains an important solution as well, not to mention the more urban population that has fiercely embraced apps over the past 12 months in several African markets," observes Nokia's Hinkkanen.

Many emerging mobile services are only trying to replicate existing models (eg. Groupon); many innovations are still half-baked and very focused on the urban market, laments KDN's Wulff.

Other mobile startups are focused on SMS, J2ME and Android apps. "Many people think that Android is the answer, but the biggest opportunity still lies with SMS and J2ME in terms of installed base as well as new monthly sales," observes Alan Knott-Craig of MXIT.

"While there remains a strong focus on social media, right now some of the bigger opportunities lie in voice and SMS. That is what the majority of people are using, so anything which uses 3G or smart phones to work could well find itself peaking too early. As the saying goes, 'Go to where the fish are.' Right now, most of the fish are around feature phones. Almost anything else will be niche -- which means it could work if that niche market can afford it," predicts Ken Banks of Frontline SMS.

"There is a huge installed base of feature phone devices across Africa which is made up largely of Nokia devices. There are many reasons for this market share including but not limited to the quality of the devices and superior battery life (an important consideration due to intermittent power supplies across Africa)," according to Jonathan Hoehler of MobileMonday Johannesburg, in an Afrinnovator post (<http://bit.ly/GODiS>). "Don't forget about the humble feature phone, they make up a large part of the handset universe and are not going anywhere anytime soon," advises Hoehler.

"Apple provided developers with a relatively simple framework for developing mobile applications, removing a developer's biggest challenge: device fragmentation. This created a structure for monetising mobile applications through a relatively simple 70/30 revenue share split, with the majority reaching the developer. Over the past three years, mobile application development has skyrocketed, and we now see the likes of Google, Amazon, Nokia and many others either introducing app stores or racing to improve their current offerings," observes Hoehler

in an IT Web post (<http://bit.ly/H0lu79>). With smartphones becoming widely available in South Africa, the mobile application craze has struck, with locally developed applications taking off.

Hoehler identifies a number of promising developer-orientated initiatives and programmes: GTUG (Google Technology User Group: www.jhb.gtug.co.za and www.capetown-gtug.org) and Vodacom Developer Programme (<http://www.vodacom.co.za/developer>) to stimulate the local 'garage' developer community.

In sum, a big focus is on apps-based startups, but the big opportunities lie in voice and instant messaging, according to Arthur Goldstuck of World Wide Worx

Mobile Innovation: The Road Ahead

The economic imperative towards infrastructure sharing and outsourcing will free up operators in Africa to concentrate more on marketing and product development for their customers. This will have a significant impact on the competitive landscape and hence innovations in services provided. "We are going to see an explosion of mobile apps focused companies financed by a plethora of small local VC entities," predicts according to Ham M. Namakajjo of Google Uganda.

From a technology point of view, data services will become quasi-popular, reaching a potential user base of 50% of mobile subscribers. From an industry point of view, there may be a shift in power between access providers (operators, device manufacturers) and service providers. This will happen only if there is way to increase the density of innovative service providers (startups) and facilitate easier routes to market for them, predicts Franco Papeschi of the World Wide Web Foundation.

"We are going to see a lot more mobile communities emerging, such as the ones Motribe and Bozza are building. SMS is still going to be key. QR codes and location-based services are going to be used cleverly, compellingly and effectively. We are going to see innovation on feature phones as well as smartphones, especially as smartphone prices drop and battery life improves. This innovation is going to meet unique local needs and solve problems, and as has happened in the past, be exported to the rest of the world," predicts Mobiflock's Clark. Mobiles will take the place of bank cards and identity documents, a move which is very suited to Africa.

Other future trends will be cross platform mobile money transfers, such as M-Pesa to Airtel Money and visa versa; growth of social media platforms on mobile and mobile advertising channels are other developments to watch, according to Jonathan Hoehler of MobileMonday Johannesburg.

There will be an invasion of international content and app providers into the African market, predicts Jussi Hinkkanen of Nokia Middle East and Africa. "The window of opportunity for African developers is open for the coming year or so, but the sizeable opportunity in Africa is going to attract large international players to come to Africa as well, which increases competition in the market rapidly," according to Hinkkanen. Education related services will also boom over the coming 12-24 months with the introduction of lower cost GPRS/EDGE devices and low-end tablets.

"The next big wake-up will be the realisation that mobile money is not the Africa-wide opportunity that commentators suggest. There is a need and demand in certain markets, like Kenya, but the real mobile payments market is still some years off. By the same token, airtime as payment mechanism is going to become more and more significant, and innovations to harness this as a channel will emerge," predicts Arthur Goldstuck, managing director of World Wide Worx. Apps with an African focus will explode, with a strong focus on education, translation and access to services.

As the technology and entrepreneurship sectors grow, increasing numbers of young people will see an outlet for technology and business skills and increasing numbers of graduates will leave university with them. "My key prediction is strong growth and a rise in local talent, and an African ICT sector leading the world in creating socially relevant and environmentally responsible technology solutions," says Ken Banks of Frontline SMS.

Mobile applications are 10% development and 90% business and marketing; remember, it is not an EGOsystem, it is an ECOSystem, jokes MoMo's Hoehler. Nedbank's Milosevic predicts more cloud, more speed, more social media and more meaningful apps for BOP segments in the years

ahead.

“Tweaking Moore’s Law, we can predict that innovation will accelerate every year, and I think Africa will be the source of the game changing innovations in global mobile services,” says Alan Knott-Craig, CEO, MXIT.

“In much the same way that Africa’s lack of significant telecom capacity was a boon rather than a hindrance to the emergence of mobile telephony, its lack of legacy infrastructure for everything ranging from waste management to energy utilities could provide the appetite — non-existent in the West — for genuinely transformative, future-friendly reconceptualisation of the very notion of infrastructure,” says Bright B. Simons, founder of the mPedigree Network for pharmaceutical drug authentication (GBC News: <http://bit.ly/H1xu97>).

“Leapfrogging is the umbrella name for the systems available to us today that make all this possible. Cloud computing, social media, new professional paradigms such as social entrepreneurship, below-the-line marketing and a host of novel realities have transformed the global context for Africans with their eyes set on continental and beyond-continental scale,” according to Simons. The level of productivity possible in these operations has been boosted several-fold by the growing proliferation of next generational models in finance, banking, and logistics.

In fact, the New Digital Economy report from PricewaterhouseCoopers predicts what it calls “the reverse of the digital divide” -- the digital medium may have been planted and nurtured by the so-called First World, but it is in the ‘Third World’ that it has really taken root and flourished. Emerging nations may soon take the lead in digital development due to their willingness to adopt digital technologies, according to Wayne Bischoff, MD of Habari Media (The Media magazine: <http://bit.ly/Gmpkyv>).

PART II: MobileMonday in Africa

The evolution of MobileMonday over the last 10+ years is a good indicator of the global power of networked innovators. This hyper-local and super-global concept has grown from its home base in Helsinki into an international peer-driven platform for industry players from Adelaide to Zurich with some 500 events running in 2011 attracting an estimated 50,000 attendees across 100+ cities.

While MobileMonday has always been an offline network focused on physical face-to-face encounters, the increase of digital interaction between stakeholders has become increasingly clear. With the rise in social tools, and wide range of chapters connecting those dots online, there is tremendous growth in new connections being made on the person-to-person level.

As always, it is the energy found in emerging markets that drives most interesting next-generation opportunities; from Africa, Eastern Europe, Asia, the Middle East and South America, MobileMonday regularly shares reports on these innovator communities through its monthly newsletter (<http://www.mobilemonday.net/category/the-mob-rulz>).

According to Jari Tammisto, CEO of MobileMonday, there are currently MoMo chapters in the following countries in Africa: Mauritius, Uganda (Kampala), Tanzania (Dar es Salaam), Kenya (Nairobi), South Africa (Johannesburg, Cape Town), Senegal (Dakar), Nigeria (Lagos), Ghana (Accra), Egypt (Cairo), Algeria (Algiers) and Morocco (Casablanca). Chapters are to be formed in 2012 in Ethiopia (Addis Ababa) and Zambia (Lusaka).

Founded in January 2008, MobileMonday in **South Africa** has two chapters: Johannesburg and Capetown (Web: www.mobilemonday.org.za, www.momoct.com, www.momjoburg.com; Twitter: @momjoburg, @momoct). The Johannesburg chapter began with with about 40 people, and now averages over 200 people at its events with a database of 1,500+ members across a wide sector of the industry (but less of government representatives). There are around 30 startups as members. Meetup themes in the past eight events have been mobile cloud, mobile security, mobile enterprise, tablets, mobile apps and mobile social.

As with many startup communities, funding and time are key challenges for MoMo in South Africa. Working with some sponsors can be difficult if they do not understand the open ethos of MoMo, according to organiser Jon Hoehler. Targeted events include the MoMo Africa Summit, MoMo Mobile Payments event, MoMo AfricaCom event in Cape Town and the launch of MoMo Durban. Further on down the road there are plans to assist in the launch of MoMo chapters in Zimbabwe and Gaborone.

MoMo can become a proper business in South Africa connecting clients and suppliers and researching, tracking and recommending trends and best practices in mobile, predicts Hoehler.

Momo Kampala (Web: www.momokla.ug; Twitter: @MoMoKampala) had its first organiser meeting on 10 January, 2010 and the first MoMo event was held subsequently on 15 February. The official launch took place on the eve of the Innovation Africa Digital Summit in Kampala on 8 March.

The chapter has a steadily growing membership list that numbers over a thousand. "We are averaging between 160 and 180 delegates per MoMo meetup, a mix of predominantly developers, start-ups and entrepreneurs, with NGOs, aid agency managers, telecom and content company managers including prospective investors, mentors, VC managers, a smattering of academia, and government officials," observes Daniel Stern, MoMo Kampala coordinator.

In 2012, MoMo Kampala hosted two events. On 6 February, the theme was "From Research & Ideation to Design & Development Innovation," hosted by Victoria University, sponsored by Orange Uganda, with 175 delegates. Speakers included Sean Paavo Krepp, Country Director Grameen Foundation Uganda; David Young Victoria University Vice Chancellor; Ruhakana Rugunda, Minister of ICT; Ravi Chhatpar, Founder and Strategy Director, frog; and Kristoffer Leivestad-Olsen, Project Manager, Design without Borders.

On 19 March the event carried on with the same theme, this time hosted by Google, and with 175 delegates. Speakers included Lisa Kiezle, Operations & Strategy Manager for the AppLab Money Incubator; David Gonahasa, CCO M-Cash; Francis Otim, CEO Scyfy; Evelyn Stark, Senior Program Manager, Bill & Melinda Gates Foundation; and Gabriel White, User Experience Designer.

