# THE IMPACT OF MOBILE SERVICES IN NIGERIA

## How Mobile Technologies Are Transforming Economic and Social Activities

Pyramid Research

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**By Pyramid Research**

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Pyramid Research

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## *FOREWORD*

*It is an established fact that the economic development of a nation can be accelerated by improvements in the country's ICT infrastructure. This is because ICTs, if well harnessed, provide a proper platform for development across all sectors of the economy. ICTs not only contribute to the development of commercial activities, education, health and governance, but are also key enablers of broad-based social and economic development and of sustainable human development in a more general sense.*

*Two reports, by the World Bank (Information and Communication for Development Report, 2006) and the World Economic Forum (Global Information Technology Report, 2005-2006), underline the fact that economic development depends on overall progress in a country's ICTs sector, and that, without such progress, both the economy and private enterprises suffer. The World Bank's study also found that companies that use ICTs grow faster, and are more productive and profitable than those that do not.*

*Indeed, ICT networks are now making it possible for developing countries to participate in the world economy in ways that simply were not possible in the past. This reality is reflected in the rapid growth telecommunications has been experiencing around the world: In 1999, there were 1.4bn connected lines worldwide (490m mobile, 905m fixed); today, there are more than 5bn lines. Thus in the past nine years, over 3.6bn lines have been added to the 1.4bn lines connected in all the years before. In fact, to quote an ITU publication, "most of the planet's 6.7bn inhabitants are within reach of telephone service… There are now more telephone subscribers worldwide than there are households." All these statistics go to demonstrate the importance the world attaches to the development of telecommunications infrastructure.*

*Increased adoption of ICTs implies that nations need to adopt ICTs or become less competitive. Emerging economies such as Nigeria have therefore created the enabling environment to encourage the development of ICT infrastructure. Indeed, the developing world has over the past decade become the destination for new investment opportunities. During this period, exponential growth in the mobile subscriber base has mostly been generated in developing countries.*

*Nigeria is recognized as a major market for telecommunications equipment and services on the African continent. With a population of more than 140m, it remains Africa's most populous nation. Nigeria therefore has always had what it takes to attract the attention of potential investors. This potential was not, however, unleashed until a civilian democratic government came into being in 1999 and a new board was appointed for the NCC, with Engineer Ernest Ndukwe as Executive Vice Chairman and CEO. Since then, Nigeria has pursued an aggressive market liberalization policy that has made it perhaps the most liberalized telecom market in Africa. The attention of the world thus returned to Nigeria as the market with the highest potential for ICT investment on the continent, and more than US$18bn had been invested by December 2009.*

*In a highly competitive market, the telecommunications industry in Nigeria has continued since 1999 to grow exponentially, which has led to increased access nationwide. The market has been described as one of the world's fastest growing telecommunications markets, especially between 2001 and 2007. These achievements can be attributed largely to the foresight of the government in embracing sector reform and creating an enabling and conducive environment with respect to policy and the regulatory regime. The NCC has proven its commitment to promoting a regulatory environment that is independent, fair, transparent and predictable.*

*The nation's teledensity currently exceeds 50%, with about 74m subscriber lines as of the end of December 2009. Access to modern telecommunication services is now within reach of more than 90% of the people who live within Nigeria.*

*In Nigeria today, daily activities such as shopping, entertainment, banking, manufacturing, office work, education, medical care, governance and even commuting have become increasingly dependent on information and communications networks.*

*The massive deployment of digital mobile services across the country and the speed at which they are being subscribed to have demonstrated the importance of ICT services to the people. The Nigerian Communications Commission has established a regulatory environment that has led to the creation of a robust, pervasive and ubiquitous information and communications technology infrastructure across the nation. This has helped to drive socio-economic development and improve the living standards of the citizenry.*

*The current focus of the Commission is on facilitating broadband Internet deployment in Nigeria. With its application in areas such as public safety, national security, telemedicine, e-government, e-health, e-commerce, distance learning and utilities, broadband is an accelerator of social and economic development in the modern world. The Commission has thus initiated projects aimed at facilitating and speeding up widespread deployment and usage of broadband services in Nigeria. One such project is the State Accelerated Broadband Initiative (SABI), which is to ensure that broadband infrastructure is speedily extended to all the state capitals as well as to urban and semi-urban centers across the country. SABI was designed to provide operating companies with incentives to roll out services faster and encourage usage.*

*The pace of Nigeria's telecom growth also creates increasing demand for high-capacity transmission infrastructure to provide the necessary support for further expansion, especially in the area of bandwidth-intensive data services. Anticipating this demand, the major operating companies in Nigeria responded with massive rollouts of fiber backbone infrastructure across the nation. Their efforts are being augmented by the Commission's Wire Nigeria (WiN) initiative to extend the fiber-optic infrastructure to remote and rural areas not covered by the operators.*

*This initiative is now being expanded by the CEO of the NCC to an Africa-wide campaign termed Fiber without Borders encouraging deployment of high-capacity, cross-border and cross-country fiber infrastructure linking all countries in Africa. Governments in the region are being urged to remove obstacles to granting permits for such projects and – where necessary – offer incentives to speed up rollouts.*

*In short, access to telecommunications and information technology holds the key to the nation's ability to respond to the demands of its position in the new world order.*

*Under Ernest Ndukwe Era as CEO, the Nigerian Communications Commission has witnessed unprecedented transformation in the Nigerian telecom sector, resulting in what is now commonly referred to as Nigeria's telecom revolution. Teledensity figures grew from less than 0.5% in December 2000 to more than 50% by December 2009. The impact of the telecom revolution on the social and economic lives of the citizens has been tremendous.*

*This study presents a scientific analysis of the positive changes telecommunications development and growth have brought to all spheres of Nigerian life. It documents these changes for posterity, and readers interested in the role telecommunications plays in human development will find the study useful.*

*Ikeddy Isiguzo*

*Chairman, Editorial Board, Vanguard Newspapers*

## Table of exhibits

## Organizations mentioned

ABSA
Access Bank Nigeria
Action Health Incorporated
African Development Bank (AfDB),
African Union (AU)
AIDS Information Center- Uganda
Alcatel
Alheri Engineering
ANZ
Apollo Hospitals
Apple
Bridge IT
British Telecom (BT)
Busoga Rural Open Source Development Initiative (BRODSI)
Butterfly Works
Canadian International Development Research Centre (IDRC).
Cartoon Network
Central Bank of Nigeria (CBN)
Cisco Systems
Claro
CNN
Commonwealth
Communications Investment Limited (CIL)
Ctrack
DAARSAT
Dangote Group
Datamation Foundation
Deloitte
Dr. Math
DStv
Earth Institute
Econet Wireless
Economic Community of West African States (ECOWAS)
Economist Intelligence Unit (EIU)
EDF Energy
Education as a Vaccine Against AIDS (EVA)
Edurite
Elimu kwa Teknolojia
eNowNow
Ericsson
Ericsson India
Etisalat
FCMB Nigeria
Federal Government of Nigeria
Federal Ministry of Transport
Finalist IT Group
Financial Sector Deepening Trust
First City Monument Bank (FCMB)
FNB Banking
Forum for African Women Educationalists (FAWE)
France Telecom
frog design
Gallo Images
General Motors
Girls Power Initiative (GPI)
GiCell Wireless
Glo Mobile
Google
Grameen Foundation
Gramjyoti Rural Broadband Project
Growing Businesses Foundation (GBF)
GSMA
GT Bank
Hand in Hand
HiTV
Hot FM Abuja
IBRD,
ICSL
Ideal Services
Indian Society of Agri-Business Professionals (ISAP)),
infoDev
Integrated Cassava Project (ICP)
Intel
Intercellular
International Finance Corporation (IFC)
International Institute of Tropical Agriculture in Nigeria (IITA)
International Monetary Fund (IMF)
International Youth Foundation (IYF)
Investment International Limited
IRRAD
iTeach
John D and Catherine T MacArthur Foundation
Kelly Services
K-Nect
LAPO
Learning About Living
Learning2Go
LifeLines
Longman Ladybird Mobile Reading
Longman Nigeria Plc
Manobi Development Foundation
Maritime Organization of West and Central Africa (MOWCA)
Millennium Promise
Millennium Villages
Ministry of Education and Vocational Training (MoEVT)
MISS Ltd
Mobile Telecommunications Limited (Mtel)
Mobile Xcetera Limited
MobileXcetera
Mobitel Nigeria
Money TextMe
MoneyBox Africa
Movirtu
M-PESA
MTN Banking
MTN Foundation
MTN Foundation (MTNF)
MTN Nigeria
MTN South Africa
MTN Uganda
MTS First Wireless Ltd (MTS First)
Mubadala Development Company
Multi-links
MXit

My Question, My Answer
National Bureau of Statistics (NBS)
National Council for Privatization (NPC)
National Geographic Society
National Transport Commission
Network of Agricultural Market Information Providers of Nigeria (NAMIN)
New Partnership for Africa's Development (NEPAD)
Niger Delta Development Commission
Nigeria Education Research and Development Council (NERDC)
Nigeria's Ministry of Agriculture
Nigerian Communications Commission (NCC)
Nigerian Ministry of Health and the Nigerian Ministry of Education
Nigerian National Agency for the Control of AIDS (NACA)
Nigerian Telecommunications (Nitel)
Nokia
Nokia Corporation
Nokia Siemens Networks (NSN)
Nonaligned Movement (NAM)
Novib
O2 UK
One World
One World South Asia
One97
OneWorld UK
OnStar Telematics
Opto Africa
Organization of Petroleum Exporting Countries (OPEC),
Organization of the Islamic Conference (OIC)
Oxfam
Pearson Education
Pearson Foundation
Philips
Pikitup
PopTech
Praekelt Foundation
Prest Cable & Satellite TV Systems
Project Manobi
Project Masiluleke
Reltel
Safaricom Kenya
Salt and Einstein Ltd
Shell Petroleum Development Company of Nigeria
SMS Sokoni Project
SNDT Women's University
Sonatel
Spectranet
Standard Bank of South Africa
Starcomms
TARAhaat
Tata Indicom
Telenor
Telkom SA
Text To Change (TTC)
Texting4Health
The Women of Uganda Network
Trade Net Africa
Transnational Corporation of Nigeria (Transcorp)
Turner Broadband Systems
UBA Mobile
Ugandan Ministry of Health f
UN Department of Economic and Social Affairs (UN-DESA)
UNAIDS
UNDP
UNESCO
UNICEF
United Nations,
US Agency for International Development (USAID)
US Department of state
VAS2NET
Vianet vOpen
Village Phone
Village Phone Uganda
Visafone
V-Mobile
Vodacom
Wizzit
World Bank
World Trade Organization (WTO)
Zain Nigeria
Zenith Bank
Zoom Mobile
ZTE