Table 2: MoMo Kampala Meetups in 2011

Date	Event theme	Speakers
28 February	How Do You See Mobile Apps for Uganda in 2011? Hosted by Google Uganda. 120 delegates	<ul style="list-style-type: none"> - Simon Kaheru, Director Business Convergence SMS Media (U) Ltd - Michael Niyitegeka, Lecturer, Head Corporate Affairs Makerere University - Denis Ruharo, GM and Managing Partner D-Mark Company - Reinier Battenberg, Director Mountbatten Ltd - Elijah Kitaka, Business Development Associate Google Uganda
28 March	Financial inclusion through mobile money: The role of banks, mobile operators and developers. Hosted by Grameen Foundation & MTN Nyonyi Gardens. 171 delegates	<ul style="list-style-type: none"> - Sean Paavo, Country Director Grameen Foundation Uganda AppLab - Mark Pickens, CGAP Executive - Olga Morawczynski, Financial Literacy Project Manager, AppLab - Gerald Begumisa, MD Yo! Uganda - Matt Krueger, M-Banking Research Project Manager at Equity Bank - Anthony Katamba, Director MTN Foundation Tamara Cook, Bill & Melinda Gates Foundation
9 May	How Do We Create an Enabling Ecosystem for Developers and Industry Leaders? Protea Hotel. Sponsored by Nokia. 181 delegates	<ul style="list-style-type: none"> - Teemu Kijarvi, Co-founder MoMo South Africa - Michael Niyitegeka, Makerere University CIT Lecturer - Francis Egbuson, Principal with CEMM Group - Nicolas Pottier, Founder, CEO Nyaruka Limited - Viola Bazanye and Joan Byamugisha, Makerere University CIT Developers - Victor Miclovich, Director of Technology, the Kuyu Project
20 June	The Battle of the Gadgets. Hosted by Google. 144 delegates	<ul style="list-style-type: none"> - Simon Kaheru, Director, Business Convergence, SMS Media - Buga Asasira, MD Buga Tech - Edouard Blondeau, CSO Orange Uganda - Steven Zhang, Terminal Sales Director, Huawei Uganda - Nigel Ball, Director Mara Foundation
18 July	mAgriculture: The role of mobiles in reaching farmers in the last mile, MTN Nyonyi Gardens. Hosted by Grameen Foundation AppLab. 220 delegates	<ul style="list-style-type: none"> - Sean Paavo Krepp, Country Director Grameen Foundation AppLab - Richard Mwami, Head Public Access & Mobile Money, MTN Uganda - Robert Kintu, Managing Director, FIT Uganda - Geresom Okecho, Senior Program Officer, NAADS - Luke Kyohere, Technology Manager, Grameen Foundation
29 August	Using Innovative Approaches to Improve Health Outcomes At the Community Level. Hosted by UNICEF Uganda. 120 delegates	<ul style="list-style-type: none"> - Isaac Ezaati, Director Health Services Planning & Development, MoH - Terra Weikel, Head, Technology for Development Coordination Unit, UNICEF - Steve Ollis, Project Manager, D-Tree - Pau Varela, Lead Programmer, eMOCHA, JHMI - Jill Shemin, Partnership Development Specialist, Grameen Foundation AppLab - Eunice Gnyay Namirembe, Programme Manager, TextToChange Uganda - Flavia Mpanga, Health Specialist, UNICEF
23 October	Hacker Expo. Hosted by Cavendish University. 144 delegates	<ul style="list-style-type: none"> - Nelson Kabanda, Loopa - Harold Turyasingura, Map the Crap - Daniel Okalany, Matatu - Francis Nkurunungi, MobiVisal - Ford Arnold, Pot-Holific - Christine Ampaire, Mafuta Go - Victor Miclovich, Semaje - Terry Karungi, Zword - Joseph Lutalo, QuiXX - Jacob Muhire, Water Crusaders
21 November	AppCircus Uganda. Protea Hotel. Sponsor Nokia. 210 delegates	<ul style="list-style-type: none"> - Nelson Kabanda, Loopa - Harold Turyasingura, Map the Crap - Daniel Okalany, Matatu - Francis Nkurunungi, MobiVisal - Ford Arnold, Pot-Holific - Christine Ampaire, Mafuta Go - Victor Miclovich, Semaje - Terry Karungi, Zword - Joseph Lutalo, QuiXX - Jacob Muhire, Water Crusaders

MoMo Kampala events are covered in local newspapers, the monthly magazine Dispatch (<http://dispatch.ug>) and on YouTube (eg. <http://youtu.be/rLROaMLXIys> http://youtu.be/n-ODOtBk_BQ <http://youtu.be/VdhjKf4-hk>).

Member startups at MoMoKLA include JKFOTIS (for apps and security services), Send Air Time (www.sendairtime.com) by 3nitylabs, Semaje (<http://semaje.com>) for learning foreign languages, Mspoti (<http://mspoti.com>) for sports news and views, Pthor (<http://p-thor.com>) for medical informatics, EpayAfrica (<http://epayafrika.com>) by Beyonic, Scify Technologies (<http://1st.ug>) for mobile payments, Meridian Softech for SMB solutions, Credit2go (www.creditogo.com) for credit-card mobile services, Kola Studios (www.kolastudios.com) for mobile gaming, AgaSha Business Network (<http://www.agashaknows.com>) for SMB interactions, and MafutaGo for finding the nearest petrol station with the cheapest prices.

The startups report that their biggest challenge is sensitising people about their solutions and then expanding solutions beyond beta-stage. Still, Sharon Againe, who is one of the MoMoKLA participants, took the Orange African Social Venture Second Prize in Capetown. Christine Ampaire's MafutaGo was a winner at the Mobile Premier Awards in Barcelona. Musa Mwange and Daniel Nkurunungi received a scholarship for a three-month training at m:Lab Nairobi.

MoMo Kampala is still benefiting from the infoDev grant given to MoMo Kampala towards improving the mobile social networking ecosystem. "We've begun to speak with some of our core team about putting together a board of directors who could shoulder some of the responsibility of organising the events and improve on our professionalism. We need to improve on our traction

with the key players, probably starting with some of the telecoms companies who have yet to come on board, but also with policy makers in sectors such as education and health, agriculture, and business, and with the rural village communities,” explains Stern.

“We’re living on the edge, we like it that way, and we wouldn’t trade it for cushy air-conditioned multinational company office career jobs, not for anything. It’s alive, it’s a moving target, it’s fun, exhilarating sometimes, not knowing which rabbit might pop out of the magician’s hat next! I think that if we can continue to play that role for the next five or ten years we’ll be doing the job we’re meant to do,” enthuses Stern.

MoMo Nairobi had about seven meet-ups in 2011, themed on e-commerce ecosystems in Kenya (January), design (April), local developers and their successes (May), ad-supported apps (August) and presentation skills to sell apps (November). The activities of **MoMo Senegal** are well captured in the infographic in Fig.1.

MoMo Nigeria was founded in February 2011 and had its first monthly event subsequently on 21 March (URL: www.momonigeria.org, Twitter: @momonigeria, Facebook: www.facebook.com/momonigeria). “We started with about 50 developers and startups and we currently have about 200 people in our database,” according to Emmanuel Oluwatosin, founder of MoMo Nigeria.

Ten events have been held so far, which have been covered in the media (see <http://otekbits.com/?s=momonigeria>, www.techloy.com, www.mobility.com.ng). Monthly themes and activities launched have been mentorship programmes, developers’ clubs, a newsletter for startups, and tech topics such as mobile clouds, m-commerce, cross-platforms app development; other discussion groups have addressed fundraising for startups. Quarterly big events have been held on topics such as mobile payment, MoMo Ideas, and Pitch Monday. Immediate needs for the chapter are meetup sponsorships, developer toolkits, mentorship opportunities and participating in outsourcing arrangements.

The major challenge reported by local startups in Lagos is data cost and penetration; others are lack of human resources and funding for tech startups. Collaboration among developers and startups could also improve significantly. MoMo Nigeria members plan to attend the Open Innovation Africa Summit scheduled for May 2012.

Fig.1: Activity infographic of MoMo Senegal



Part III: Mobile Application Labs

In addition to MobileMonday, other startup networks and facilitators have emerged across Africa. “When we started Balancing Act twelve years ago, Africa’s ICT entrepreneurs were talking about a whole range of services and applications but none of the basics – like bandwidth, a critical mass of users, transaction technologies and finance – were in place. Over the last twelve months, many different things have begun to fall into place under each of these headings. What has been as impressive has been the growth of soft networks and hard, physical infrastructure like incubators and the way that these things have created links between Africa’s innovators and the rest of the world,” according to Russell Southwood, CEO of Balancing Act (<http://bit.ly/GM2Mhn>).

For instance, VC4Africa started in 2007 when Ben White went to a meeting of the African Venture Capital Association in Dakar; he launched the platform along with Bill Zimmerman (of ActivSpaces in Cameroon). As a result, some important connections have been made between entrepreneurs in Togo and Nigeria, for instance, and a number of international investment deals have been brokered.

BongoHive’s Hubs in Africa identifies 17 ‘spaces’ in Africa that are a mix of technology hubs, business incubators, university tech labs and hacker spaces. Zambia’s BongoHive is itself one of the latest of these spaces on a road pioneered by Nairobi’s iHub. The space is in the Ministry of Education and it has set up training programmes for its members on topics like Java. In September 2011, it got US\$17,000 funding from philanthropist Brenda Davies. In December 2011, Ushahidi and a Canadian developer ran an Android Boot Camp for members.

In response to demand by local mobile entrepreneurs, the World Bank Group’s infoDev program, in collaboration with the Government of Finland and Nokia, established a network of five mobile application labs, or mLabs, and eight mobile social networking hubs. “In Armenia, Kenya, Pakistan, South Africa and Vietnam, Labs facilitate demand-driven innovation by grassroots entrepreneurs, so that breakthrough low-cost, high-value applications can be developed,” according to Tim Kelly, Lead ICT Policy Specialist, infoDev, The World Bank Group.

Each mLab is a technology-neutral platform for developing the technical skills and business sense needed to build scalable mobile solutions into thriving businesses that address social needs. As well as providing state-of-the-art equipment, the labs offer technical training and workshops, and they connect developers and entrepreneurs with potential investors, experts, and public sector leaders, according to Kelly.

The labs are complemented by eight mHubs, which focus on mapping multi-stakeholder communities in the mobile industry and strengthening personal relationships between entrepreneurs, developers, investors, students and others. Both the mLabs and mHubs are run and used by local communities working to increase the competitiveness of enterprises in mobile content and applications and are part of a wider mobile innovation program, seeking to develop talent and produce successful companies with strong growth potential.

Examples of mLab and mHub activities can be found on the websites Mlab.co.ke, Mlab.co.za and Akirachix.com. These include the annual Pivot25 awards (see Table 3).

1. mLab Southern Africa

The mLab Southern Africa (SA) provides incubation support to mobile developers and entrepreneurs through a number of core services, such as subsidised office space with meeting rooms to allow members to benefit from being part of the mobile startup community, training and accreditation on mobile technologies and entrepreneurship, and business mentoring and coaching.

It is based at The Innovation Hub in Tshwane, South Africa, with the first satellite office in Cape Town. The mLab SA is hosted by a consortium of four organisations: CSIR Meraka Institute, The Innovation Hub, InnovationLab and Ungana-Afrika. This consortium has strong existing relationships with business, the public sector, civil society and academia throughout southern Africa.

mLab Southern Africa’s members include companies such as Sowertech, which is working on

a push-to-talk (PTT) platform that combines with GPS-enabled devices to offer LBS. Sowertech already has this working on rugged mobile devices, and the PTT app is also integrated on mainstream phones such as those running the Symbian platform, including feature phones, and Windows Mobile smart phones. Sowertech has partnered with MTN for network support.

Among other activities, the mLab Southern Africa has been tasked with managing a Gauteng Innovation Challenge (GIC) for mobile solutions on behalf of the Innovation Hub. Such challenges essentially invite members of the public to submit entries that either solve a particular problem, or simply demonstrate the most innovative apps in a particular sector. Examples of other past and present challenges include Nokia's Calling All Innovators (<http://www.callingallinnovators.com>), World Bank's Apps for Development Challenge (<http://appsfordevelopment.challengepost.com>), Design Indaba: Your Street (<http://www.designindaba.com/yourstreet>), and Blackberry's App Master Challenge (<http://blackberryappmaster.co.za>).

mLab Southern Africa also shares a number of useful online resources for app monetisation and commercialisation, such as mServices Commercialisation Analysis (by Vital Wave Consulting), Mobile Monetisation: A Revenue Stream Framework (by Keegan Ziady and Steve Vosloo), Developer's Guide to In-Application Advertising (from Skyhook Wireless), Mobile Commerce and Applications: An Explanatory Study and Review (from Journal of Computing), Sizing up the Global Mobile Apps Market (from Chetan Sharma Consulting), Monetising Mobile (by KPMG), and Mobile App Decision Making Framework (by MobiBiz Canada).

2. m:lab East Africa

In addition to local training and support for mobile startups, a new partnership to help grow and finance innovative mobile start-ups in East Africa has been signed between m:lab East Africa and GrowVC International. It aims to address the challenge of mismatched levels of financing needs. Grow VC's crowd funding model facilitates funding in small steps that make sense for entrepreneurs to get better valuations and for investors to better mitigate their risks. Grow VC's platform is also a nurturing ecosystem where entrepreneurs can connect with experts, funders, team members, new customers and partners to realise their ideas. The platform is designed to help start-up companies to secure initial funding of up to USD 1 million. Grow VC International Headquarters is located in Hong Kong, with offices in the US, UK and Finland.

m:lab East Africa also recently hosted a Wireless Wednesday event focusing on m-agriculture. According to Jamila Abass, CEO of Mfarm, mobiles can help optimise productivity and livelihoods of farmers through market price information, collective produce selling and collective inputs buying. Juhudi Kilimo uses mobile communication to help finance agricultural assets for farmers that generate income, using a micro-finance model. Apps in use include SimpleMFI (for loan officers to process loans using Huawei Ideos) and Mswali SMS survey tool (for polling dairy farmers).