## Acronyms and abbreviations

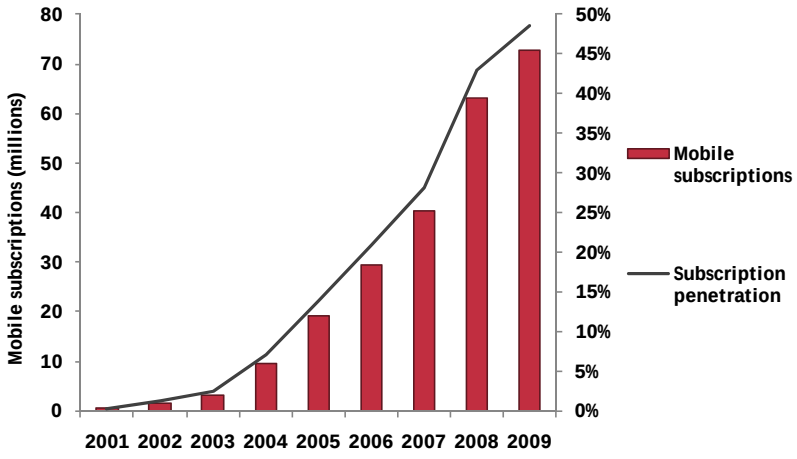
| Acronym | Definition |
|---|---|
| 2G | second generation |
| 3G | third generation |
| 4G | fourth generation |
| AIDS | acquired immunodeficiency syndrome |
| AME | Africa and Middle East |
| ARPS | average revenue per subscription |
| ATM | automated teller machine |
| CAGR | compound annual growth rate |
| CDMA | Code Division Multiple Access |
| DRC | Democratic Republic of Congo |
| DTH | direct-to-home television |
| DVB-H | Digital Video Broadcasting – Handheld |
| EDGE | Enhanced Data Rates for Global Evolution |
| EMEA | Europe, Middle East and Africa |
| EV-DO | Evolution Data Optimized |
| FWA | Fixed Wireless Access |
| GB | Gigabyte |
| GDP | gross domestic product |
| GPS | Global Positioning System |
| GSM | Global System for Mobile Communications |
| GPRS | General Packet Radio Service |
| GHz | Gigahertz |
| HIV | human immunodeficiency virus |
| HSPA | High-Speed Packet Access |
| ICT | information and communications technology |
| IP | Internet Protocol |
| IVR | interactive voice response |
| LTE | Long-Term Evolution |
| MoU | minutes of use |
| MMS | multimedia messaging service |
| MNP | mobile number portability |
| MVNO | mobile virtual network operator |
| M2M | machine to machine |
| N | Naira |
| NBS | Nigerian National Bureau of Statistics |
| NCC | Nigerian Communications Commission |
| NGO | non-governmental organization |
| PIN | personal identification number |
| SIM | subscriber identity module |
| SMS | Short Message Service |
| UASL | Unified Access Service License |
| UMTS | Universal Mobile Telecommunications System |
| US | United States |
| USSD | Unstructured Supplementary Service Data |
| WAP | Wireless Access Protocol |
| W-CDMA | Wideband Code Division Multiple Access |
| WiMAX | Worldwide Interoperability for Microwave Access |

## Executive summary

Mobile services are having a positive impact on Nigeria by enabling greater interaction and bringing a wide variety of services to the majority of the country's population. To develop an overview of the mobile industry's effect on the country, Pyramid Research has analyzed mobile adoption trends as well as the perspectives of key mobile operators, vendors, international organizations and 1,500 Nigerian end users. We also assessed relevant examples of mobile applications across industry verticals in different countries to illustrate the far-reaching impact mobile technologies have in emerging markets. The top five conclusions of our study are:

1. **Mobile services have ample reach in Nigeria and will continue to post rapid growth.** According to Pyramid Research's estimates, mobile services are already in use by a significant proportion of Nigeria's population. The number of mobile subscriptions in the country was roughly 73m in 2009, resulting in a mobile penetration rate of 49% of the population.

**Exhibit 1: Mobile subscriptions and mobile subscriptions penetration of population in Nigeria, 2001-2009**

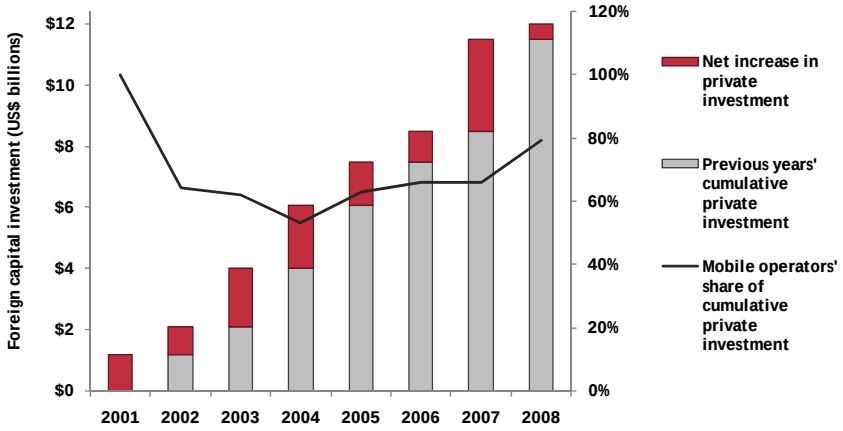



*Source: Pyramid Research Mobile Data Forecast, 2009*

Due to intense competition and constant innovation from mobile service providers, a greater number of people will see value in and be in a position to use mobile services in the near future. We project that Nigeria's mobile subscriptions will surpass 129m by 2014, creating a substantial user base for the development of the mobile applications market.

2. **The mobile industry has generated substantial investment in infrastructure and employs a significant number of Nigerians.** Pyramid Research estimates that in the time since the Nigerian government successfully liberalized the industry in 2001, capital investments in mobile networks and operations have constituted 80% of overall investment going into the telecommunications sector — a total of more than $12bn by the middle of 2008. Total figure for the industry, as of March 2010, according to the NCC reached $18bn, of which $16bn is related to mobile.

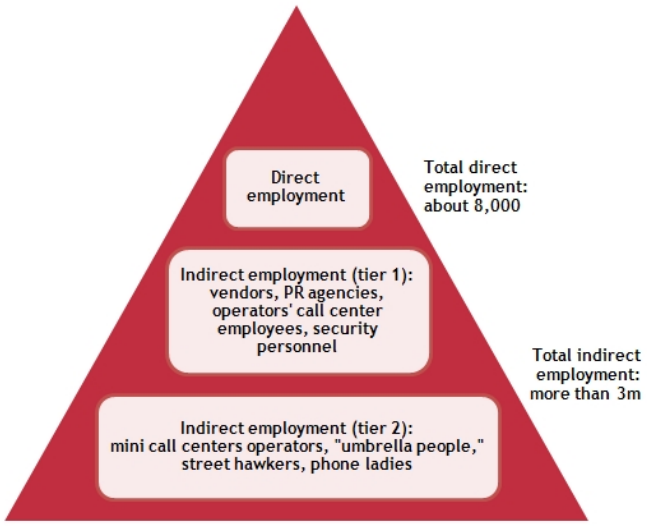
**Exhibit 2: Private investment by telecom operators in Nigeria, 2001-2008**




Note: 2008 private investment figures do not reflect the full year
*Source: NCC*

In addition, the mobile industry has contributed more than 3m direct and indirect jobs in Nigeria, including employees of mobile service providers and those in independent distribution channels and points of sale across the country.

**Exhibit 3: Workforce related to mobile services industry in Nigeria, 2008**

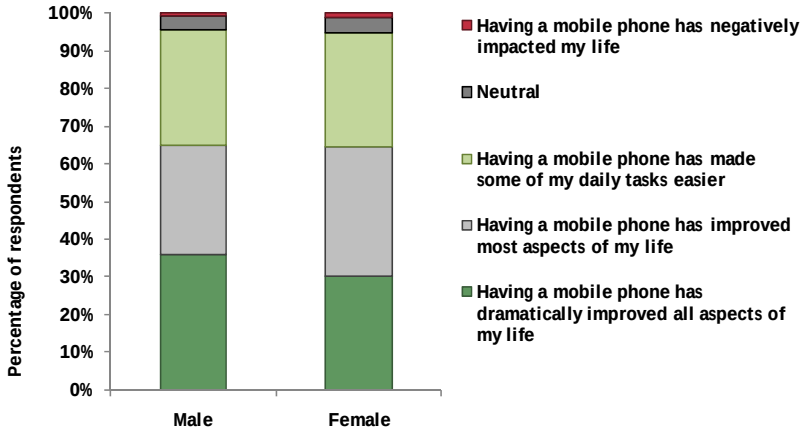



*Source: Pyramid Research, 2009*

3. **Nigerian mobile end users agree that mobile services have positively influenced every aspect of their lives, connecting them to clients, coworkers, relatives and friends, thus helping people access information, creating business opportunities, lowering transaction costs and enhancing social interaction.**

More than 60% of the 1,500 Nigerians interviewed by Pyramid Research believe that using mobile services has improved their lives, including more than 35% of interviewees who say that a mobile phone has "dramatically improved all aspects of their lives."

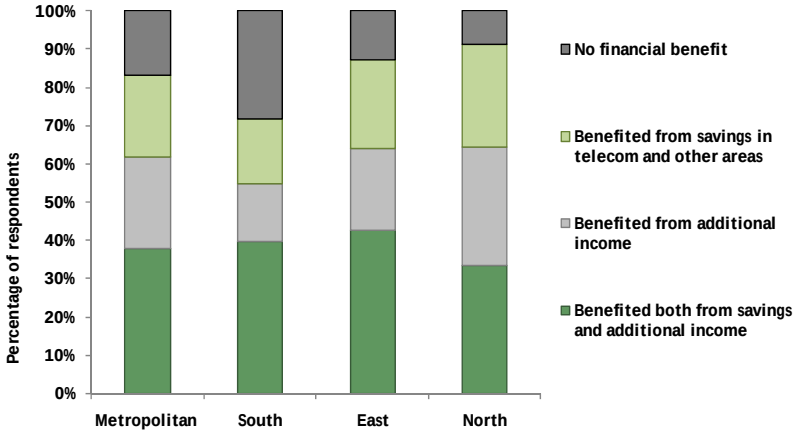
**Exhibit 4: What option best describes the impact of mobile services in your daily life? Nigerian mobile end users, 2009**




*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Furthermore, more than 80% of our sample has seen financial gains from using mobile services through a combination of saving on communications expenses and generating additional income by way of staying connected.

**Exhibit 5: Have you seen a positive financial impact on your life from the use of mobile services? Nigerian mobile users, 2009**




*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

4. **An analysis of mobile applications in the areas of agriculture, education, health, productivity, transport and finance across different emerging markets shows that these services are generating interest and participation from end users thanks to their tangible impact on day-to-day lives.**

Pyramid Research has identified numerous examples of initiatives using public and private funding that leverage mobile services in social programs and promote the adoption of connectivity services by lower-

income people. Other applications help improve the operation and efficiency of various vertical industries across emerging markets. Highlights of available applications in Nigeria include:

i. Zain's ultralow-cost handset initiative in Nigeria allows subscribers to acquire a sub-$20 handset.
ii. The Millennium Village project is sponsored by the UNDP in Pampaida, Nigeria, with the objective of bringing mobile communications and Internet services to inhabitants of selected villages in sub-Saharan Africa.
iii. The Rural Telephone Project in Nigeria aims to provide connectivity for rural and semi-rural areas, targeting mostly villages and population clusters on the outskirts of major towns. The program empowers women with the necessary tools and financing to run a public telephone business in their community. The program has benefited over 1,500 Phone Ladies in rural and semi-rural Nigeria, who operate in 21 of the country's 36 states.
iv. The Ladybird Mobile Reading program was introduced in seven schools in Lagos in mid-2009 by Longman Nigeria PLC, a subsidiary of Pearson Education in collaboration with MobileXcetera, a Nigerian mobile content provider. The program targets students 5-9 years old, allowing them to download reading, spelling and grammar activities to their parents' mobile phones. The application program is WAP-based and requires a GPRS or 3G handset and an Internet connection.
v. In the health area, programs such as My Question, My Answer provide awareness, counseling and education through SMS and mobile-call interaction about sensitive topics, such as HIV.
vi. In the financial services area, MoneyBox Africa, a mobile commerce platform, allows users to store and move money, make payments over distance and perform a host of transactions via mobile phones.
vii. In the agriculture sector, mobile applications are only beginning to take off. A current initiative is the Cassava Growers project, which disseminates information — Agribusiness Information Points — ranging from the prices of key crops to volumes indicating demand trends.
viii. SMS- and short-code-based information systems disseminate traffic information in Lagos and Abuja.
ix. A wide variety of mobile entertainment services, ranging from ringtones and music downloads to mobile video and TV are offered by leading players MTN, Zain, Etisalat and Glo Mobile.

5. **The development of the mobile data market in Nigeria will be driven by collaboration among equipment and handset vendors, mobile operators, local government and international organizations.** There is ample space to develop mobile data applications in the areas of agriculture, education, financial services and health in Nigeria. End users value mobile connectivity greatly and are frequent users of this platform, yet the availability of specific applications is still limited. Developing a set of tools and information systems will require close collaboration among local and international entities; telecom vendors and operators can play a key role in importing successful initiatives to Nigeria.

In the areas of entertainment and productivity, mobile operators are already moving quickly to launch new value-added services. Since the disposable income of the local population is limited, content sponsorship will play a key role in promoting adoption of mobile entertainment services.

# 1. The mobile industry in Nigeria: Context and Milestones

In this section, Pyramid Research examines the macroeconomic and policy context in Nigeria and highlights the most important aspects of the development of the country's mobile telecom industry. Economic development, a widely distributed population and a policy framework enabling competition among multiple operators have all contributed to the growth of mobile services in Nigeria over the past decade.

## 1.1 Nigeria's political, economic and socio-demographic context

### 1.1.1 Political overview of Nigeria

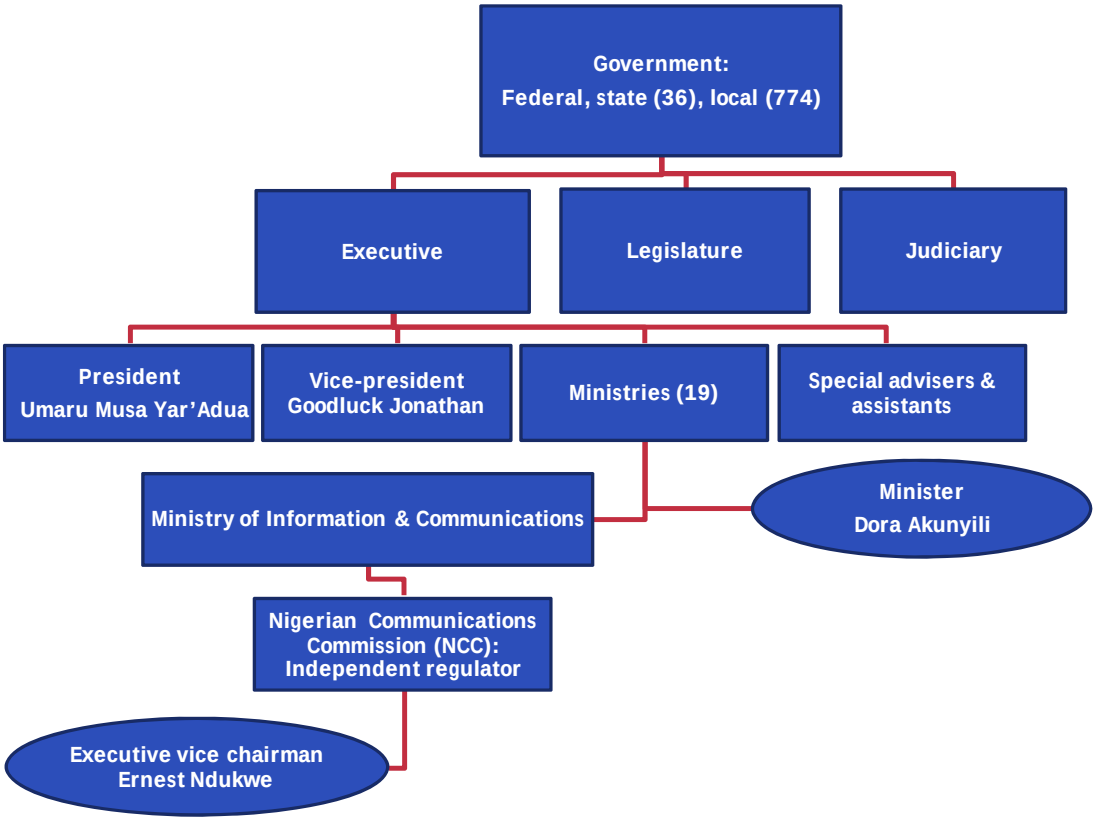
The current political climate in Nigeria is stable. After 16 years of turbulence in the political environment under military rule, Nigeria elected a civilian government in May 1999. Led by Olusegun Obasanjo, the civilian government successfully completed two terms, lasting four years each. The first democratic transition in the history of Nigeria took place in April 2007 when power was successfully transferred from one civilian leader to another and the elected president, Umaru Musa Yar'Adua, former governor of Katsina state under the Obasanjo administration, formally assumed power. On May 29, 2009, Nigeria celebrated its first decade of democratic rule.

The current ruling political party, the Peoples Democratic Party (PDP), has dominated politics since Nigeria's democracy began: both the previous and current presidents were candidates presented by PDP. The other major political parties include All Nigeria Peoples Party (ANPP) and Action Congress (AC).

Nigeria operates a federal presidential system. The administration is structured along three levels of authority: Federal, state and local governments. The country has 36 states, which are further divided into 774 local governments. Power is shared among the three arms of government — executive, legislature and judiciary.

The executive cabinet consists of the president, vice president, ministers and special advisers, and their assistants. There are 19 federal ministries, one of which is the Federal Ministry of Information and Communications. The Ministry works with the independent national regulator, the Nigerian Communications Commission (NCC), and both collectively establish the policies and regulatory framework that govern the Nigerian telecommunications industry.

**Exhibit 6: Structure of Nigerian government, 2009**




*Sources: Nigeria Direct — Official information gateway of the Federal Republic of Nigeria; Nigerian Embassy; NCC website*

Since the start of the democratic era in Nigeria, the government has focused its strategy on financial-sector reform, debt management, foreign reserves accumulation, exchange rate stability and the fight against corruption. Nigeria's national debt declined from 36% of GDP in 2004 to just 4% in 2007[1]. To further economic progress, the elected government developed the National Economic Empowerment and Development Strategy (NEEDS), which aims to drive economic growth, reduce poverty and achieve the Millennium Development Goals (MDGs). The program has been successful so far, in the past few years winning the support of international institutions such as the IMF, which reviewed and approved a Policy Support Instrument (PSI) for Nigeria.

The early years of President Yar'Adua's administration were devoted to tackling the sociopolitical issues in the country. As most of these have now been rectified, the government's focus is to solve the deeper problems that are detrimental to the country's economic development. The government has introduced two economic growth mechanisms covering the government's policy intentions: the "Seven Point Economic Agenda" and "Vision 2020." These are both ongoing plans, but the 2009 budget specified projects toward achieving these goals.

The Seven Point Economic Agenda covers key infrastructure goals, such as improving power and energy supply, boosting food security and agriculture, wealth creation and employment opportunities, improving the mass transportation system, reforming land ownership, strengthening security and raising the quality of the education system.

[1] US Department of State, Bureau of African Affairs, April 2009

For its long-term strategy, Nigeria's government developed the Vision 2020 plan. The key goal is that "by 2020 Nigeria will be one of the 20 largest economies in the world, able to consolidate its leadership role in Africa and establish itself as a significant player in the global economic and political arena." The government has set up various committees under one framework for the development and implementation of the Vision 2020 plan. To achieve its vision, the government has come up with indicative parameters, which are listed in the table below and serve as an overall framework for the development of various industries.

**Exhibit 7: Nigeria's Vision 2020 goals**

| Sector | 2020 target |
|---|---|
| **Policy** | By 2020 the country will be peaceful, harmonious and a stable democracy. |
| **Macro-economy** | A sound, stable and globally competitive economy with a GDP of not less than $900bn and a per capita income of not less than $4,000 per annum. |
| **Infrastructure** | Adequate infrastructure services that support the full mobilization of all economic sectors. |
| **Education** | Modern and vibrant education system that provides for every Nigerian the opportunity and facility to achieve his maximum potential and provides the country with adequate and competent manpower. |
| **Health** | A health sector that supports and sustains a life expectancy of not less than 70 years and reduces to the barest minimum the burden of infectious diseases such as malaria, HIV/AIDS and other debilitating diseases. |
| **Agriculture** | A modern technologically enabled agricultural sector that fully exploits the vast agricultural resources of the country, ensures national food security and contributes significantly to foreign exchange earnings. |
| **Manufacturing** | A vibrant and globally competitive manufacturing sector that contributes significantly to GDP with a manufacturing value added of not less than 40%. |

*Source: Vision 2020 website, June 2009*

The introduction of democratic rule in 1999 , progress across its strategic goals and a stable foreign policy have all helped to improve investor confidence in Nigeria, which in turn has led to a sizable rise in foreign direct investment. The newfound stability also has made Nigeria into a viable oil and gas producer, which now accounts for a considerable share of US oil imports.

Nigeria has also made substantial progress by becoming a member of a number of international organizations. These include the United Nations and many of its related agencies, the International Monetary Fund (IMF), the World Bank – the International Bank for Reconstruction and Development (IBRD), the African Development Bank (AfDB), the Organization of Petroleum Exporting Countries (OPEC), the World Trade Organization (WTO) and the Economic Community of West African States (ECOWAS). Other organizations include the African Union (AU), the Maritime Organization of West and Central Africa (MOWCA) and several other West African bodies, the Commonwealth of Nations, the Nonaligned Movement (NAM), the New Partnership for Africa's Development (NEPAD) and the Organization of the Islamic Conference (OIC).

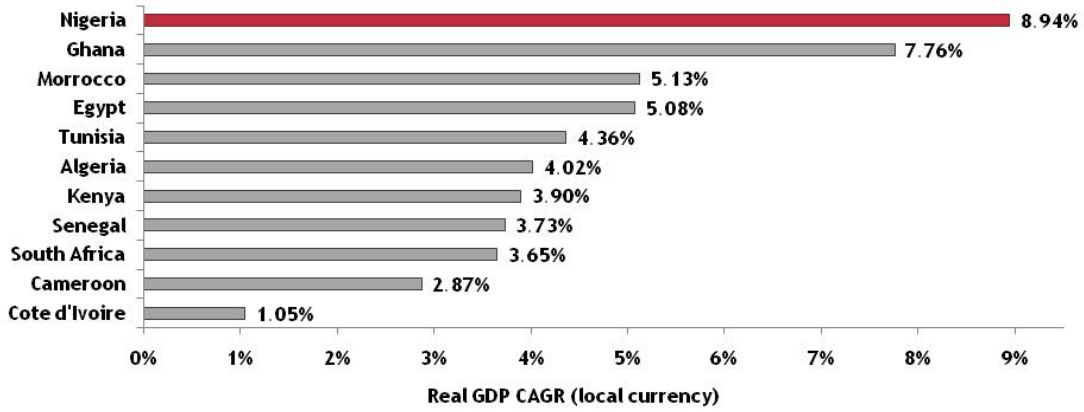
To position itself as a key regional player within Africa, Nigeria helped create ECOWAS, which was established in Lagos in 1975. The organization seeks to harmonize trade and investment practices for its 15 West African member countries and

ultimately to achieve a full customs union. It aims to promote economic integration in specific areas such as energy, agriculture, transport, commerce and telecommunications.