Uhasibu (see Table 3) was also selected as the Best Innovator at AITEC Banking & Mobile Money COMESA Conference. The conference saw a new addition this year: The Innovator Fast-track Theatre aimed at providing a structured platform to emerging enterprises that are creating solutions for the financial services sector. Uhasibu was selected on the basis of the ability of the project to scale, the maturity of the project, the management team involved in the project, and how ready an investor would be to invest in the project.

The innovation track was organised in partnership with @iLab, NaiPay, mLab, iHub, Digital Age Institute and the Kenya ICT Board. The following industry leaders formed the appointed panel of judges: Joseph Sevilla, CEO, @iLab, Strathmore University, Kenya; Michael Murai, Senior Investment Officer, Frontier Investments Group, ACCION International, USA; Sean Smith, New Investment Manager, Invested Development, Kenya; Andrew Lewela, BPO Manager, Kenya ICT Board; and Preston Odera, CEO, ISACA Kenya Chapter.

3. AkiraChix

AkiraChix is an association that inspires and develops women in technology through networking, training and mentoring. It started in April 2010 when a group of young female techies got together

at the iHub and decided to create a network that increased visibility for women in technology. In a continent where women form a majority of the population and half of the workforce, it is an anomaly that the percentage of women working in technology is less than 15%. Technology is one of the key factors driving Africa's projected economic rise. As such, there is enormous potential for maximising the growth of technology through increasing the number and quality of women in technology. AkiraChix vision is to inspire and develop a successful force of women in technology that will change Africa's future. This is achieved through key programs areas of networking, mentorship and training.

'Akira' is a Japanese word meaning 'intelligence' and 'energy.' Akirachix has a strong community of 200 women in technology. The first class of the Akirachix Training program has graduated and entered the workforce. The organisation secured an infoDev grant to develop mobile social networking in the region. Akirachix also helps organise regular events called Mobile Garage (www.mobilegarage.co.ke), which have focused on mobile app entrepreneurship for students. Its partners include Afriwit (African Women in Technology) and Google.

Akirachix was also recognised on the Top 50 List of Ideas and Solutions Improving the Lives of Girls and Women Worldwide, by Women Deliver, a global advocacy organisation. The "Women Deliver 50" list is a compilation of the 50 most inspiring ideas and solutions that are delivering for girls and women across the globe. After receiving hundreds of online nominations from 103 countries, a selection committee chose 125 finalists to be voted on by the public. More than 6,000 individuals participated in the online voting. The "Women Deliver 50" list showcases advocacy campaigns; health interventions; technologies; educational initiatives and leadership programs. The initiatives, which range from grassroots to global, are led by social entrepreneurs, civil society, governments, international agencies and private companies.

PART IV: Mobile Award Winners from Africa

Startups and service providers involved in the above innovator networks and beyond are winning a number of awards in the region and around the world. This section surveys some of Africa's successes in these awards movements, which reflect the growing maturity of mobile innovation in the continent: MobileMonday Peer Awards, Mobile World Congress awards, Apps for Africa, Pivot 25 awards, AfricaCom awards, and Mobile Premier Awards.

Mobile operator Etisalat won two **GSMA Global Mobile Awards** 2012 in the 'Best Mobile Health Innovation' and 'mWomen Best Mobile Product' categories (<http://www.globalmobileawards.com>). Etisalat Mobile Baby helps combat maternal mortality in developing countries, and Etisalat Commerce commercial platform enables customers to use the mobile phone as a payment instrument.

Developed in partnership with Qualcomm, D-Tree International and Great Connection, Etisalat Mobile Baby brings together medical healthcare professionals, NGOs, pharmaceutical and insurance companies, and federal and state government to deliver affordable healthcare powered by mobile connectivity. In Tanzania, in the regions where Etisalat first launched the service, there has been a substantial drop in baseline maternal mortality rates and 30 percent increase in in-medical facility delivery rate. In 2012, the Etisalat Mobile Baby service will be rolled out across its operations in Afghanistan, Pakistan, Sri Lanka, Ivory Coast, Benin, Togo, Niger, Central African Republic and Gabon.

The GSMA Best Mobile Advertising & Marketing Campaign 2012 award went to Brandtone in South Africa, for its Carling Black Label "Be the Coach" mobile engagement campaign in soccer. The 2012 award for Best Product, Initiative or Service for Underserved Segments went to Safaricom and Grundfos for its water payment system built on the M-PESA platform.

In 2011, the GSMA award for Best Mobile Money Product or Solution went to Airtel Africa, MasterCard Worldwide and Standard Chartered Bank for their Airtel Card. The award for Best Mobile Money for the Unbanked Service went to Vodafone Group, Safaricom, Vodacom, Vodafone Essar Limited and Roshan Ltd for their M-PESA service. The 2011 award for Best Customer Care & CRM went to Airtel Africa and Tango Telecom for the Tango Telecom's 'Dynamic Pricing Service.'

m:lab East Africa's **Pivot 25** competition in 2011 attracted over a hundred entries from across East Africa in five categories. The 2011 conference was attended by over 300 people who included angel investors, venture capitalists, corporate executives, senior government officials, representatives of development organisations and researchers. The panels of judges for the contest were composed of industry experts and global thought leaders. The conference proceedings were live streamed by Capital FM. The competition and conference also received much coverage from local and international media including being featured in Time magazine. In addition to five category winners receiving \$5,000 cash prizes, the overall winner won a fully paid trip to pitch their application at DEMO.COM in Silicon Valley.

Table 3: Pivot25 2011 Award Winners (m:lab East Africa)

Category	Winner	Finalist 1	Finalist 2
m-Health	MEDKenya: a platform that provides symptom checkers, first-aid information, doctor & hospital directories as well as relevant alert services. The service aims to make healthcare information affordable and accessible to Kenyans.	KUSANYA: SMS Data Capture by BTI Millman: a solution harnessing the power and simplicity of an SMS to send data for fieldwork based operations primarily in the health sector. It sends a predefined string of information via SMS to the server for storage, analysis and later retrieval.	M-Chanjo by M-Chanjo: an application that creates a centralised registry for children who should be in an immunisation program, creates SMS reminders as a way of creating awareness and reminding patients of scheduled appointments, and manages patients' appointments through an automated system.
m-government, agriculture and education	SchoolSMS Premium by Tusqee Systems: an Interactive Mobile Messaging System for schools. It allows parents to get exam results of their kids, enquire about fees balances and get fees statement quotes from the school via use of simple SMS	M-Farm by M-Farm Limited: a market transparency tool for farmers. Kenyan farmers simply SMS the number 3535 to get information pertaining to the retail price of their products, to buy their farm inputs directly from manufacturers at favorable prices, and to find buyers for their produce	Mobile Crop Disease Surveillance by Makerere University Students in Uganda: an automated smartphone-based survey system for crop disease, which uses camera images to diagnose viral damage and puts survey information online in real time
m-business	Hasibu by Pluspeople Kenya: a cloud based accounting system for small & medium companies in East Africa. It helps in generating KRA format VAT reports, petty cash management and other financial management features. It also supports East African Currencies and is accessible for Sh1,000 per month	Bongo Live by Bongo Live Enterprises – from Tanzania: a targeted opt-in based SMS advertising service in Tanzania. Subscribers receive offers and discounts of their interest whilst advertisers can target their niche demographic with measurable results. A group messaging component allows advertisers to send SMS to their existing contacts.	EasyParking by Kenya Methodist University Students: works with car park operators to assist city motorists in locating the nearest parking slot, view remaining slots, book a slot, and pay the parking fee. Product is intended to reduce the inconveniences motorists go through to locate free parking slots in Nairobi City
m-Entertainment	Whive by Space Kenya Networks: a mobile social aggregator integrated with major social media platforms. It allows members to communicate with contacts, friends via SMS, messaging and other social media. Whive is a recent winner of the Vision 2030 ICT award.	Eat Out Mobile by Websimba: a product that allows users to search for restaurants by location, cuisine, budget and make reservations using their mobiles. It provides details including photos, menus, maps, opening hours, customer ratings and details of special offers and discounts.	Sakanya by Sakanya Networks: an online service for recovery of lost documents in Kenya. It is a tool available on mobile phones empowering existing lost and found document agents to avail documents to their respective owners efficiently. It also provides batch document processing and a reporting functionality.
m-Payment	M-Shop by MTL Systems: a platform allowing consumers to order, pay for, obtain and validate tickets for events, travel, goods & services. The solution provides USSD technology or a mobile application on smart phones to deliver this convenience at any time and from any location with a mobile carrier signal.	Kopo Kopo: a software-as-a-service mobile payment gateway for small and medium sized enterprises in Sub-Saharan Africa. The service is available on a pay-as-you-go basis.	Jamobi by OTB Africa: a mobile software solution allowing members of the informal sector to effectively carry out book-keeping from their mobile device at affordable costs and convenience.

Three African developers were shortlisted for the **Mobile Premier Awards 2012** (<http://www.mobilepremierawards.com>) organised by Apps Circus at the Mobile World Congress in Barcelona: Ghanaian App Developer Robert Lamptey of Saya, Ugandan app developer Christine Ampaire of Mafuta Go!, and South African app developer Anne Shongwe of Moraba. The winner of the Ringmasters Award (given by the organisers) was Christine Ampaire of Mafuta Go!, an app that helps drivers find the nearest and cheapest petrol station.

“Our application was a product of a 48 hour hackathon called Garage 48. We are a group of students who are passionate about our country and the city we live in, and we wanted to address the daily struggle of rising petrol prices in our city,” according to App developer Christine Ampaire. Garage 48 is an Estonian organisation that hosts workshops that allow developers to put a product together in 48 hours (<http://bit.ly/GM2Mhn>).

The Orange **African Social Venture Prize** 2011 went to Prize (Horticultural Remote Irrigation System), AgaSha (business network for SMEs), and Kachile (professionalising the artisan sector in West Africa via e-commerce).

The **AfricaCom** 2010 Awards went to Flexenclosure and E-site (Green Telecoms Award), Orange France Telecom with Village Phone (Best Solution for Rural Services), Sibesonke and User Generated Content (Telecoms Innovation of the Year), and MTN Foundation for Rural Telephone Project 3000 (Changing Lives Award).

Table 4: AfricaCom 2011 Award Winners

Category	Award winner
Best New Service	Surf & Pay: Orange aimed to offer the first hassle-free billing solution for small businesses in Uganda and Kenya. It allows small business customers to charge end users for connecting to the Internet. It also makes it possible for neighbours to share the cost of an Internet connection. Surf & Pay will be helping to create new opportunities and new sources of income for small businesses, as well as increasing the Internet penetration rate in Africa.
Best Cost Efficiency Initiative for Africa	Helios Towers Africa pioneered the independent model of shared telecoms infrastructure on the African continent. They enable reduced costs in both roll out and management of networks. This resulted in a greater number of national operators and more tower availability, this increases the accessibility of communications coverage for consumers in rural Africa. Furthermore, the cost savings made by operators can then be passed on to their consumers, reducing communications costs for business and individual users.
Rural Telecoms Award	Rural Netco: Ericsson's Rural NetCo aspired to be a high speed, shared broadband network to provide an affordable service and enable ICT development in rural regions. It is the first wholesale company set-up to cater for rural areas. Ericsson tested it with one of the largest operators in Tanzania, and April and May 2011 saw Rural NetCo reaching a milestone when they announced coverage across 18 regions in rural Tanzania.
Changing Lives Award	Safaricom's M-PESA service was used for a nationwide fundraising initiative, responding to the worst drought facing Northern Kenya in decades. The objective was to raise 500mil Kenyan Shillings in 4 weeks (approx \$5 million US) to feed 4 million Kenyans facing starvation. In four weeks, the amount raised was three times more than what Kenya Red Cross Society had been able to raise in six months globally. Within those four weeks close to 300,000 needy Kenyans received emergency food and water – averting impending disaster.

Source: <http://www.africomawards.com/>

The **MobileMonday Peer Awards** 2010 winner in Base of the Pyramid category was iCheki, a Kenyan mobile startup. Another finalist at the awards was AkiraChix.

Sony Ericsson has unveiled a regional competition called **Apps for Africa**, to promote mobile innovation as well as drive sales of its smartphones. Its 2012 competition was open to students and small and medium-sized enterprises (SMEs) based in Kenya, Burundi, DRC, Comoros, Madagascar, Mauritius, Rwanda, Seychelles, Tanzania and Uganda.