### 1.1.2 Economic overview of Nigeria

Nigeria's economy experienced significant progress over the past five years, just before the 2009 slump in the global economy. In dollar terms, the country's nominal GDP grew at a 16% CAGR during the 2001-2009 period, one of the highest growth rates in Africa. In real GDP terms, measured in local currency, the expansion was a solid 8.94% CAGR over the same period, which makes Nigeria the fastest growing economy among the countries in Exhibit 8 .

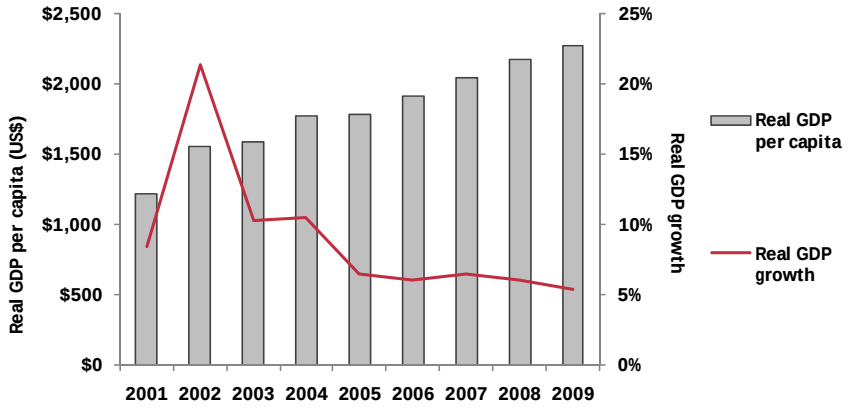
**Exhibit 8: Real GDP CAGR in 2001-2009 in local currencies in select African countries**




*Source: Economist Intelligence Unit, 2010*

Nigeria's GDP growth is highly correlated with developments in the oil sector. A sharp increase in international crude prices in 2003 resulted in a 10.4% peak for annual real GDP growth. Between 2000 and 2005 the country's economic growth continued to be driven by surging oil prices and rapid growth in the agricultural sector. According to the NBS's statistical fact sheet on Nigerian economic and social development of December 2007, oil and mineral products represented 94.9% of export revenue in 2007.

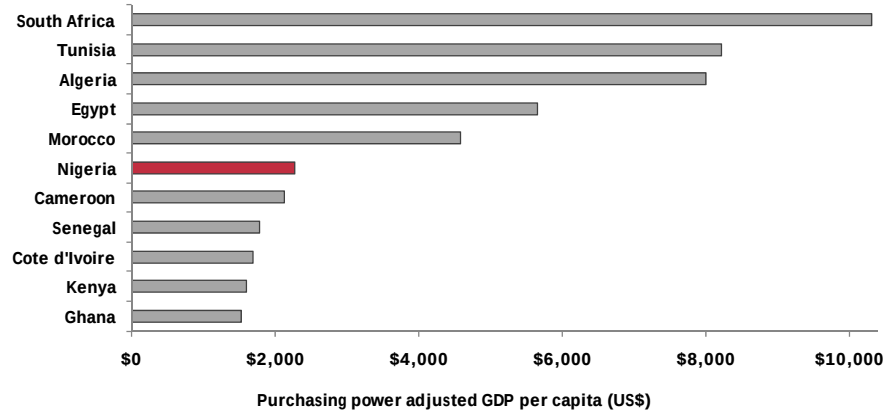
**Exhibit 9: Real GDP per capita and real GDP growth in Nigeria, 2001-2009 (US$)**




*Source: Central Bank of Nigeria; Economist Intelligence Unit, 2010*

In spite of its impressive overall growth, Nigeria still faces the challenge of low per-capita income. According to Economist Intelligence Unit figures based on CBN data (see Exhibit 10), Nigeria's real GDP per capita in 2009 exceeded $2,200, placing it behind its Northern African neighbors, such as Tunisia, Algeria and Egypt, but ahead of many other countries in Sub-Saharan Africa.

**Exhibit 10: Real or PPP-adjusted GDP per capita in selected African countries, 2009 (US$)**




*Source: Economist Intelligence Unit, 2010*

In terms of inflation, the government also managed to make substantial progress. The country fulfilled its obligations, and the sharp decline in Nigeria's external debt helped drive down inflation. The consumer price index (CPI) peaked at 17.9% in 2005 but has since dropped significantly.

The value of the Nigerian currency, the naira, was worth an average of N129 per US dollar in 2006, compared with N131 per dollar in 2005. The naira continued to appreciate against the dollar until the last two months of 2008, when its value fell by 20%. This was mainly driven by a slowdown in the world economy and a sharp decline in oil prices during 2008.

Additional factors were international concern about stability and security in the Niger Delta region as result of militant activity since 2006. By January 2010, however, the exchange rate had climbed back to about N152[2] per dollar.

Going forward, the main challenge that Nigeria faces is the significant deficiencies in infrastructure. Over the past 10 years, the government has made substantial investments in various sectors, but room for improvement remains. President Yar'Adua plans to increasingly rely on public-private partnership initiatives to address these issues. The government hopes that privatization will improve planning and management and increase financial investment across the country.

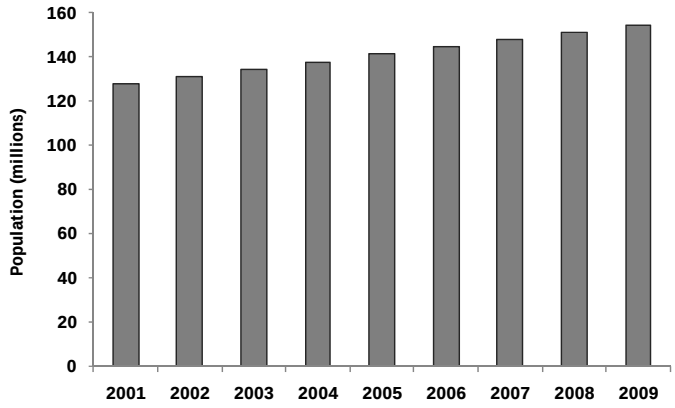
The economic reforms outlined in the "Seven Point" economic agenda are slowly but surely being implemented. In order to face a shrinking budget in 2009, the government introduced plans to cut expenditures without compromising planned infrastructure-related projects. The government is also taking tough measures such as deregulating domestic fuel prices, which means that fuel subsidies will cease.

### 1.1.3 Socio-demographic overview of Nigeria

With more than 150m inhabitants, Nigeria has the largest population in Africa; it accounts for 47% of West Africa's total population[3] and is the eighth most populous country in the world.

Nigeria has experienced one of the highest rates of population growth over the last 10 years. However, the UNDP expects the country's population growth rate to decline slightly, from 2.8% in the 1975-2005 period to 2.2% for the period 2005-2015. The UN[4] projects a population of 210m by 2025 and 289m by 2050, which would make it the sixth most populous country in the world.

**Exhibit 11: Total population in Nigeria, 2001-2009**




*Source: World Bank, 2009; Pyramid Research, 2009*

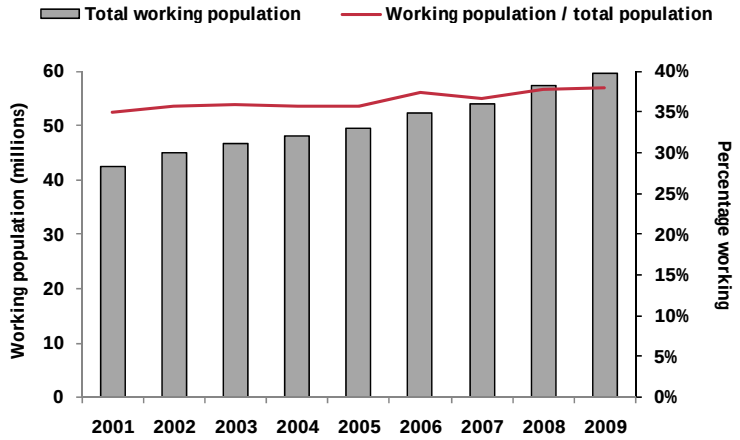
Nigeria's population is relatively young. As of 2005, 42% of the country's population was 0-14 years of age, while 55% of the population was in the 15-65-year-old bracket and only 3% over the age of 65.

According to Pyramid Research estimates and official figures, Nigeria's working population makes up roughly 39% of all inhabitants. The National Bureau of Statistics says the working population grew from 44.9m in 2002 to 53.98m in 2007.

[2] EIU, January 2010
[3] World Bank, March 2009
[4] United Nations, *Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. World Population Prospects: the 2008 Revision 2009,*
[5] CIA World Factbook, 2009.

With such a large and young population, curbing unemployment is a considerable challenge. According to the NBS, the national unemployment rate reached 14.6% in 2007.

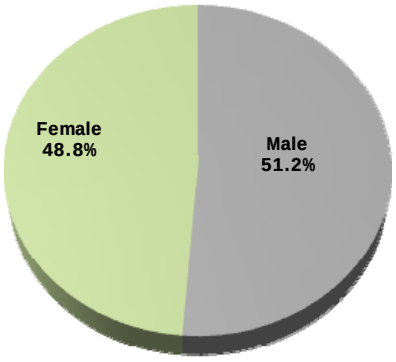
**Exhibit 12: Working population as proportion of total population in Nigeria, 2001-2009**




*Source: NBS, 2009; Pyramid Research, 2009*

With respect to gender, official estimates suggest a relatively even distribution of the population. According to the census carried out in 2006 and published by the National Bureau of Statistics[6] in November 2007, the breakdown of population by gender was 71.7m males (51.2%) and 68.3m (48.8%) females.

**Exhibit 13: Population breakdown by gender in Nigeria, 2006**



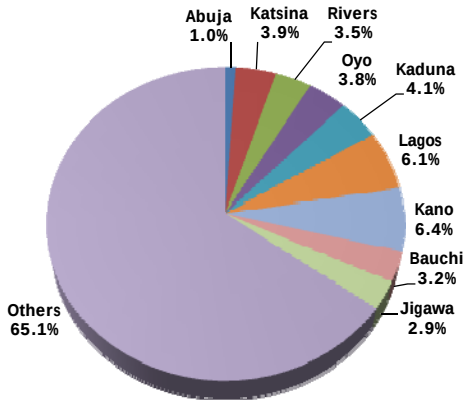

*Source: NBS, 2007*

As for the geographical distribution of the population, the Kano and Lagos areas are the largest. The 2006 census shows that Kano, with a population of almost 9.4m or 6.4% of the total, was the most populous among the 36 states of Nigeria, followed Lagos with 6%. Although Lagos is the smallest state in Nigeria — 3,577 square kilometers — it has the second largest population and hence the highest population density in Nigeria. Abuja, which became the capital in 1991, replacing Lagos, has only 1% of the country's population. Nigeria's population density is roughly 140 people per square kilometer according to the UN. Overall, it has been estimated that up to 64% of Nigerians live in rural areas, although rural-urban

[6]NBS: *Nigerian Statistical Fact Sheet on Economic and Social Development,* 2007.

migration is underway. Rural areas face significant infrastructure gaps. For example, the World Health Organization[7] estimates that in 2006, safe drinking water was available to 65% of urban dwellers but only 30% of rural inhabitants.