Sony Ericsson's 2012 winners for the Apps for Africa competition have been finalised (<http://www.ericssonapplicationawards.com>). Winners for Central Africa include SenMobile, Thinkers and Dunde. The winning app from SenMobile addresses a specific need in Senegal. Its primary function is to crowdsource the pricing of various types of fish in a geographic area. The idea is that this will reduce the overall prices by eliminating gouging and to stabilise regional prices. Integration with Mobile Maps/Google Maps makes it easy to see geographic pricing.

In Africa East, the winners were Afrosilicon, Komunity Bora and MedAfrica. The Afrisilicon comprises three first-year students at the Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Nairobi (Business Daily Africa: <http://bit.ly/xsHq4k>). Their app combines social elements, mobile money, and an event scheduler. Dubbed 'Funkies', the app notifies the user of upcoming events while allowing him/her to reserve a ticket for the event via mobile money partners, and even share details of the event via social networks like Facebook.

Other 2011 finalists include NabdaCare from Egypt, with their mobile and distance health application. "There is much talent and thereby potential for the growth of society, life and business," according to Lars Lindén, Head of Ericsson Region Sub-Saharan Africa.

In other African mobile awards, **Nigeria's Mobile Content Awards** 2012 recognises best innovators in mobile games, imaging, music, videos, mobishows/cellsodes, and streaming.

PART V: Mobile Momentum: Shifts in Africa

In addition to the innovation developments from 2011-2012 tracked in earlier parts of this report, this section addresses broader industry movements in the areas of mobile connectivity, media services, social inclusion, and political impacts.

Mobile phones will outnumber humans by the end of 2012, according to a report by technology company Cisco. There will be more than 10 billion mobile connected devices by 2016 - more than the estimated global population of 7.3 billion (News.com: <http://bit.ly/zeze4l>). The increase in mobile phone use will come largely from the Middle East and Africa – which are predicted to experience a compound annual growth rate of 104 per cent - along with the Asia Pacific region.

The number of African people with access to mobile devices will one day surpass those with access to electricity, according to political analyst Daniel Silke, speaking at a Cisco CxO Forum in South Africa (IT Web: <http://bit.ly/GOVPLg>). Africa has 139 million Internet users, according to the Internet World Statistics; in 2000, it was a meagre 45 million. Out of these 139 million users, 37 million have Facebook accounts. 39% of urban South Africans and 27% of rural users are now browsing the Internet using their mobile phones. At least seven million South Africans now have Internet access on their phones. Nigeria has the most Internet users in Africa with 44 million users; Egypt is in second place with 20 million; Morocco third with 13 million; and South Africa is fourth with seven million, according to Silke.

Table 5: Mobile market overview: Sub-Saharan Africa

Category	2008	2010	2012	2014	2016
Mobile Connections	262,942,000	387,703,000	502,934,000	605,817,000	700,368,000
Mobile 3G Connections	6,154,000	23,505,000	89,407,000	147,220,000	186,752,000
Service revenue (USD)	30,964,800,000	36,840,000,000	48,850,900,000	59,257,500,000	68,286,300,000
ARPU (USD)	11.51	8.66	8.53	8.49	8.42
Mobile penetration	32.1%	45.3%	57.1%	66.8%	75.4%

Source: *Analysys Mason*

Jan Vermeulen ranks South Africa's leading social networks as Mxit, Facebook, BBM, Twitter and LinkedIn (MyBroadband: <http://bit.ly/ySA4LM>). South Africans are the most active Twitter users on the continent, followed by Kenya, Nigeria and Egypt.

"Technology also plays an important part in the new African boom. Probably the most astonishing development success since 2000 in Africa has been the communications revolution. A dozen years ago, merely making a phone call (or receiving one) was virtually impossible even in Africa's most important commercial centres. No longer. The advent of mobile telephones has brought instant communications to hundreds of millions of Africans, rich and poor, urban and rural. Africans are now on the move," observes G. Pascal Zachary (The Atlantic: <http://bit.ly/zD3h15>). The Economist magazine has apologised for its former Afro-pessimism, and its editors now conclude that "a profound change has taken hold" in the region, according to Zachary.

Today, Africa's eight largest mobile networks are **Vodafone** (in Ghana, South Africa, Egypt), **Telefónica** (Sudan, Morocco), **Airtel** (Burkina Faso, Chad, Republic of the Congo, Democratic Republic of the Congo, Ghana, Kenya, Nigeria, Uganda), **Orange** (Botswana, Cameroon, Egypt, Equatorial Guinea, Ivory Coast, Kenya, Madagascar, Mali, Niger, Senegal, Uganda, Togo), **Beeline** (Egypt, Algeria, Burundi, Central African Republic, Namibia, Zimbabwe), **MTN** (the largest, in 21 African countries), **Etisalat** (Benin, Burkina Faso, Central African Republic, Egypt, Gabon, Ivory Coast, Niger, Nigeria), and **Qtel** (Algeria, Tunisia), according to IT News Africa (<http://bit.ly/wsGcfw>). The report "Connecting Africa" by Booz and Company cautions, however, about continued regulatory risks, shareholder disputes and extreme pricing pressure in Africa.

Ericsson Group CEO and President Hans Vestberg estimates that a 10% increase in mobile broadband penetration could translate to a 1% increase in GDP growth for a country's economy, depending on the baseline penetration (MoneyWeb: <http://bit.ly/GMkktN>). Approximately 80

jobs could be created for every 1,000 broadband connections made in a developing economy.

Mobile broadband can help Africa reach its Millennium Development Goals, according to Hamadoun Touré is secretary-general of the ITU, in a CNN report (<http://bit.ly/wAKRcv>). In the next five years, there are likely to be as many mobile cellular subscriptions as there are people on this planet, and by 2020, pundits predict more than 50 billion connected devices. With seven billion people's needs to serve, ICTs represent the single most powerful channel ever to reach out to the world's population.

In the areas of education, health, and the environment, mobile broadband has a key role to play. Broadband can better engage children, equipping them with valuable ICT skills and opening a window on the world's information resources, in a multitude of languages. From simple SMS reminders for vaccinations to grassroots information gathering on demographics and diseases, cellphones are becoming a key cornerstone of health programs in a growing number of African countries. "Because we understand the incredible potential of broadband, we launched the Broadband Commission for Digital Development to help move broadband to the top of the political agenda," according to Toure (<http://bit.ly/wAKRcv>). "Ubiquitous mobile broadband is a big idea whose time has come," he explains.

There are four critical targets for all countries to strive to attain by 2015:

Target 1: Making broadband policy universal. By 2015, all countries should have a national broadband plan or strategy or include broadband in their universal access/service definitions.

Target 2: Making broadband affordable. By 2015, entry-level broadband services should cost less than 5% of average monthly income.

Target 3: Connecting homes to broadband. By 2015, 40% of households in developing countries should have Internet access.

Target 4: Getting people online. By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in least-developed countries.

On the industry front, a number of international players are ramping up Africa strategies and operations, according to reports in The Citizen (Tanzania: <http://bit.ly/H0U67J>). France Telecom and Vodafone are contemplating expansion, but will face competition from the likes of Russia's Vimpelcom, South Africa's MTN and India's Bharti Airtel. In 2010, China Mobile lost a bidding war to Bharti, who took on telecom units in 16 African countries. The market is fragmented in 56 countries, and consumers in Africa tend to spend only between \$1 to \$10 a month on telecommunications.

In Ethiopia, where this Mobile Africa report is being launched by MobileMonday, companies are increasingly taking advantage of the benefits associated with ICTs, and local organisations are working in partnership with technology suppliers to realise the growing use of ICT in the country (<http://bit.ly/HOAY1>). For instance, Huawei has introduced a major mobile broadband technology program in Ethiopia. It is seeking ICT markets in Africa to achieve its aim of 'Growing with Africa' and has invested an estimated US\$ 1.5 billion towards the development of African economies and the telecom sector.

Technology events overseas are also increasingly addressing mobile developments in Africa. For instance, Liz Ngonzi, Technology Instructor at New York University, and fellow Ugandan T.M.S. Ruge organised the panel "Africa, Tech & Women: The New Faces of Development" at the recent technology conference, SXSW (<http://bit.ly/x4XRZf>). Profiled topics included Digital Advocacy (Ebele Okobi, Yahoo!), Small Business Mobile Advertising (Isis Nyong'o, InMobi Africa), and Media and Internet Connectivity (Deborah Ensor, Internews).

The recent Mobile Web East Africa 2012 conference highlighted regional impacts of mobiles, covered by BizCommunity (<http://bit.ly/GNLXDK>). The Kenyan government has embraced the mobile web, and in the process has managed to save in the region of US \$1 million, according to Bitange Ndemo, the permanent secretary in the Kenyan Ministry of Information and Communications. The government has reportedly set a date of 2013 for a complete shift to eProcurement for all its needs. An iCow study illustrates that 82% of farmers who try the mobile services platform stay with it, and they experience an increase in milk production of up to 56%. This translates into a 42% increase in income, mainly due to increased milk production.

According to CEO of Vikantti Software, Emeka Okkoye, Nigeria has 30 million devices, two-thirds of which have Internet access; 60% of all Google searches in Nigeria come from mobile devices. There was a 256% increase in ad impressions served in Kenya over the past 12 months, according to mobile ad network inMobi. 95% of Kenyans already see their mobiles as a business tool, according to John Waibochi of Virtual City (<http://bit.ly/GNLXDK>).

On the mobile finance front, African countries have been urged to consider expanding microfinance and foster development through wireless tools and apps. "Services through M-pesa, tigo pesa, Ezy-Pesa, Z-pesa and Airtel money in Tanzania are an opportunity for change," according to Benno Ndulu, Governor of the Central Bank of Tanzania (AllAfrica: <http://bit.ly/GOOHpl>).

The African financial inclusion policy is important in all developing countries because the mobile financial services market is growing fast, mostly consisting of money transfers, according to Alfred Hannig, Executive Director of Alliance for Financial Inclusion (AFI). In 2011, about half of the 78 mobile money ventures launched around the world came from Africa, spanning more than 20 countries (MarketWatch: <http://bit.ly/GRNDgc>).

The African Development Bank (AfDB) Group and India's Yes Bank have held a joint Indo-African Knowledge Exchange Workshop on regulation of cross-border mobile payments and regional financial integration. Topics included easing of financial integration by facilitating cross-border mobile money flows, while maintaining regional and national financial stability and integrity (Ghana Business News: <http://bit.ly/wos4wD>).

There is about Sh1.5 trillion at any given moment circulating in the mobile banking systems in Tanzania, compared to Sh 620 billion monthly transactions in the inter-bank cash market and Sh2.3 trillion in circulation (The Citizen: <http://bit.ly/GPBx9m>). There are about 16.8 million mobile banking services subscriptions with M-Pesa having eight million subscriptions, Airtel money with seven million and Ezy Pesa with 1.8 million. To mitigate risks of fraud in mobile transactions the BoT is regulating mobile operators via Know Your Customers (KYC) strategy which helps operators to clearly understand their customers. The African Mobile Observatory 2011 report has ranked Tanzania as number eight in Africa and second in the East African region for having the highest level of mobile penetration and subscription number of mobile phone services.

CGAP, Grameen Foundation, and MTN Uganda have announced plans to introduce a new initiative to research and develop mobile financial products for the poor (MarketWatch: <http://bit.ly/GS6TKC>). CGAP, an independent policy and research center dedicated to advancing financial access for the world's poor, together with MTN and Grameen Foundation, will provide US\$1 million in financing to this initiative. The aim is to build upon the extensive research already conducted through Grameen Foundation's Application Laboratory (AppLab) in Uganda and to leverage MTN's Mobile Money service.

"To achieve our goal of financial inclusion for all, the industry needs to move beyond mobile payments and provide a full array of pro-poor mobile financial products," said Tilman Ehrbeck, CEO of CGAP. The success of mobile operators in online payments has spurred other heavyweights to enter this space. For example, Orange Money customers in the Middle East and Africa will be able to use Visa prepaid accounts for retail and e-commerce purchases as well as for ATM withdrawals and other Visa-related payments. The service will be available in seven countries across Africa and the Middle East in the coming year, and it will be accessible by more than 30 million subscribers (ZDnet: <http://zd.net/HOL9v5>).

Another emerging mobile opportunity in Africa is in m-health. Africa may well generate \$1.2 billion in revenue for operators, handset vendors and healthcare providers from m-health by 2017, according to a 2012 report released by the GSM Association (GSMA) titled 'Touching Lives through Mobile Health: Assessment of the Global Market Opportunity', conducted by PwC.

To enable this opportunity, the report urged governments, regulators and healthcare providers to work with mobile operators and organisations in the broader mHealth ecosystem to support the roll-out and adoption of new mHealth services. "By 2017, mobile technology will be a key enabler of healthcare delivery reaching every corner of the globe," said Jeanine Vos, Executive Director, mHealth at the GSMA.

Higher mobile phone penetration leads to more business opportunities and also to more

efficient business processes. “Both the formal and the informal economy benefit from affordable mobile telephony and wide coverage. Be it hair dressers, taxi drivers or labour lawyers, Africans across various businesses and industries profit from a boost in productivity through mobile technology,” explains Christoph Stork, senior researcher at Cape Town-based agency, the Research ICT Africa network (BizCommunity: <http://bit.ly/zNOGqs>). Mobile adoption enhances rural entrepreneurship since it lowers costs of starting a business and can substitute travel needs.

For example, Ivory Coast’s N’Kalo (“I’m informed” in the local Dioula language) scheme provides over 9,000 farmers with text messages every week about the latest market information. Cashew farmers use this information to decide whether to sell or hold on for a higher price (BBC: <http://bbc.in/H5A7p9>). Despite widespread poverty, around 70% of cashew nut farmers have mobile phones, making it an ideal way to spread market information. The scheme is run by international aid agency Rongead, which works with local partner Chigata. Ivory Coast is now the world’s third largest producer and the biggest in Africa.

The growth of the mobile subscriber market is also spurring media startups and services in the areas of mobile marketing and advertising. Vomo South Africa (<http://bit.ly/wvJn7N>) singles out three mobile marketing campaigns that are unique and creative: AVBOB Funeral services (the mobile survey lead to a customer conversion rate of 15%), Livemobile Football (football stats and live game information during the Confederation Cup), Surf Pick-A-Box (drive awareness of the new brand of cleaning product).

Mobile ad network Twinpine’s cofounder Oduntan Odubanjo, in an interview with Forbes magazine (<http://onforb.es/wxUbqn>), claimed the company already has accounts like MTN, Nokia, Google, Pepsi, Autodesk, Jobberman, Wakanow.com, Vconnect and Jana. “We also work with over 20 local and international digital advertising agencies to develop mobile advertising campaigns across Africa. On the publisher side of the space we have local publishers in Nigeria, Kenya and Ghana including Guardian, Vanguard, Jobberman, Businessday, Complete Sports, Standard Media, Daily Nation and Ghanaweb,” according to Odubanjo.

On the startup investment front, Omidyar Network and ACCION International have invested US \$3.2 million in Mobile Transactions International (www.mtzi.net), a Zambia-based company that leverages mobile technology and an agent network to enable financial transactions across the Zambian economy. With a proprietary technology platform and countrywide agent network, Mobile Transactions makes transacting easy, quick and safe by replacing cash with electronic currency. The investment from Omidyar Network and ACCION, the first venture capital deal in a Zambian start-up technology company, will enable Mobile Transactions to develop its leadership team, agent network, and technology platform to provide financial access to underserved organisations and base-of-the-pyramid consumers in Zambia and in new markets.

“Omidyar Network believes that Mobile Transactions demonstrates the potential of a ‘cashless Africa’ to transform the way people and organizations transact in emerging markets,” said Arjuna Costa, Director of Investments at Omidyar Network. As part of the transaction, both Costa and Monica Brand, fund manager for ACCION’s Frontier Investments Group, will join Mobile Transactions’ Board of Directors.

“From the cotton farmer in rural regions to the small shop in Zambia’s urban centers, Mobile Transactions is expanding financial inclusion and integrating the unbanked into the broader economy,” according to Monica Brand of Frontier Investments.

In 2010 John Waibochi, founder and CEO of Kenya’s Virtual City Group, won the Nokia Growth Economy Venture Challenge, which came with a US \$1 million cash prize (<http://bit.ly/GRPRgh>). The company’s mobile supply chain solutions are used by at least 300,000 tea farmers, eg. for automating produce purchasing transactions.

Janet Roberts chief marketing officer at Syniverse Technologies, identifies five global areas where mobiles are transforming lives: philanthropy, politics, education, economics and healthcare (Cable360 Community Technology News: <http://bit.ly/wnTwjV>). Mobile has become one of the most effective methods of nonprofit fundraising, allowing aid organisations to benefit from contributions to fund emergency relief efforts and ongoing programs. Over the past two years, SMS has proved to be a key tool for real-time election monitoring in several countries in Africa (some experts forecast that eventually smartphones will become the main medium for casting ballots in the US).

Other entrepreneurs are also setting up shop in countries such as Ethiopia. For example, technopreneur Woldeloul Kassa returned from Silicon Valley and began producing a mobile phone supporting the Amharic language, without which mobile data services would be inaccessible to the majority of Ethiopians, particularly in rural areas (NewsDire: <http://bit.ly/H2rCdO>). His venture, TANA Communications, received a 70% loan from the Ethiopian Development Bank. It is estimated that in the next three years, the number of mobile phone users in Ethiopia will increase by 30 million. The phone is currently sold at 370 birr (\$20) including airtime; components are supplied by Chinese company ZTE.

With regard to education, the BridgeIT program in Nigeria provides public school teachers with access to hundreds of educational materials on an array of topics, including science, math and language, all via a mobile application or text messaging. The World Bank has calculated that the gross domestic product (GDP) of low- to medium-income economies increases by 1 percent for every 10 percent increase in mobile penetration. A six-month study in Kenya revealed that sending twice-daily text messages detailing treatment tips to healthcare workers cost-effectively improved the quality of care for African children with malaria, according to Roberts.

Internet and mobile search giant Google also sees that Africa is getting richer and more connected. Africa's sparsely populated Internet is a money-making opportunity for Google and an army of African developers is being trained to help fill in the gaps via mapping initiatives and application developer support. Africa's future is an online and a mobile one, according to The Africa Report (<http://bit.ly/HOZGJg>).

"Innovation is not what it used to be. It's no longer limited to the usual places, to the usual social groups, or the usual personality types," observes Francis Pisani, writing about mobile innovation in Africa (The Next Web: <http://tnw.co/GM7ZG1>).

A range of mobile innovators continue to emerge in areas like mobile messaging. Saya Mobile, a Ghanaian mobile messaging company, has revealed its messaging product Saya, described as Africa's Whatsapp equivalent. Robert Nii Lante Lamptey, Saya Mobile CEO, says the app is much cheaper than SMS, bringing mobile users a chat application that enables them stay in touch with their phone contacts via unlimited messages and images (IT News Africa: <http://bit.ly/GOWGvv>).

Corporate reports which mention regional mobile potential include the IBM East Africa white paper, "A Vision of a Smarter City: How Nairobi can lead the way into a prosperous and sustainable future." It looks at the use of mobile signal density and triangulation to pinpoint and predict traffic problems. Ideally, working with the telcos, city planners could gather data on patterns of traffic before it builds up into congestion (The Star: <http://bit.ly/AfukJE>). Such a project could work on a public-private partnership (PPP) basis; with government using telcos to collect such data, IBM could offer analytics through its intelligence operations. Nairobi was ranked the fourth most painful city to commute in, according to an IBM global survey; the economy is estimated to lose about Sh 50 million daily in traffic congestion.

In its February 2012 issue, Forbes Africa magazine published its list of Africa's top 20 tech startups. Each of the startups included in the list had to meet the following criteria: they must have been in operation for less than 10 years; provide solutions to some of the continent's most pressing socio-economic and communication problems; have a robust social media presence, and be Pan-African in scope and service offering. The startups that made the list are profiled in Table 6.

In addition to business opportunities, social inclusion via mobiles continues to be a pressing concern for ICT4D activists. "Portraits: A Glimpse into the Lives of Women at the Base of the Pyramid," a report released at the Mobile World Congress 2012 in Barcelona, surveyed the wants, needs, aspirations and mobile uses of women living at the base of the pyramid (BoP), defined as those living on less than \$2 a day, according to the GSM Association.

The research was conducted in partnership with the Australian Agency for International Development (AusAID) and the U.S. Agency for International Development (USAID), with primary research undertaken by TNS. The GSMA multi-country research and primary fieldwork was conducted with more than 2,500 BoP women in Egypt, India, Papua New Guinea and Uganda, with secondary research contributions from other parts of the developing world.

"Our ultimate goal is that the research will lead to the private and public sectors working in partnership with BoP women on the development of mobile services that truly meet their needs,"

says Trina DasGupta, GSMA mWomen program director (www.mwomen.org). “We believe any mobile product or service aiming to serve BoP women in a commercially successful manner must meet the actual lived needs of BoP women, as expressed in their own voices.”

Table 6: Forbes Africa’s list of Top 20 TechStartups

Startup	Profile
Mxit	Founded in 2003 by Namibian entrepreneur Herman Heunis, Mxit is a mobile instant messaging utility which offers social networking, voice clips, music & entertainment, banking and other community based applications. Subscribers can connect to other social networks and IM applications. It has over 30 million users.
Yola	Founded by South African-born internet entrepreneur Vinny Lingham in 2007, Yola (formerly known as Synthasite) is a website builder which lets you create your own website with easy-to-use drag and drop multimedia features.
Dropifi	Founded in 2011, Dropifi is a Ghanaian web messaging platform which helps companies better analyze, visualize and respond to incoming messages from contacts.
Cobi Interactive	Cobi Interactive is a leading South African mobile software development company that provides mobile technology and strategy consulting for top African corporations.
FloCash	FloCash allows anyone with an email address and mobile number to send and receive money across Africa simply and easily.
Obami	Founded in 2009, Obami is a social network and learning management system for South African schools, teachers and students.
Bandeka	Founded in 2011, Bandeka is an invite-only online community where well-educated Africans can connect with other equally successful professionals, thereby building lasting relationships over the long term.
Jobberman	Founded in 2009, Jobberman.com is West Africa’s most popular job search engine and aggregator.
Motribe	Motribe is a mobile platform enabling users, brands, agencies and publishers across the world to build and manage their own mobile social communities.
PesaPal	PesaPal is a payment platform that enables Kenyans to buy and sell on the Internet using M-Pesa, Zap and Credit Cards.
Synaq	Synaq provides messaging and security products built around open source solutions.
Rupu	Rupu is a Kenyan daily deals website modeled after Groupon.
BongoLive	Bonglive is Tanzania’s first targeted opt-in based SMS advertising service.
Skyrove	Skyrove is South Africa’s largest independent Wi-Fi hotspot network with over 600 Wi-Fi hotspots in South Africa.
Njorku	Founded in Cameroon, Njorku is a career and recruitment services platform focused on Africa.
Ushahidi	Founded in Kenya, Ushahidi develops software for information collection, visualization and interactive mapping.
SMSGH	SMSGH, a Ghanaian startup, offers bulk SMS solutions, SMS Gateway solutions and mobile web solutions.
Hummba	Hummba is a social and travel networking website that lets you download free audio travel guides and share travel experiences directly from your mobile phone.
10Layer	A South African startup, 10Layer is a CMS system targeted specifically at newsrooms.
Sembuse	Sembuse is a South African mobile social network & instant messaging platform similar to Mxit.

Source: Adapted from Forbes Africa (<http://onforb.es/wHyedy>)

The GSMA report has a number of interesting and important findings. Seventy-four percent of married women who did not want a mobile phone said it was because their husbands would not allow it. Seventy-three percent of participants expressed interest in entrepreneurship to help support their families, indicating that mobile solutions that help manage business or set up mobile retail enterprises could be particularly impactful. Thirty-eight percent of BoP women live “off the grid,” without easy access to an electricity source. Seventy-seven percent of BoP women have made a wireless call, but only 37 percent have sent an SMS, regardless of literacy levels. Eighty-four percent of women wanted better healthcare information; however, only 39 percent expressed a specific interest in receiving general healthcare information through their mobile phones. Therefore, mobile health offerings have to be geared closely toward women’s needs and communicated clearly to be fully utilised.