**Exhibit 14: Population distribution by state in Nigeria, 2006**




*Source: NBS, 2007*

Nigeria has one of the most ethnically diverse populations in the world. There is an abundant variety of customs and traditions — as well as 500 indigenous languages — among the more than 250 different ethnic groups in Nigeria. There are also two main religions, Islam and Christianity, representing 75m and 65m respectively; other faiths include worship of local indigenous gods and animism. The three largest ethnic groups are the Hausa, Yoruba and Igbo, which together account for about 70% of the population. Of these, the largest are the Hausa, who are predominantly Muslims from the northern part of Nigeria. Yoruba people are predominant in the south-west. Igbos, predominant in the south-east, are mostly Christians of various denominations. Most of Nigeria's populations commonly communicate in English, although it is common to find people who have knowledge of two or more Nigerian local languages and dialects. Hausa, Yoruba, Igbo and Fulani are the most widely used Nigerian languages.

7 World Health Organization: *Population with sustainable access to improved drinking water sources*; available at http://data.un.org/Data.aspx?d=WHO&f=inID%3ARF02

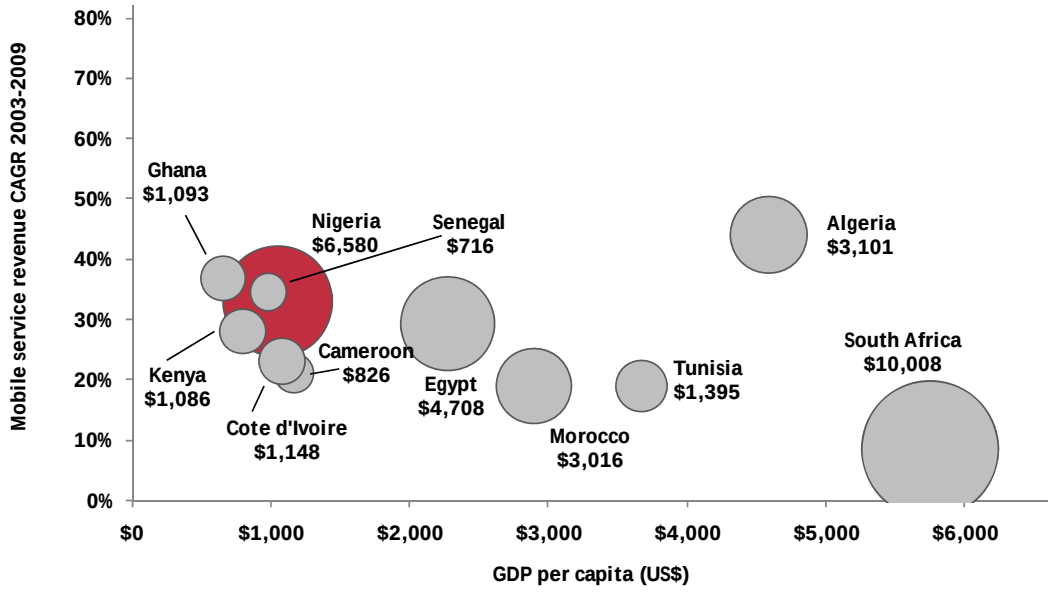
## 1.2 Key events in Nigeria's mobile telecommunications market

The Nigerian mobile market has boomed in the past eight years, supported by a successful liberalization program as well as positive political and economic environment. The first set of GSM licenses was issued in 2001. At present, there are five active GSM operators (MTN, Zain, Glo, Mtel and new entrant Etisalat) as well as a multitude of smaller CDMA operators. The top mobile GSM operators, MTN, Glo Mobile and Zain, account for over 85% of mobile subscriptions in the country.

The liberalization of Nigeria's telecommunications industry started in the early 1990s and accelerated in 2000, after the election of a democratic government. Since then there has been an influx of foreign direct investment, especially in the mobile services segment. Growth in the fixed segment has been sluggish due to inadequate infrastructure and investment, prompting a significant fixed-mobile substitution effect and turning mobile technology into the dominant means of communication in Nigeria. In order to stimulate growth in the fixed sector, the government initially stepped in, inviting bids to privatize the fixed incumbent, Nitel, but the sale of the incumbent has not been completed so far. The Internet segment has also posted growth, with Internet user penetration increasing from 0% in 2001 to 4% in 2009. This is mainly due to growth in the number of Internet service providers and cyber cafes, mostly in urban areas.

Given its size and rate of growth, Nigeria is one of the most attractive markets in the Africa. In 2008, the country became the biggest mobile market in Africa in terms of subscriptions, which in 2008 exceeded 63m, surpassing South Africa, and reached 73m in 2009. However, given the country's lower purchasing power, Nigeria still lags South Africa as the second largest African market in terms of mobile service revenue, generating $6.6bn in 2009 (see Exhibit 15).

**Exhibit 15: Size of the mobile market, nominal GDP per capita and mobile service revenue CAGR, in select African markets, 2003-2009**




Note: Bubble size represents mobile service market revenue in millions of US dollars.

*Source: Pyramid Research, 2010; EIU, 2010*

### 1.2.1 History of the telecommunications industry in Nigeria

In 1985, the government embarked on a journey to deregulate the whole economy, including the telecommunications sector. As part of the program, the independent national regulator, the Nigerian Communications Commission (NCC), was formed in 1992. The NCC is the body that supervises the activities of operators and other stakeholders in the Nigerian telecommunications industry. Following the establishment of the NCC, a law, Decree 75, was enacted to allow private companies to participate in the telecom sector as well as help develop and invest in the country's infrastructure.

**Exhibit 16: NCC objectives and regulations**

*The commission's responsibility is to promote competition among service providers in the industry as well as ensure the provision of adequate telecommunications services throughout the country. The vision of the NCC is to act as an information rich environment, whose industry regulation activities can be comparable globally to other world class regulatory organizations. Its mission is to support a market driven telecommunications industry and promote universal access.*

*Upon the establishment of the NCC, its objectives were determined as follows:*

- *To promote the implementation of the national communications or telecommunications policy, this may be modified and amended from time to time.*
- *To establish a regulatory framework for the Nigerian communications industry and create an effective, impartial and independent regulatory authority.*
- *To promote the provision of modern, universal, efficient, reliable, affordable and easily accessible communications services and the widest coverage throughout Nigeria.*
- *To encourage local and foreign investments in the Nigerian communications industry and the introduction of innovative services and practices in the industry in accordance with international best practices and trends.*
- *To ensure fair competition in all sectors of the Nigerian communications industry and also encourage participation of Nigerians in the ownership, control and management of communications companies and organizations.*
- *To encourage the development of a communications manufacturing and supply sector within the Nigerian economy and also encourage effective research and development efforts by all communications industry practitioners.*
- *To protect the rights and interest of service providers and consumers within Nigeria.*
- *To ensure that the needs of the disabled and elderly persons are taken into consideration in the provision of communications services.*
- *To ensure an efficient management, including planning, coordination, allocation, assignment, registration, monitoring and use of scarce national resources in the communications sub-sector, including but not limited to frequency spectrum, numbers and electronic addresses, and also promote and safeguard national interests, safety and security in the use of the said scarce national resources*

*Current regulations implemented by the NCC include:*

- *Type approval regulations*
- *Numbering regulations*
- *Telecommunications networks interconnection regulations*
- *Competition practices regulations*
- *Quality of services regulations*
- *Universal access and universal service regulations*
- *Consumer protection regulations*
- *Deployment of Wi-Fi*
- *Frequency spectrum (fees and pricing)*
- *Nigerian communications (enforcement process)*

*Source: Nigerian Communications Commission website, 2009*

### 1.3 Key activities of the Nigerian Communications Commission (NCC)

The NCC began licensing network operators in 1996. However, due to political setbacks caused by the acting military government at the time, the market's potential was not exploited and it continued to suffer from underinvestment. During the same year, Nitel was brought under the supervision of the NCC, and a subsidiary, Mtel, was created to manage the company's mobile services and network.

A new telecom policy was introduced in 2000 that commenced full liberalization of the industry. In February 2001, the NCC awarded digital mobile licenses in the GSM900 and GSM1800 bands for an initial period of 15 years to four companies: MTN, Communications Investment Limited (CIL), Econet Wireless (formerly V-Mobile, Celtel and now Zain) and Mobile Telecommunications Limited (Mtel Ltd). Following CIL's inability to pay the full sum of $285m, it had its licensed revoked.

MTN and Zain launched service in May and August 2001, respectively, and have since deployed their networks across Nigeria's 36 states. In September 2002, Glo Mobile also received a digital mobile GSM license to provide service in all parts of the country. National carrier licenses were issued to Glo Mobile and Nigerian Telecommunications (Nitel) in September and November of 2002, respectively. In the same year, both companies were also issued international gateway licenses for 20 years, until 2022, along with Prest Cable & Satellite TV Systems.

MTS First Wireless acquired a national long-distance operator license in 2002, followed by six other companies in the 2004-2006 period. In September 2008, Gateway Telecom Integrated Services became the latest company to acquire a license in this category. All licenses are for a 20-year period.

In October 2003, a new Nigerian Communications Commission Act was passed, replacing the Nigerian Communications Commission Act of 1992. The new act gives the regulator more independence and power to regulate the industry.

In February 2006, the NCC introduced unified access service licenses with a single concession covering the provision of fixed, mobile and any other telecommunications services for a period of 10 years. It was granted to 13 companies in total, including two major GSM operators, MTN and Zain. The earliest operative date for the licenses was July 2006.

This unified license replaced all existing licenses, including the 15-year digital mobile licenses granted to GSM operators in February 2001. Other recipients were CDMA operators (formerly known as private telecom operators, or PTOs) such as Starcomms, Multi-Links and Intercellular. The licenses cost $2.11m each and cover a period of 10 years. The introduction of unified access service licenses was a major change in the market, since it officially ended the exclusivity period of the GSM operators in the provision of mobile telecommunications services. In July 2007, Visafone was granted a similar license and went on to join the country's top-tier CDMA operators. CDMA operators can now extend their reach beyond their former geographical limits and compete in both fixed and mobile markets. As a result, CDMA operators are dominating the fixed market and have extended their services into mobile markets, competing freely and aggressively with established GSM-based operators.

In January 2007, the Mubadala Development Company, a business development and investment company based in Abu Dhabi, was issued a license for the provision of mobile, fixed and broadband services. Etisalat joined Mubadala during the same year as its operational partner in Nigeria, and the duo launched mobile GSM service in October 2008.

In March 2007, the NCC awarded four UMTS licenses in the 2GHz band. Only four operators bid for these licenses, including three mobile operators — MTN Nigeria, Glo Mobile, Zain (Celtel Nigeria) — and one long-distance fixed operator, Alheri Engineering (a subsidiary of the Dangote Group). All four bidding companies received a 10MHz block each at a cost of $150m for each concession. To date, all licensed operators except Alheri Engineering have launched 3G services in Nigeria.

**Exhibit 17: NCC headquarters in Abuja**

*Source: NCC*

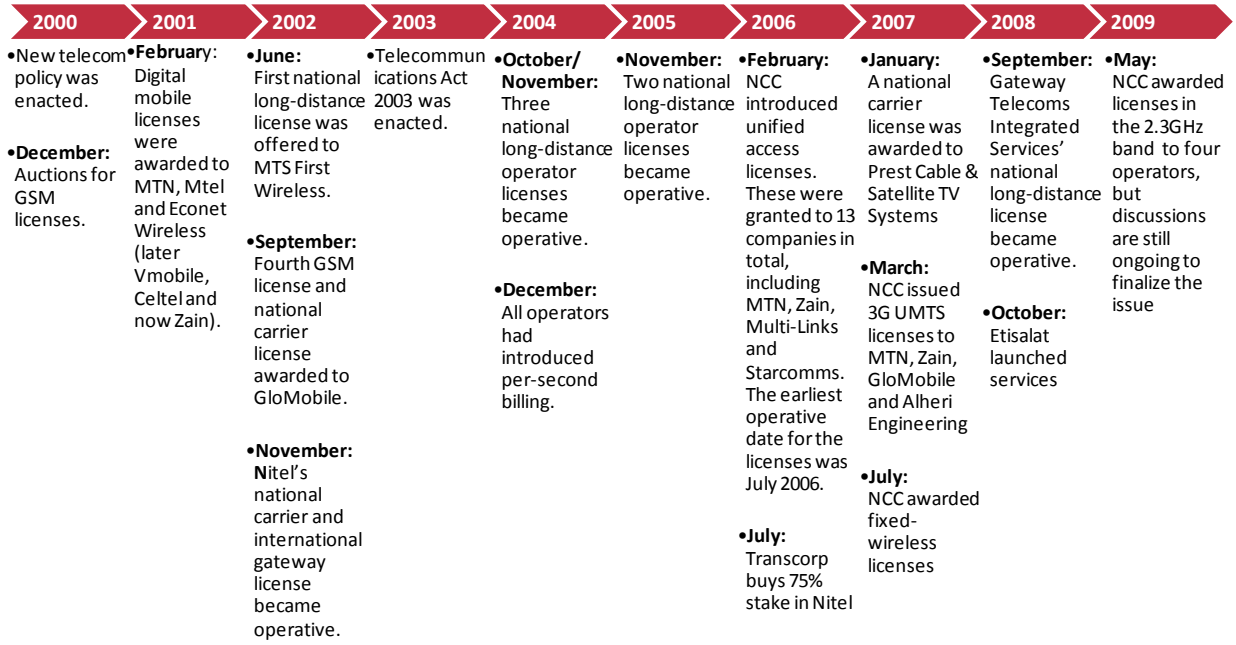
Plans to privatize the fixed incumbent Nitel and its mobile arm Mobile Telecommunications Limited (Mtel) have been underway since 2002. The incumbent operator was eventually privatized in 2006, when Transnational Corporation of Nigeria (Transcorp) purchased a majority stake in the company for $500m, but the acquisition did not improve Nitel's position in the market. Its continued decline prompted the regulator to threaten to annul the partial sale to Transcorp on multiple occasions, referring to the lack of investments to upgrade the operator's network. However, in February 2008, Transcorp reached an agreement with the government to divest a majority stake in Nitel/Mtel to a third-party investor by mid-2009. Multiple international operators, including Vodafone, Glo Mobile, Telenor, France Telecom and Telkom SA, were said to have expressed interest; however, charges of corruption and mismanagement against Transcorp officials prompted the government to finally annul the sale and retrieved ownership of the incumbent from Transcorp in June 2009. The government has since announced alternative ways to restructure and reorganize Nitel by breaking it up and selling the parts as separate entities, in order to be able to recognize more value from each division and attract more buyers.

In 2009, the NCC also announced plans to register all GSM-enabled SIM cards: starting in the first quarter of 2010, all unregistered SIM cards will be disconnected. The NCC has also established a committee to implement mobile number portability (MNP) for mobile networks in Nigeria, but no official date or specific plans have been communicated so far.

More recently, after receiving 41 applications for WiMAX spectrum in the 2.3GHz band, the NCC awarded licenses on a "use it or lose it" basis to Multi-Links, Mobitel Nigeria and Spectranet at a cost of N1.368bn (US$9.4m) for each 20MHz slot. However, the licensing was canceled in order to accommodate new parameters for the evaluation process, and new licensing round is expected to take place shortly.

GSM operators MTN and Zain have also applied to the Central Bank of Nigeria (CBN) for m-banking licenses, with the aim being to expand into mobile banking services. Both operators believe that the service will add value to their subscribers and plan to target both the banked and unbanked populations.

**Exhibit 18: Milestones in licensing and concessions awarded by the NCC, 2000-2009**




*Source: NCC; Pyramid Research, 2009*

**Exhibit 19: Key activities and milestones by mobile operator, 2001-2009**

| Year | MTN | Zain | glo | mtel | etisalat | Starcomms | visafone |
|---|---|---|---|---|---|---|---|
| **2001** | **February:** Was awarded digital mobile GSM license by the NCC at a cost of $285m.<br><br>**May:** Launched commercial services on May 16, 2001, in Port Harcourt, Lagos and Abuja. | **February:** Awarded digital mobile GSM license by the NCC at a cost of $285m.<br><br>**August:** Launched commercial services. | NA | **February:** Awarded digital mobile GSM license by the NCC at a cost of $285m.<br><br>Mtel merged with Nitel. | NA | NA | NA |
| **2002** | NA | NA | **September**: Glo Mobile was awarded digital mobile license at a cost of $200m as part of its multiple licenses (national carrier services, mobile services, long-distance communications and fixed wireless services). Also was issued international gateway and national carrier license alongside Nitel. | First attempt to privatize Nitel/Mtel, but the preferred bidder, UK-based Investment International Limited, failed to pay for the 51% stake. | NA | NA | NA |
| **2003** | **December**: Third operator to introduce per-second billing. | **November:** Introduced per-second billing.<br><br>**December**: Vodacom won court case over acquisition of Econet Wireless. | **August:** Launched commercial services over 2.5G network.<br><br>Became first operator to introduce per-second billing. | **April:** Appointment of Pentascope to manage Nitel/Mtel.<br><br>**December**: Mtel rolled out GSM services to the capital cities of all 36 states. Also introduced per-second billing. | NA | NA | NA |
| **2004** | NA | **April**: Econet rebranded to Vee Networks (was trading as V-Mobile) after acquisition of a controlling stake by Vodacom. | Glo Mobile introduces GPRS with WAP. In just nine months of service, Glo Mobile became the fastest growing mobile operator, with 1m subscribers across 60 municipalities.<br>**August**: Announced plans to invest in fiber-optic submarine cable. | **June**: Second privatization attempt commenced. | NA | NA | NA |

*Source: Pyramid Research; operators*

**Exhibit 19: Key activities and milestones by mobile operator, 2001-2009 (Cont'd)**

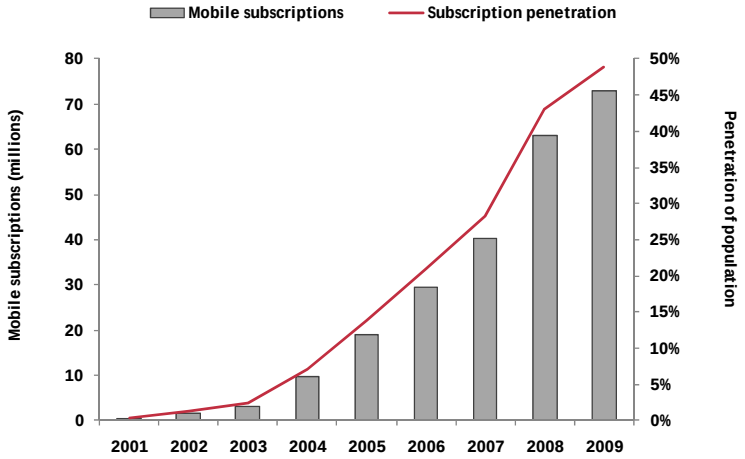
| Year | MTN | Zain | glo | mtel | etisalat | Starcomms | visafone |
|---|---|---|---|---|---|---|---|
| **2005** | **September**: Rolled out GPRS services. | NA | **September**: Rolled out GPRS/GSM services. | Pentascope contact was cancelled.<br><br>**May**: Mtel's subscriber total peaked at 1.2m and its market share at 8%. | NA | NA | NA |
| **2006** | NA | **May**: Celtel International acquired majority stake (65%) in Vee Mobile.<br><br>**September**: Re-branded to Celtel. | NA | Majority stake (51%) in Nitel was sold to Transcorp. | NA | **March**: Launched fixed-wireless services based on CDMA and 3G EVDO mobile broadband data service.<br><br>**May**: Awarded unified license by the NCC. | NA |
| **2007** | **March/April:** Was awarded a 3G UMTS license for a 10MHz block in the 2GHz band at a cost of $150m.<br><br>**May**: First test call for 3G completed. | **March/April:** Was awarded 3G UMTS license for a 10MHz block in the 2GHz band at a cost of $150m. | **March/April:** Was awarded 3G UMTS license for a 10MHz block in the 2GHz band at a cost of $150m. | NA | **January:** Was issued a unified access license by the NCC (GSM 900/1800MHz bands) at a price of $400m.<br><br>**September:** Etisalat acquired 40% of Mubadala Development. | Redefined mobile and fixed voice service. Introduced freedom roaming tariffs. | **June:** Acquired Cellcom.<br><br>**August**: Awarded unified access license (800MHz spectrum) by the NCC, which allows it to offer fixed and mobile services. |
| **2008** | **May**: Launched DVB-H TV service. | **August:** Celtel was rebranded as Zain following the global acquisition of Celtel International by MTC. | **August:** Hit the 20m-subscriber mark.<br><br>**September**: Launched Internet packages over 3G-plus network. | **February**: Transcorp shares were suspended from the Nigerian Stock Exchange (NSE). | **March**: First official call on the network.<br><br>**October**: Launched commercial operations in Nigeria. | **July:** Starcomms listed on the Nigerian stock exchange.<br><br>**November**: Reached the 2m subscribers mark. | **September**: Crossed the 1m subscribers landmark after six months and 2.5m after 10 months. |
| **2009** | **June**: Launched IP-based connectivity. | **February:** Zain launched 3G service in Nigeria.<br><br>**April**: Announced plans to migrate to all-IP network.<br><br>**October:** Signed network management deal with Nokia Siemens Networks. | **January:** Reduced international call rates by 70%.<br><br>**October:** Announced expansion of its network coverage to 86 predominantly remote communities. | **February**: Transcorp started divesting its stake in Nitel. | **April**: Raised N15bn in a private placement.<br><br>**June:** Subscribers hit 1m mark seven months after it launched operations. | **February**: Introduced missed-call notification service and call waiting. | **February**: Launched voice SMS service and introduced free late-night calls.<br><br>**July:** Agreed with Nokia to introduce dual-band mobile CDMA handsets. |

*Source: Pyramid Research; operators*

## 1.4 Evolution of mobile subscriptions in Nigeria

The Nigerian mobile services market has increased at a rapid pace, from 422,000 subscriptions at the introduction of GSM networks in 2001 to 73m at the end of 2009. Measured in terms of the mobile penetration, growth has been equally exponential, from just 0.33% of the population in 2001 to 48.9% in 2009. Intense competition, the proliferation of prepaid plans, low-cost handsets and the rapid expansion of mobile networks to different parts of the country are the main drivers of growth in mobile subscriptions. The expansion of coverage to underserved areas by the smaller CDMA operators has also led to increased competition, bringing overall communication prices down.