Another major impact of mobile has been in political activism, with a combination of social media and wireless access. Twitter came of age in Africa in 2011, according to a study by Portland Communications and Tweetminster of geo-located tweets from the continent. Africa’s

twitterati are largely young and middleclass, with 60 percent of users aged between 21 and 29 compared with the worldwide average age of 39 (The Africa Report: <http://bit.ly/GP7Ejg>). Of the 4-5 million users, 81 percent used Twitter for social conversation whilst 68 used it to monitor news. 'Revolution' and 'elections' were the big hashtag trends of 2011. Young activists in Egypt used Twitter and Facebook to coordinate protests, while in South Africa the country's 'secrecy bill' was a long-running trend on Twitter towards the end of the year.

The Arab Spring in north African countries such as Tunisia and Egypt has attracted a lot of attention from leaders, political commentators and telecom analysts. Arab leaders are beginning to strategise, albeit somewhat sceptically, for development of mobile and Internet infrastructure, according to an Al-Jazeera report (<http://aje.me/AEV5d1>) on the recent Connect Arab States Summit in Doha which brought together political and industry leaders from 21 countries in the Middle East and North Africa. The innovative and surprising ways in which activists have begun using communication technology has forced governments everywhere to realise the extent to which freedom of information has empowered their citizens.

World leaders have finally been shaken into awareness of the true potential of ICTs, according to Paul Budde, an independent ICT consultant and adviser to the Broadband Commission for Digital Development, the joint initiative linked to the ITU and UNESCO. Governments would be wrong to try to reverse the empowerment that comes with ICT development. Pax Technologia, the ITU's latest report on the Arab region, shows that there is a growing gap in ICT access between the oil-rich Gulf countries and the rest of the region. By the end of 2011, there was an average of 97 mobile subscriptions for every 100 people across the Arab states (the ITU includes 21 countries in the Middle East and North Africa in its reports).

But many ordinary Algerians have reportedly found it increasingly difficult to get online, under security restrictions introduced by the interior ministry after the Arab uprisings began more than a year ago. As many as half of the country's Internet cafes have been forced to close under the new restrictions (<http://aje.me/AEV5d1>).

In other countries, more Africans are leveraging mobile services to foster peace, handle life issues and access medical advice. For instance, Kenyan villagers are using Twitter to prevent crime. The crime rate is reportedly down in the village of Lanet Umoja, thanks to its administrative chief Francis Kariuki's tweets about robberies, missing children and stolen farm animals (Mobiledea: <http://bit.ly/GSvGxZ>). In October 2011, Somalis received donations from humanitarian aid organisations via a mobile money transfer system which bypassed the region's al Shabaab insurgent rulers, who control much of the countryside and have banned outside food assistance.

But as for environmental impact, electronic waste levels in West Africa are rising as more people in the region buy mobile phones and personal computers. According to a UNEP report, African countries such as Benin, Côte d'Ivoire, Ghana, Liberia, and Nigeria have been generating between 650,000 tons and 1,000,000 tons of domestic e-waste each year from 2009 to 2011.

"We can grow Africa's economies, generate decent employment and safeguard the environment by supporting sustainable e-waste management and recovering the valuable metals and other resources locked inside products that end up as e-waste," said Achim Steiner, executive director of the UN Environment Programme (IT Web: <http://bit.ly/GOBKXC>). The problem of e-waste in West Africa is exacerbated by second-hand devices that are exported from places such as Europe to countries such as Nigeria.

Part VI: Mobile Market Challenges, Opportunities and Recommendations

The concluding section of this report picks up on the conversations which kicked off the first section of the report on mobile innovation; we now address the broader implications of the mobile revolution in Africa, from the perspectives of the experts interviewed in 2012. The experts were also asked to identify the most promising opportunities in the mobile sector in Africa, key challenges facing the growth of mobile, and recommendations for the industry with regard to inclusion and sustainability. Highlights of the insights are summarised in Table 7, and discussed in more detail in this section.

Table 7: Mobile market challenges, opportunities and recommendations

Expert	Key challenges facing the growth and maturity of the mobile market in Africa today	Emerging opportunities in the mobile sector in Africa today	Recommendations for the mobile industry to grow the market in a more inclusive manner and support innovation
Sean Pashley, Starfish Mobile	<ol style="list-style-type: none"> 1) <u>Quality handsets remain out of reach of many subscribers</u> 2) <u>Low disposal income means limited funds for VAS services</u> 3) 3G tends to be limited to major cities only 	<ol style="list-style-type: none"> 1) Mobile payments 2) mProjects (education, health & farming) 3) Mobile advertising 4) mBanking 5) utility applications 	Break down the silos that exist amongst the various stakeholders and sectors within the ecosystem.
Jussi Hinkkanen, Nokia Middle East and Africa	<ol style="list-style-type: none"> 1. Sub-standard and fake devices that create problems for QoS of networks 2. Slow liberalisation of telecom markets 3. High level of device and services taxation 	<ol style="list-style-type: none"> 1. Locally relevant mobile content and services 2. Thematic opportunities are in trading, entertainment, education, health, etc. 	<ol style="list-style-type: none"> 1. Entrepreneurial development is key 2. Reduction of mobile device and services related tariffs 3. Governments to follow example of Kenya for Open Government
Ham M. Namakajjo, Google Uganda	<ol style="list-style-type: none"> 1. Cost of services/unfavorable pricing models, particularly for data 2. High cost of devices 3. Lack of consumer awareness of mobile Internet 	<ol style="list-style-type: none"> 1. Enhanced services (financial or otherwise) unlocked by the mobile money system 2. Willingness of operators to open their APIs 3. Explosion of Social Media 4. Downward pressure on smartphone cost driven by OSs like Android 	<ol style="list-style-type: none"> 1. Look at New Media companies as strategic partners rather than adversaries 2. Figure out models to finance/subsidise devices 3. Invest in education and consumer awareness about mobile Internet
Ken Banks, Kiwanja	<ol style="list-style-type: none"> 1. Mobile coverage, high-speed data 2. Handset costs 3. Service costs 	<ol style="list-style-type: none"> 1. Mobile money, mobile payments 2. Social mobile 3. Appropriate mobile (eg. energy) 	<ol style="list-style-type: none"> 1. Cooperation between industry and non-profit sector 2. Increase coverage, at low cost
Alan Knott-Craig, MXIT	<ol style="list-style-type: none"> 1. Price wars are a massive threat for consumer services in the long run 2. Data optimisation 3. Mobile payments 	<ol style="list-style-type: none"> 1. Cross border payments 2. Audio content 3. Marketplaces 	<ol style="list-style-type: none"> 1. Think long term. 2. Invest in infrastructure. 3. Avoid the temptation to make a quick buck.
Jones Killimbe, RASCOM	<ol style="list-style-type: none"> 1. ARPU 2. Frequency availability/ frequency congestion 3. Capex & licensing costs (in Tanzania and Cote D'Ivoire) 	<ol style="list-style-type: none"> 1. Internet 2. Financial transactions (money transfer etc) 3. TV reception 4. Other IT apps 	<ol style="list-style-type: none"> 1. Promote mobile internet more particularly in schools and colleges (education centers); children represent the future of mobiles and innovation 2. Reduce roaming costs to support mobility, increase traffic volumes.
Hajo van Beijma, TextToChange	<ol style="list-style-type: none"> 1. Government regulations, banking rules 2. Conservative investments by telcos 3. High costs of power 	<ol style="list-style-type: none"> 1) Mobile money transfers between telcos 2) M-governance 3) Search based on voice, SMS 	Treat the base of the pyramid as your new customers
Arthur Goldstuck, World Wide Worx	<ol style="list-style-type: none"> 1. Cost 2. Availability of infrastructure 3. Quality of the user experience 	<ol style="list-style-type: none"> 1. WiFi offload 2. Content for mobile access (eg. education, e-government, health) 	Networks need to be more supportive and provide better incentive for content creators and providers
Uwe Schwarz, Sibesonke	<ol style="list-style-type: none"> 1. Price competition in voice, SMS 2. Financing for Africa focused ventures 3. Coordination, innovation and network interoperability 	<ol style="list-style-type: none"> 1. m-health 2. m-payment and other financial products 3. m-agriculture 	<ol style="list-style-type: none"> 1. Leap-frogging services 2. Fast-to-market solutions 3. m-health, m-education, m-agriculture
Fred Milosevic, NedBank Capital	Only a couple of mobile markets are fairly mature and post-growth (SA, Botswana, Kenya). Others have weak economic KPIs (eg. Malawi) or too high competition-levels (eg. Burundi)	<ol style="list-style-type: none"> 1. Market opportunities: Angola, Ethiopia 2. Tech opportunities: Wifi 3. Service opportunities: payment, social 	Invest more in social innovation and think seriously how you can leverage existing networks and services into commercially viable social and green innovation

Carlyle Fernandez, Nokia-Siemens Networks	<ol style="list-style-type: none"> 1. How to connect the remaining 40% of Africa (rural) 2. Explosive need for data bandwidth 3. Availability of spectrum for mobile broadband 	<ol style="list-style-type: none"> 1. Mobile broadband 2. Expectation of people to be always connected, not just through voice but also data 	
Janice Allem, SilverStoneCIS	<ol style="list-style-type: none"> 1. Data: cost, speed, accessibility 2. Mobile strategy is not integrated within overall communication strategy 3. Brands/ agencies not convinced that mobile works 	<ol style="list-style-type: none"> 1. Creating permission based communities, mobile CRM 2. Incubator opportunities 3. Location based services 	MobileMonday is an ideal platform to drive industry innovation in Africa; brands should team up with MoMo
N. Arjun, Airtel Africa	<ol style="list-style-type: none"> 1. High cost. 2. Elasticity of growth. 3. Poor coverage in the rural areas due to lack of RoI in those areas. 4. High churn rate 	<ol style="list-style-type: none"> 1. Data 2. m-Commerce 3. Content 	
Alison Gillwald, Research ICT Africa	<ol style="list-style-type: none"> 1. Ineffectual regulation of incumbents/dominant players 2. Lack of air/affordable access to next generation spectrum 	<ol style="list-style-type: none"> 1. Data 2. Social network 3. Mobile money 	<ol style="list-style-type: none"> 1. Bring down prices through reducing monopoly rents/excessive surpluses 2. Build profitability on increased demand (lower margins) and more efficient use of networks.
Kai Wulff, KDN	Lack of understanding by operators of dynamics of user problems in paying for calls, handsets, energy	More social and business networking.	Open up to new business models. Like Web 2.0, there must be TELCO 2.0!
Jonathan Hoehler, MobileMonday Jo'burg	<ol style="list-style-type: none"> 1. Decreasing ARPU 2. Delivering data capacity in-land 3. Affordable data + device costs 4. Openness of government agencies and regulators 5. Illiteracy of mobile subscribers in order to engage with richer mobile services 	<ol style="list-style-type: none"> 1. Mobile Money and Mobile Payment solutions 2. Mobile sites via feature phone and smartphones devices 3. Rise of M-Class services like M-Education, M-Health, M-Agriculture 	<ol style="list-style-type: none"> 1. Regulators and mobile operators to be more open and engaging 2. Favourable revenue generating opportunities by operators 3. Access, interconnections for startups 4. Industry support for startups 5. VCs and angel investors to be introduced to start-ups
Henning Brazer, Buzzcity	<ol style="list-style-type: none"> 1. Affordability of devices 2. More VAS (for business, community life) 3. High SIM turnover, hard to compile an accurate customer profile 	<ol style="list-style-type: none"> 1. Mobile commerce is clearly taking the lead 2. Services that cater to the more mature users and women 	Local players need to look beyond consumer services into business centric services that support local businesses
Vanessa Clark, Mobiflock	<ol style="list-style-type: none"> 1. Skills shortage 2. Bandwidth costs and speed 3. Admin and tax burden on startups 	<ol style="list-style-type: none"> 1. M-payments and m-commerce 2. Location-based services built around the "me" generation 3. Mobile communities: reviews, endorsements, recommendations 	<ol style="list-style-type: none"> 1. Skills development, skills development and more skills development! 2. Create an environment where it is easier for startups to setup and succeed.
Emmanuel Oluwatosin, MoMo Nigeria	<ol style="list-style-type: none"> 1. Data cost and penetration 2. Lack of human resources and funding for tech startups 	<ol style="list-style-type: none"> 1. SMS apps 2. Mobile Apps development 3. Creating mobile websites 	<ol style="list-style-type: none"> 1. Support incubators 2. Pitching Events 3. Training programmes for techies to have world-class skills
Franco Papeschi, Web Foundation	<ol style="list-style-type: none"> 1. Definition of the mobile market in itself! 2. Access: cost and habit 3. Product/Market fit 	<ol style="list-style-type: none"> 1. Services enabled by mobile payments 2. Services to support SMEs go 'digital' 3. Entertainment 	
Gustaf Engstrand, MoMo Lusaka	<ol style="list-style-type: none"> 1. Lack of reasonably priced bandwidth 2. Lack of local APIs/apps 3. Lack of affordable high-quality devices 	<ol style="list-style-type: none"> 1. Apps and mobile services 2. Hardware sales 3. Mobile money 	
Khalil Al Hindwan, Acision	<ol style="list-style-type: none"> 1. Availability of low cost smartphones (<20 USD) 2. Focus on price wars rather than consumer differentiation 3. Drive to LP and IP world not clearly linked to revenue growth 4. Lack of clarity in rural connectivity investments 	<ol style="list-style-type: none"> 1. mHealth, mGov on top of mobile money 2. Green solutions, power sharing 3. Convergence and seamlessness: HSDPA, WiFi, WiMAX 4. Social networks looking at their next billion users 	<ol style="list-style-type: none"> 1. Smaller Version of the GSMA to be established only for Africa 2. Provide the consumer the ability to define his usage and plans 3. Work whole heartedly as an industry on infrastructure sharing 4. Operators need to open up their service creation environments

Mobile: Emerging Opportunities

“In a place like Africa, where mobile infrastructure and device ownership far outstrip access to roads, electricity, clean water, medical care, or wired telephones, the mobile device holds extraordinary power and potential to transform people’s lives,” according to Prodeep Bose, who regards mobile phones as “the Swiss Army knife of the Digital Age” (MediaPost: <http://bit.ly/AhsAjz>).