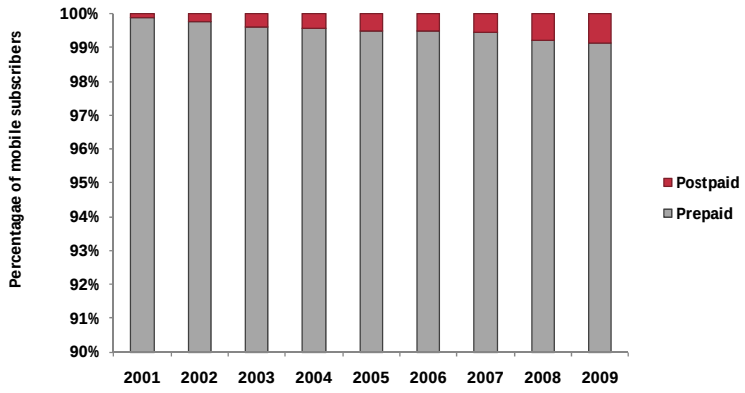
**Exhibit 20: Mobile subscriptions and mobile subscriptions penetration of population in Nigeria, 2001-2009**




*Source: Pyramid Research Mobile Data Forecast, 2010*

Since the inception of GSM technology in Nigeria, prepaid mobile services have been the most popular. Over the past eight years, prepaid subscriptions accounted for an average of 99.6% of total subscriptions, but the ratio fell to 99.1% in 2009. Subscriptions are wholly operator-based, since there are no mobile virtual network operators (MVNOs) in Nigeria.

**Exhibit 21: Mobile subscriptions breakdown by subscription type in Nigeria, 2001-2009**




*Source: Pyramid Research Mobile Data Forecast, 2010*

GSM technology remains the dominant platform in the mobile market, representing 90% of total subscriptions. Respectively, 2G, 2.5G and 3G technologies accounted for 17%, 75% and 8% of subscriptions at year-end 2009. Pyramid Research expects 2.5G and 3G+ technology, including CDMA2000, GPRS, EDGE and UMTS/HSPA, to play an increasingly important role in spreading Internet access to the millions of Nigerians who are currently unable to obtain access through fixed-line networks. The lack of a competing fixed-line Internet offering in most regions of Nigeria has made mobile networks the only Internet option for both business and residential customers. CDMA operators such as Visafone have made a successful business model out of this with CDMA-based technologies, and we expect them to stay strong in this segment given their expansion plans. GSM-based operators such as MTN, Glo Mobile and Zain are also increasingly making inroads in the mobile Internet market with UMTS-based service.

Key market indicators show a rapid decline in ARPS since 2001, reflecting strong competition in the market. Mobile ARPS fell from $48.21 in 2001 to $11.26 in 2008 and to an estimated $8.07 in 2009, while MOU fell from 225 to 48 in the same period. The entry of Etisalat in 2008, the addition of marginal and lower-spending subscribers of prepaid subscriptions, and increased competition among existing GSM and CDMA-based operators will continue to drive ARPS downward. To respond to falling APRS, mobile operators are now concentrating on the provision of value-added services. In a market with as many mobile operators as Nigeria's, retention is also increasingly important to mobile operators. Pyramid Research estimates that annual churn rates have already surpassed 40%, a considerable increase from the 2% level in 2001.

**Exhibit 22: Snapshot of key market indicators in Nigeria, 2001-2009**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| **Subscription penetration of population** | 0.3% | 1.2% | 2.4% | 7.2% | 13.8% | 20.9% | 28.2% | 43.1% | 48.9% |
| **User penetration of population** | 0.3% | 1.1% | 2.2% | 6.5% | 12.0% | 17.4% | 23.3% | 34.5% | 38.0% |
| **Prepaid subscriptions as percentage of total** | 99.9% | 99.8% | 99.6% | 99.6% | 99.5% | 99.5% | 99.5% | 99.2% | 99.1% |
| **ARPS (US$)** | $48.21 | $47.56 | $41.55 | $29.94 | $17.80 | $13.65 | $12.12 | $11.26 | $8.07 |
| **Data ARPS as percentage of total ARPS** | 0.5% | 0.7% | 0.9% | 1.1% | 2.0% | 3.0% | 3.5% | 5.7% | 7.9% |
| **Monthly minutes of use (MOU)** | 223 | 162 | 136 | 119 | 89 | 70 | 53 | 51 | 48 |
| **Annual churn rate** | 2.0% | 8.7% | 18.5% | 18.6% | 26.8% | 27.9% | 48.4% | 44.0% | 41.8% |

Note: Mobile subscriptions refer to the number of SIM cards present in the market, while mobile users refer to the number of unique mobile users in the country.

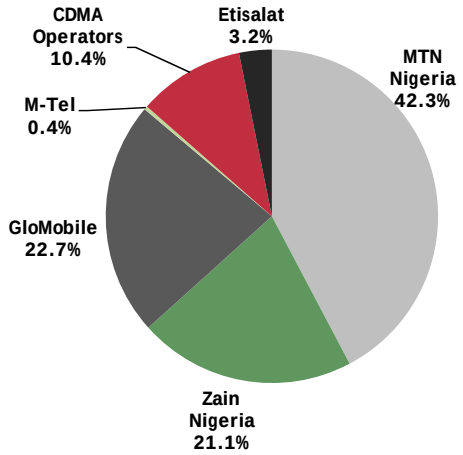
*Source: Pyramid Research Mobile Data Forecast, 2010*

Nigeria is one of the most competitive markets in Africa, with five GSM mobile operators. This has resulted in lower tariffs, a wide variety of innovative services, attractive offers and improvements in service quality in order to differentiate and set the brands aside.

Pyramid Research estimates that MTN remained the market leader at year-end 2009, with more than 42% of overall subscriptions, followed by Glo Mobile (23%) and Zain (21%). The key competitive strengths of each player can be summarized as follows:

- MTN has managed to maintain its position as the largest operator in terms of subscriptions by constantly investing in aggressive network rollouts. It has also recently introduced various value-added services, such as mobile TV, MTN Google, Video Cam, Mobile Internet and a SIM backup service.
- Zain overtook Glo Mobile as the second largest player in the mobile market after its rebranding exercise in 2008. One of the contributors to Zain's success is the introduction of its ultralow-cost handset project, which markets phones with prices as low as $20 in the Nigerian market. As a result, it gained more than 1m customers within nine months. Among other community initiatives, Zain also focuses on providing various value-added services and offers on-net tariff discounts to the Nigerian police and military. However, from 2Q 2009 onwards, Zain attracted less subscribers than Glo Mobile and it fell back to the third position at year end 2009.
- Glo Mobile's market share has increased significantly, from only 9.3% in 2003 to 22.7% in 2009. This is due to its competitive on-network rates. Glo Mobile focuses on the provision of various innovative packages, bonus airtime and low roaming charges. The operator aims to provide affordable services to the masses, which it demonstrated by being the first operator to launch per-second billing from the onset, in 2003. At its launch, the operator also introduced lower-denomination scratch cards and innovative packages that allowed low-income earners to pay for their starter phone packs by installments.
- In June 2009, Etisalat reached the 1m subscription mark, less than one year after its commercial launch; by year end 2009 the operator's subscriber base reached 2.3m. In order to attract subscribers from the established mobile operators, Etisalat focuses on marketing, value-added services and service quality as well as on differentiating its services.
- Mtel is lagging due to a lack of infrastructure investment and the financial challenges that Nitel, its controlling company, faces. Mtel's market share dropped from 10.7% in 2001 to 0.4% in 2009.
- In parallel, CDMA operators are gaining leverage in the Nigerian mobile market, with their combined market share increasing from just 1.1% in 2001 to 9.6% in 2008. We estimate that the footprint of the CDMA operators continued to grow in 2009, to 10.4%. Given their lower call rates and partially subsidized handsets, companies like Visafone, Starcomms, Multi-Links and Zoom Mobile (previously Reltel) are emerging as a significant force in the market.
    - Visafone launched service in March 2008 and began to sell handsets at very low prices, starting at just N2000 ($13.80). It is now the leading CDMA operator in terms of subscriptions. The operator's customer base jumped from about 60,000 subscribers in March 2008 to almost 2.2m at the end of 2008, with the majority of its subscribers purchasing handsets for the first time.
    - Another UASL holder, GiCell Wireless, has been deploying a low-cost CDMA2000 mobile network across Adamawa, Borno, Cross River, Kwara and Oyo states. It has already launched services in Yola state. The operator received partial financial support ($5m) from the World Bank's International Development Agency, local banks, corporate groups and individuals. GiCell is promising the cheapest communication rates in the country and targeting subscribers in un-served and low-penetration areas.

**Exhibit 23: Mobile operator market shares in Nigeria, 2009**




*Source: Pyramid Research Mobile Operator KPI Forecasts, 2010*

Going forward, as operators continue to expand coverage in rural areas, market share positions will be affected by investments in capacity, marketing and advertising. Strong uptake of mobile service in Nigeria over the past two years has put a significant strain on the operators' infrastructure, resulting in multiple service interruptions and poor service quality. In response, operators have invested to upgrade their networks and add capacity, setting the stage for another strong period of expansion of the market in the years to come.

The top three GSM mobile operators are expected to keep their grip on the mobile market but will face increasing competition from the CDMA operators and new operators such as Etisalat. Competition will continue to drive down prices and operator margins, making mobile communications more affordable to a wider population, thereby increasing penetration.

## 2. The impact of the mobile services industry on Nigeria's economy

In this chapter, Pyramid Research analyzes the economic impact of the mobile industry in Nigeria by looking at the ratio of mobile service revenues to GDP, capital investment and employment related to mobile operators as well as their contributions in the form of license fees and taxation. We also provide a snapshot of innovative services introduced by mobile operators that are helping to reduce connectivity gaps and open up opportunities for the value-added services market to flourish in the next few years.

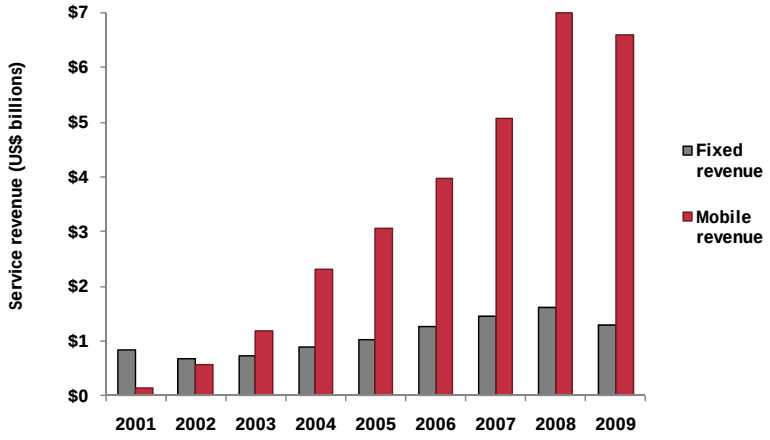
Mobile services have multiple positive effects, most notably in emerging markets. Their economic benefits extend beyond the investment that network operators allocate to license fees, taxes and network equipment:

- End user spend money on mobile telecom services.
- Telecom operator spending on marketing, distribution, maintenance, training, support and network enhancements have significant effects.
- Mobile operators create employment, both direct and indirectly, and invest in the development of the labor force.
- Mobile services have a wider economic impact, since they enable a different way of conducting business, reducing the time and cost of transactions, improving access to markets, commoditizing information and generally allowing businesses to operate more efficiently.

### 2.1 Relevance of mobile services revenue to gross domestic product

Across Africa, due to the limited fixed-line and Internet penetration, fixed telecom service revenue tends to be exceeded by its mobile counterpart. Mobile service revenue accounts for the lion's share of total telecommunications revenue in any given African market.