Emerging opportunities in the mobile sector in Africa today include data services growth by using convergent technologies (HSDPA, Wifi, WiMAX). This includes seamless user experience across the different technologies while still maintaining a personalised user experience, according to Khalil Al Hindwan, SVP and General Manager, Acision, Middle East, Africa and Pakistan.

“Mobile payments are so 2010! It is what you can do on TOP of mobile payments now that represents the new frontier of opportunity: tickets, B2B services, accounting, investments, aggregation for purchases and transactions, and the like,” according to Franco Papeschi of the World Wide Web Foundation. Other opportunities lie in services to support SMEs to go ‘digital.’ SMEs are the economic fabric of Africa. Tools that help them keep track of their flow, assets, customers, communications are likely to win in the next three years.

Another promising category is entertainment, which usually grows when a middle class base grows, as well as services that bring the simplicity to stay in touch with each other and expand this to local and central administration, education and health. “There are already good services that are focusing on the ‘top of the BoP’ in this area, and this is a crucial step to make sure that the services will be come interesting and profitable,” observes Papeschi.

Mobile broadband is the biggest emerging opportunity in the mobile telecom sector, according to Carlyle Fernandez of Nokia-Siemens Networks. The expectation of people in Africa, and across the world, is to always be connected, not just through voice but also data. And the burst of smart mobile devices has strongly driven the need for faster data connectivity to emails, access to social networks, video streaming and other data-intensive services.

Nokia Siemens Networks estimates that the demand for mobile will grow 10-fold by 2015. In 2010, data revenues accounted for over 10% of overall service revenues for operators in Africa and this will more than double by 2015. This means that mobile broadband, in particular LTE technology, will play a significant role in improving the level of quality services in Africa. By 2015, Nokia Siemens Networks expects more than 230 million mobile broadband users across the region.

“A lack of banking infrastructure in many areas means this is a large market hungry for access via mobile payment services. There is also a huge opportunity for social mobile. Local innovators in Africa, closest to the problem and with a better understanding of how to solve it, will become world leaders in mobile tech for social change. The market in Africa is also ripe for energy efficient solar handsets; the West is already behind, observes Ken Banks, founder of Frontline SMS.

M-payments and m-commerce will open up a whole new market of mobile-only customers. “There is huge potential for location-based services built around the “me” generation: ‘I want what I want to come to me when I want it,’” predicts Mobiflock’s Clark. Mobile communities will also gain via reviews, endorsements, recommendations and even the “dreaded group buying taking place around mobile-only communities,” jokes Clark.

Mobile commerce is clearly taking the lead and markets that are emerging as key players are South Africa, Kenya and Nigeria. These are likely to be followed by Tanzania. “The next opportunities are those services that cater to the more mature users and women. These underserved demographics are rising in the mobile space especially in South Africa,” predicts Clark.

The rise of m-class services like m-education, m-health and m-agriculture services via all mobile bearer types including SMS, IVR, USSD, and mobile sites and apps also represent mobile opportunities in Africa, says MoMo’s Hoechler.

There are also opportunities emerging in creating permission based communities and integrating them with a CRM strategy. “Mobile is an ideal mechanism to communicate with your customer at the right time and place, you just have to ensure you communicate the right message

and not spam your base,” advises Janice Allem of SilverStoneCIS.

There are huge opportunities in locally relevant mobile content and services which open the door for African innovators and developers. “Only African developers have the necessary contextual sensitivity for many of these services in areas like education, health, trading and entertainment,” according to Jussi Hinkkanen of Nokia Middle East and Africa.

Key mobile market opportunities are in Angola and Ethiopia; tech opportunities still lie in Wifi; and there are numerous emerging service opportunities in payment and social services, says Nedbank’s Milosevic.

As mobile data demand grows and the networks are unable to expand capacity fast enough to meet the demand, WiFi offload will become the core solution - and the greatest opportunity, observes Arthur Goldstuck, managing director of World Wide Worx.

“Mobile money is not the opportunity everyone believes it is, because the dynamics of each market in Africa are so different, and there is great complexity in meeting the needs of each market. This means there is tremendous risk, and that must temper the opportunity,” cautions Goldstuck. An emerging opportunity is the provision of content for mobile access, across sectors ranging from education to e-government to health. The media are in the best position to take advantage, but are strategically least ready for it, Goldstuck observes.

“Internet-enabled phones will grow strongly but there will remain for many years a mass market segment relying on basic phones. The most successful mobile innovations will create a platform to include both consumer groups at the same time,” predicts Uwe Schwarz, CEO of Sibesonke.

“Mobile phones are becoming more affordable by the day, whereas bandwidth costs are still very high within emerging countries. In Namibia, mobile phone technology is used to share views and opinions in the newspapers, over the radio; student results are made known to them using SMS. There is a lot of potential for mobile apps; mobile phone usage penetrated the country is already 99% and can be used to boost economic growth in various ways,” says Maggy Beukes-Amiss, lecturer in the Department of Information and Communication Studies at the University of Namibia.

Cross border payments, audio content and marketplaces information and services via mobile are other good mobile opportunities in Africa, according to Alan Knott-Craig, CEO, MXIT.

Mobile Market Challenges in Africa

Only a couple of mobile markets in Africa are fairly mature and post-growth, or near that (eg. South Africa, Botswana, Kenya). Others have weak economic KPIs (eg. Malawi) or too high competition-levels (eg. Burundi), observes Fred Milosevic, investment banker at NedBank Capital.

High cost of services and unfavourable pricing models, particularly for data, coupled with slow speeds will continue to be a barrier to adoption and hence constrain efforts to achieve higher ARPU in Africa, according to Ham M. Namakajjo, Uganda office lead for Google. This may stem from high operational costs (due limited infrastructure sharing, as in the case of Uganda) as well as high data transit costs. There is also a general lack of consumer awareness of applicability of the Internet, particularly mobile Internet, in their daily lives, which will mean that majority of users will remain basic users and hence keep ARPU flat while non-users will have little impetus for adoption.

The first problem of the mobile market in Africa is the definition of the mobile market in itself! “Sure, there are more than 500 million active subscriptions in Africa, and this is now the second continent in terms of mobile base. But this is not the size of the potential user base. For voice and SMS-based services, these have often been restricted by a difficult access-to-market path,” according to Franco Papeschi, Program Manager at the World Wide Web Foundation.

For data services, the market is smaller. According to Papeschi, statistics from StatCounter show how people in Africa are accessing web services still predominantly from a desktop access, rather than a mobile (http://gs.statcounter.com/#mobile_vs_desktop-af-monthly-201103-201202). While in Places like Nigeria, mobile has now passed desktop (http://gs.statcounter.com/#mobile_vs_desktop-NG-monthly-201103-201202), this is not true for Africa as a whole (not even in Kenya with its cheap Android phone - http://gs.statcounter.com/#mobile_vs_desktop-KE-monthly-201103-201202).

Access cost and usage habits are key challenges in the mobile Africa market. "On one side it is perceived as too expensive to access data on a mobile; on the other hand, mobile is mostly considered a one-to-one communication device, rather than a ICT tool," observes Papeschi. There are also incredibly good services out there in the market, but there is immense work to do to provide services that are useful for different aspects of people's lives. It is a matter of being creative and introducing a variety in the types of services that are proposed to the market.

"Skills shortage - the high demand for and shortage of good programmers -- is a huge challenge and unless this gets rectified, more work will be done offshore. A vibrant local community of developers could solve real problems faced by people on the continent, and then export this innovation to the rest of the world," according to Vanessa Clark of Mobiflock.

Though bandwidth costs and speed have improved dramatically, there is still a long way to go for consumer and business take up of services. "A lot more could also be done to ease the administrative and tax burden on startups, not to mention lowering the risk

for both entrepreneurs and investors. A vibrant startup and developer community is important, because this is where the innovation happens, not in large corporates, banks and so on," advises Clark.

More value added services are needed -- not just mobile content but services that support mainstream businesses and communal life. Educating the masses about these new services, particularly among low income households, is a key challenge in Africa, according to Henning Brazer, Buzzcity sales director in South Africa. "High SIM turnover among many African countries means you cannot compile an accurate customer profile beyond voice ARPU. This in turn makes adapting or creating new services difficult," says Brazer.

Mobile coverage more broadly, and high-speed data coverage more specifically, needs to grow if the market is to move to the next stage. The cheapest smart phone (at around \$75) is still too expensive. "We need a \$30 smart phone before things will really kick off. Access to services need to be affordable for the masses, and reflect the income levels of the majority of people living on a few dollars a day," observes Ken Banks, founder of Frontline SMS.

"This is counter intuitive, but price wars are a massive threat for consumer services. Lower prices equals lower profit margins equals lower infrastructure investment equals slower data speeds," observes Alan Knott-Craig, CEO, MXIT. Data optimisation is another challenge: mobile web services cannot spread without mobile operators having enabled 2G and 3G data service. And monetisation directly from users is difficult in an African context due to lack of payment options, adds Knott-Craig.

Even though subscriber and mobile connection numbers are increasing by double digits year on year, average revenue per user is decreasing. This is due to price competition, exchange rate fluctuations and lower average purchasing power of mobile subscribers as the operators connect more users from the bottom of the pyramid, observes Jonathan Hoehler of MobileMonday Johannesburg.

Though there has been an increase of undersea cables across the east and west coast of Africa, delivering that capacity in-land remains a challenge. The building of in-land transmission networks is happening but needs to increase in order to provide mobile connectivity to subscribers, according to Hoehler.

There are great case studies of price-competitive Chinese manufactured smartphones retailing for less than US\$100 in Africa -- some are as low as \$50. However the numbers are still in the tens or hundreds of thousands rather than millions. "Getting more affordable devices into subscribers hands needs to happen coupled with affordable data costs," says Hoehler.

As for mobile media, mobile strategy is not integrated within overall communication strategy for many businesses, it is still seen as a tag on. Brands and agencies are not convinced that mobile works. "They believe mobile marketing is too expensive for your lower LSMs and that they cannot or do not operate mobi sites; therefore they not willing to fully integrate mobile marketing into their strategy, which results in 'tag on type' campaigns and obviously has disappointing results," observes Janice Allem, Interactive and Mobile Strategist at SilverStoneCIS. Creative agencies are not yet familiar or comfortable with mobile, and therefore not including mobile in their campaigns.

Sub-standard and fake devices create problems for QoS of networks. There are recent

research findings that demonstrate strong correlation between poor QoS and fake penetration), national security (they are used in criminal activities), health of the consumers, privacy (e.g. mBanking) and growth of the official economy (no-one is willing to invest in formal sector if black market is more profitable), observes Jussi Hinkkanen, Vice President, Corporate Relations and Responsibility, Nokia Middle East and Africa.

Slow liberalisation of telecom markets prevents people from accessing information and benefiting from the positive impact of mobile technologies in various dimensions of everyday life (eg. access to banking services), adds Hinkkanen.

High level of device and services taxation has direct impact on the prevalence of the grey economy (black market devices are imported and sold without taxes being paid). This also prevents consumers from adopting higher value adding services such as Internet connectivity and info-services. Many countries still have a tariff regime in place that favours immediate tax income instead of a 'long tail effect' through broad socio-economic development empowered through improved access to information and value added services, observes Hinkkanen.

For instance, in Uganda, the 30% so-called luxury tax on importation of mobile phones is still hurting the prospects for higher penetration, according to Daniel Stern, founder of Uganda Connect.

"The general problem is to understand the value that is created at the end of the chain. As much as it is understood that there is a willingness to spend a certain percentage of income on mobile/telecoms services, it is not understood by the operators that the income is not always available in exchangeable currency and that without the aim of increasing the income base, the rollout of new services such as 4G will be limited to the urban population," observes Kai Wulff, CEO of Kenya Data Networks (KDN). In brief, a user does not pay only for the call but also the handset, the energy to power the handset and the time required to interact.

Even though more than 60% of Africa is now connected, the biggest challenge in 2012 is to connect the remaining 40%. A significant portion of the remaining 40% is concentrated in rural areas, observes Carlyle Fernandez of Nokia-Siemens Networks.

Looking at the rural penetration rates in some key African markets, South Africa is at 38%, Kenya at 30% Uganda at 15% and Nigeria at 10%. And these countries have better rural penetration rates as compared to the rest of the African countries. The biggest challenge to improve rural connectivity is the lack of power grids or poor grids. According to a GSMA study, about 79% of sub-saharan BTS's do not have access to reliable electricity. And with 15-30% of overall opex related to energy costs, operators are under severe pressure and are increasingly looking at energy-saving solutions to counter these challenges, according to Fernandez.

The other challenge for Africa is the explosive need for more data bandwidth. People in Africa are showing the same behavioral patterns on mobile networks as they do on fixed networks. This means that if Facebook and Youtube are the most visited websites on fixed networks, they will have the same popularity on mobile networks. As people in

Africa start getting more and more mobile in 2012, operators will have to start "preparing" their networks to accommodate this huge tsunami of data explosion in the future, cautions Fernandez.

And lastly, but equally important, is the challenge of available spectrum to enable wide adoption of mobile broadband has been, Hernandez adds. Different countries in the region have adopted different regulatory approaches and a multitude of technologies have been deployed. Harmonised spectrum is a key factor in promoting the development of mass mobile broadband access, and an enabler for cost effective introduction of 3G and 4G technologies due to global economies of scale.

In sum, cost and availability of infrastructure remain obstacles to mobile growth in Africa. "Once those obstacles to growth are overcome, quality of the user experience becomes the main obstacle to maturity," observes Arthur Goldstuck, managing director of World Wide Worx.

Recommendations to Industry: Inclusion and Sustainability

"Operators should look at new media companies as strategic partners rather than adversaries in developing and driving locally relevant and compelling data and Internet use cases," recommends Ham M. Namakajjo of Google Uganda. "Figure out models to finance and subsidise devices.

This might be best done through building ecosystems and alliances that include banks, content providers, and government to make compelling use cases and hence demand for targeted groups like SMBs," he adds. The industry should invest in education and consumer awareness aimed at showing consumers the applicability of mobile Internet in their daily lives as well as the opportunities that can be unlocked.

There is a great need for collaboration among banks, MNOs/telcos and microfinance lenders on the mobile front to ensure that growth is inclusive and sustainable. "There need to be more success stories beyond M-Pesa. A number of service providers are using these new frontiers as 'individual' competitive capabilities yet there should be interoperability," advises Walter Mhlongo, Director of Clickatell. Another key issue is citizen registration as many countries have manual registration. MNOs still need to provide USSD Phase 2 on an urgent basis and provide a billing mechanism that is attractive.

"With voice ARPUs declining, mobile data is the new revenue stream for MNOs -- however they need to make the SMS and USSD tariffs come down. For rural folks that are totally excluded in the FSS sector, including farmers, collaboration between these sectors and governments is needed to bring to market solutions that are accessible to these areas," Mhlongo adds.

MNOs must not view WASP/PRSP (prepremium rate service providers) as competitors. FSS and MNO sectors are the enablers and thus must collaborate. There are some MNOs who want exclusive agreements for products rollout; this is antiquated thinking and a retarded strategy, argues Mhlongo.

A smaller version of the GSMA needs to be established only for Africa which brings the handset, NEMS, operators, technology providers and the mobile developer community together to drive a few key themes every six months and identify some key sub-projects, recommends Khalil Al Hindwan of Acision.

Operators should also provide the consumers with the ability to define their usage characteristics and based on that advise the right plans for them. This will definitely drive revenue growth for the operators and increase stickiness, according to Hindwan. Operators need to open up their service creation environments to developers to be able to push apps faster to the market as part of their service delivery strategies.

There need to be more angel investors for startups and intrapreneurs in larger companies. More multistakeholder partnerships are needed, according to Franco Papeschi of the World Wide Web Foundation.

Many developments are centred on consumer centric content and services; local players should also look into business centric services that support local businesses, advises Clark.

Regulators and mobile operators should be more open and engaging. "Correct business rules should be in place to allow start-ups to get interconnected and deploy mobile services. The established mobile industry players should actually be engaging and open to supporting startups. Venture Capital funding and angel investors should also be introduced to start-ups," advises Jonathan Hoehler of MobileMonday Johannesburg.

"Entrepreneurial development is key for the future of mobiles in Africa. We are still lacking experience and to some extent role models of modern entrepreneurs in many African economies. We need to allow innovation hubs and communities to grow – not under strict control of the government – but independently. Overly ambitious science and technology park initiatives may even be harmful for the growth of the ICT ecosystem as they do not necessarily stimulate innovation and bottom-up collaboration, which is the primary challenge. The issue is not the infrastructure," observes Nokia's Hinkkanen.

He also recommends reduction of mobile device and services related tariffs to drive faster device and Internet penetration growth, which further drives consumer access to information and value added services. African governments should also follow the example of Kenya for Open Government which would open up new opportunities for local innovators to support development of the local service sector (public services) and transparency (fight corruption), among many other benefits.

"Invest more in social innovation and think seriously how you can leverage existing networks and services into commercially viable social and green innovation products and services that contribute to a low-carbon and fair society," recommends Nedbank's Milosevic.

Networks need to be more supportive, and especially more modest in the cut they expect from the sale of apps or access to content. “The Japanese mobile content market thrived because NTT DoCoMo took a 10% cut, and there was a massive incentive for content creators and providers. In South Africa, the networks initially took 90% themselves, effectively killing the mobile content industry at birth. They have improved since then, but have not yet taken the stance of facilitators - they still want to be owners,” observes Arthur Goldstuck, managing director of World Wide Worx.

The industry needs to work more closely with the non-profit sector, which may include convening focus groups which study how it might support lower-level grassroots innovation. “Coverage and cost are two key issues. Non-profits and operators need to find common ground between their social missions and the needs of the private sector, and find the sweet spot where everyone wins. That will only happen through dialogue and a concerted effort to learn from each other,” advises Ken Banks of Frontline SMS.

The key lies in breaking down the silos that exist amongst the various stakeholders and sectors within the ecosystem, according to Sean Pashley of Starfish Mobile. “Think long term. Invest in infrastructure. Avoid the temptation to make a quick buck,” sums up Alan Knott-Craig of MXIT. The mobile industry must be open up to new business models. “Just like Web 2.0, there must be Telco 2.0,” advocates KDN’s Kai Wulff.

List of Abbreviations and Acronyms

ADSL	Asymmetric Data Subscriber Line
BOP	Bottom of Pyramid
CD-ROM	Compact disk, read-only memory
CLC	Community Learning Centre
CSO	Civil Society Organisation
EDI	Electronic Data Interchange
GIS	Geographical Information System
GSM	Global System for Mobile communications
HDI	Human Development Index
HDR	Human Development Report
HTML	Hyper Text Mark-up Language
HTTP	Hyper Text Transfer Protocol
ICT	Information and Communication Technologies
ICT4D	ICT for Development
ISP	Internet Service Provider
IT	Information Technology
ITeS	IT-enabled Services
LAN	Local Area Network
MDGs	Millennium Development Goals
NGO	Non-governmental Organisation
NRI	Network Readiness Index
PCO	Public Call Office
PDA	Personal Digital Assistant
PoP	Point of Presence
SME	Small and Medium Scale Enterprise
SMME	Small, Medium and Micro Enterprises
SMS	Short Message Service
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WANs	Wide Area Networks
WLL	Wireless in Local Loop

Chronology of MobileMonday: Founding of City Chapters

Year	City
2000	Helsinki
2004	Tokyo, Silicon Valley, Milan, Rome
2005	Austin, Beijing, London, Los Angeles, Paris, Singapore, Sydney, Adelaide, Chicago, New York, Seattle
2006	Bangalore, Bangkok, Boston, Chennai, Dublin, Dusseldorf, Geneva, Hong Kong, Istanbul, Kuala Lumpur, Melbourne, Mumbai, Munich, New Delhi, St. Petersburg, Stockholm, Vancouver, Washington DC, Shanghai, Barcelona, Madrid, Copenhagen, Toronto
2007	Adelaide, Amsterdam, Brussels, Caracas, Dallas, Estonia, Frankfurt, Hyderabad, Jakarta, Philadelphia, Seoul, Kiev, Marseilles
2008	Belfast, Berlin, Bogotá, Brisbane, Budapest, Casablanca, Hamburg, Lithuania, Oslo, Zurich, Geneva, Taipei, Tel Aviv, Warsaw, Lisbon, Buenos Aires, Hanoi, Montreal, Sao Paulo, Tallinn, Vilnius, Moscow
2009	Vienna, Johannesburg, Malmö, Malta, Capetown, Portland, Philadelphia, Miami, Bucharest, Riga, Oulu, Boulder, Calgary, Medellín, Mexico City, Rio de Janeiro, Slovenija, Sofia
2010	Kampala, Nairobi, Brooklyn, Orlando, Tampa, Dar es Salam, Palestine, Colombo, Columbus, Pasadena, Karlskrona
2011	Accra, Ann Arbor, Astana, Athens, Baku, Cairo, Chisinau, Dakar, Detroit, Dubai, Hanoi, Indore, Lagos, Las Vegas, Madison, Manchester, Manila, Milwaukee, Ottawa, Pasadena, Perth, Porto Alegre, Skopje, Tampere, Timisoara
2012	Trivandrum, Lansing, Inland Empire, GuanZhou, Addis Ababa, Beirut, Bologna, Ludhiana

MobileMonday Reports on Africa

Year	Mobile Africa Report
2009	Mobile Media in Emerging Economies: Opportunities and Roadmaps for Africa
2010	Rise of the Creative Economy
2011	Regional Hubs of Excellence and Innovation
2012	Sustainable Innovation Ecosystems

About the Author

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Madan was formerly the communications director at the United Nations Inter Press Service bureau in New York, vice president at IndiaWorld Communications in Bombay, and research director at the Asian Media Information and Communication Centre (AMIC) in Singapore. He graduated from the Indian Institute of Technology at Bombay and the University of Massachusetts at Amherst, with an M.S. in computer science and a Ph.D. in communications.

Madan is a frequent speaker on the international conference circuit, and has given talks and lectures in over 75 countries around the world. He has chaired and spoken at a number of telecom events ranging from the WiMax Forum to VoIP Asia. Madan was on the nominating committee of ICANN (International Corporation for Assigned Names and Numbers). He is on the board of editors of the journal Electronic Markets and the Journal of Community Informatics, and was on the board of the journal Convergence. Madan is also an editor and DJ for world music and jazz, and writes for World Music Central and Jazzuality.

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VISION DATA SECURITY
INCREDIBLE OPPORTUNITIES
COMPETITIVE ADVANTAGE
DEVELOPMENT
GREEN vs ECONOMICAL
AFFORDABLE TERMINALS
COLLABORATE & COMMUNICATE
PROVIDING INSIGHTFUL CONTENT
COST vs QUALITY
MOBILE INTEGRATION
STRATEGIES
TANGIBLE INSIGHTS
SUSTAINABLE GROWTH
COMMITMENT
NETWORKING
PERFORMANCE
OPTIMISATION
DIGITAL
MIGRATION
EFFICIENCIES

CUSTOMER
SERVICE