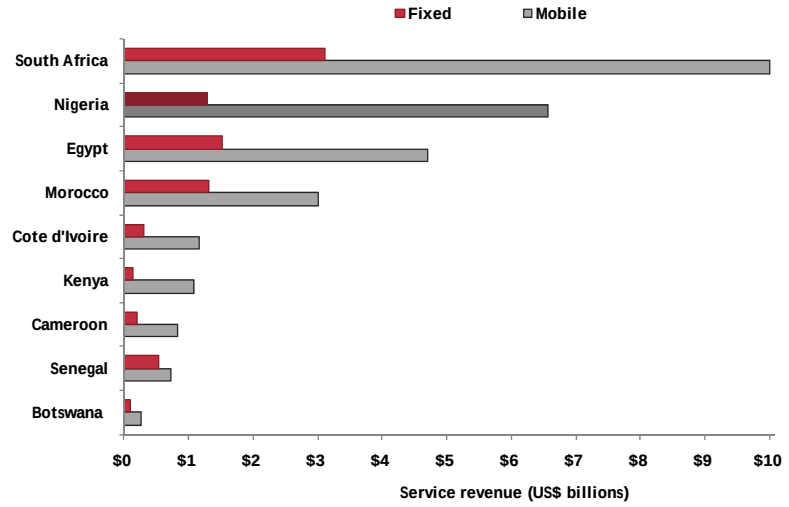
**Exhibit 24: Fixed and mobile service revenues in Nigeria, 2001-2009**




*Source: Pyramid Research Mobile Demand and Fixed Communications Forecasts, 2010*

Pyramid Research estimates that mobile services revenue in a set of eight key African countries on average accounted for 76% of total telecommunications revenue in 2009. In some countries where fixed infrastructure is limited, the figure exceeded 80%, such as in Kenya, where mobile services revenue accounted for 89% of total telecom revenue.

**Exhibit 25: Fixed and mobile telecom services revenue in select African countries, 2009**

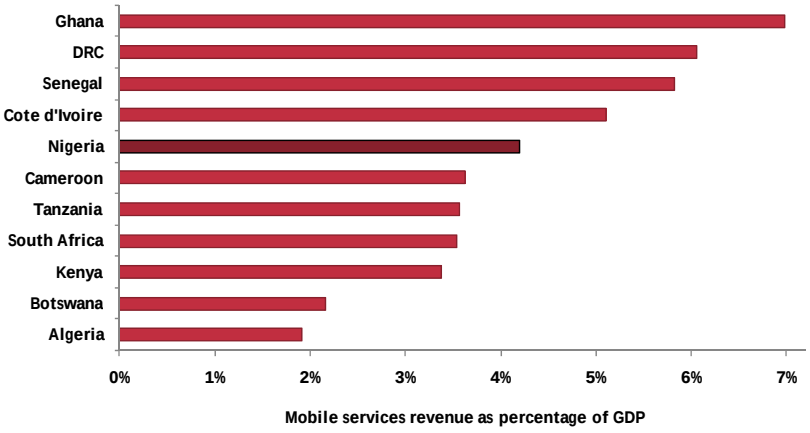



Note: Revenue calculated on the basis of ARPS.

*Source: Pyramid Research Fixed and Mobile Forecast, 2010*

Mobile services in particular contribute a significant amount to the economies of countries where they operate. Pyramid Research estimates that mobile service revenue alone contributed an average of 4.2% to the gross domestic product in 10 African markets in 2009. In some instances the ratio was much higher, such as in Ghana (7.0%), the Democratic Republic of Congo (6.1%), Senegal (5.8%) and Cote d'Ivoire (5.1%).

**Exhibit 26: Mobile service revenue as a percentage of GDP in select African markets, 2009**

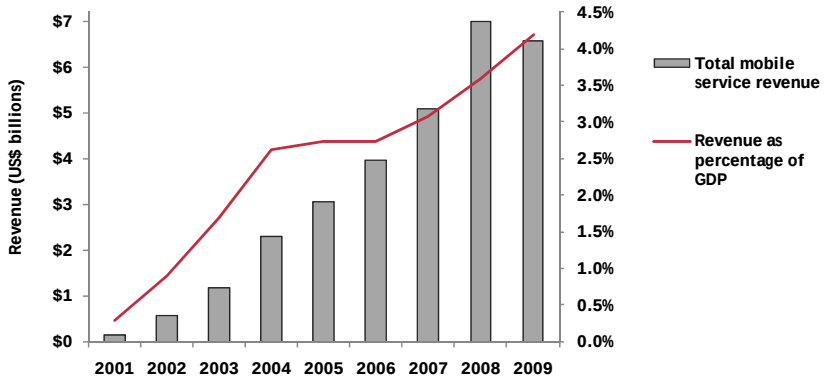



*Source: Pyramid Research Mobile Data Forecast, 2010; EIU, 2010*

## 2.2 Mobile services revenue and Nigeria's economy

For the sizable Nigerian economy, the telecom services market has become a key pillar of growth. Pyramid Research estimates that total service revenue generated by mobile operators in Nigeria has increased significantly, from $135m in 2001 to roughly $7.0bn in 2008. We estimate that mobile service revenue in 2009 fell 6% in US$ terms, to US$6.6bn. Mobile services have clearly been ahead of fixed since 2003, when mobile service revenue exceeded fixed revenue for the first time. The mobile market has grown to represent more than 80% of the overall telecom services market in Nigeria. We estimate mobile service revenue has grown from representing 1.2% of GDP in 2001 to roughly 4.2% of the country's economy in 2009. This puts the mobile sector at roughly the level of the manufacturing sector but above transportation, the finance sector and government services. The telecom sector's contribution to GDP has witnessed the fastest growth during the 2000-2009 period.

**Exhibit 27: Mobile services revenue contribution to GDP in Nigeria, 2001-2009**

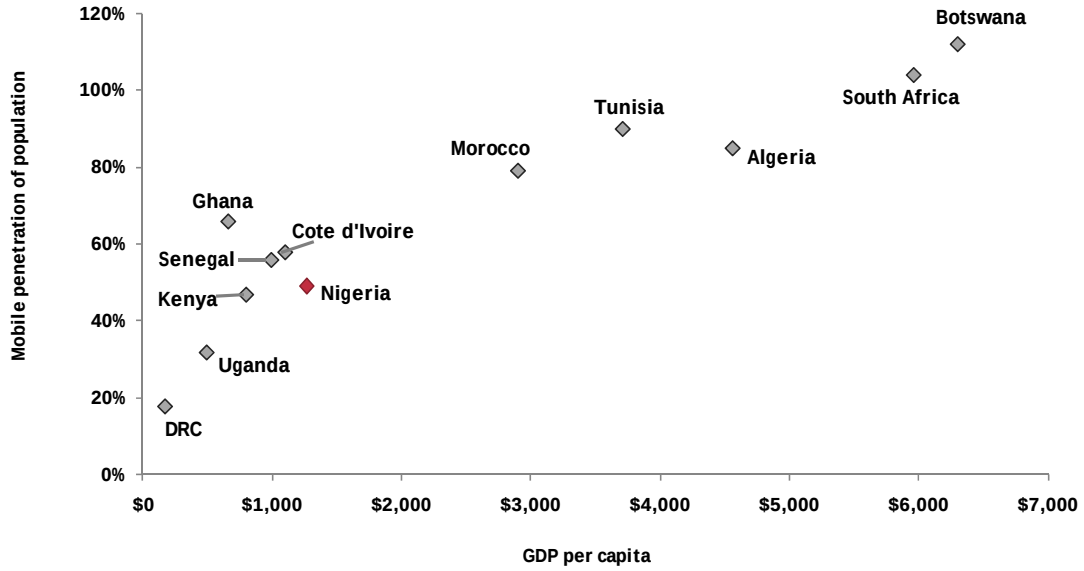



*Source: Pyramid Research Mobile Data Forecast, 2010; EIU 2010*

In addition to the direct effect on the economy measured as a contribution to the country's GDP, mobile services have an indirect impact by enabling efficiencies in adjacent industries. Empirical studies, conducted as early as in 1970s, have shown that access to telecommunications services has a positive impact on the economy of the recipients' countries. Waverman, Meschi and Fuss,[8] after analyzing the impact of mobile telephony on GDP between 1980 and 2003 in 92 developed and developing countries, concluded that mobile telephony plays as vital a role as fixed telephony has played in the Western world in the 1970s and 1980s. The economic impact of mobile telephony is twice as great in developing countries as it is in developed countries. In addition, they also believe that a 10% increase in mobile penetration of the population positively impacts GDP growth by 0.59% in emerging markets. More recent studies, such as those conducted by Deloitte[9] in 2007 or by Kathuria, Uppal and Mam about India in 2009,[10] estimate that a 10% increase in mobile services penetration leads to GDP growth of 1.2 - 1.4%.

[8] *Africa: The Impact of Telecom on Economic Growth in Developing Countries, Moving the debate forward* in The Vodafone Policy Paper Series, Number 3, March 2005
[9] GSMA & Deloitte, 2007, *Global Mobile Tax Review 2006-2007*
[10] *India: The Impact of Mobile Phones, Moving the debate forward* in The Vodafone Policy Paper Series, Number 9, January 2009

**Exhibit 28: Mobile penetration of population and GDP per capita in select AME countries, 2009**




*Source: Pyramid Research Mobile Data Forecast, 2009; EIU 2009*

The comparison in the exhibit above of nominal GDP per capita with mobile penetration rates in 12 African and Middle East countries shows a high correlation between the two variables. Although income levels are important in determining mobile penetration, there are other variables — notably the level of competition: in Burkina Faso there are just two operational networks, while in Ghana there are five, soon to be six. This affects the market in several ways, mainly in pricing: per-minute rates in Ghana are about a third of those in Burkina Faso.

Competition also drives coverage and capacity investments, which are markedly better in Ghana, where higher-quality services are offered to a larger portion of the population. And stronger competition gives operators incentive to target lower-spending groups. For example, in Ghana, market leader MTN offers the lowest top-up amount, $0.07, whereas in Burkina Faso, the lowest top-up amount offered by the largest operator, Zain, is $0.45.

The degree of competition is not, however, based solely on the number of operators — for instance, in Tanzania there are six operational networks but only three that compete nationally. Other factors also affect penetration. Political instability lowers overall penetration in a number of ways, and explains why the DRC's penetration rate is so low despite the fact that there are five live networks there. Finally, income distribution can also skew adoption; an extreme case is Equatorial Guinea, which has a GDP per capita of $19,200 and a mobile penetration rate of just 53% due to the concentration of oil wealth. Poland, which has a GDP/capita of around $12,000, has a penetration rate of 117%, as a comparison. Another consideration is the availability and affordability of fixed lines, public phone boxes in particular, as well as the size of the informal economy, which can add a significant percentage onto GDP-per-capita levels.

## 2.3 Telecom licensing fees, taxation and Nigeria's economy

Licensing fees are one of the most direct ways in which mobile operators contribute toward the economy of their host countries. In Nigeria, since the introduction of GSM in 2001, the government has received more than $2.5bn from spectrum licensing fees. In 2007 alone, the Nigerian federal government received a total of more than $1bn from the sale of licenses as shown in the next exhibit.

**Exhibit 29: Licensing fees' contribution to the economy in Nigeria, 2001-2007**


**2001**

- The NCC awarded digital mobile licenses in the GSM900 and GSM1800 bands to four companies:
  - MTN
  - Communications Investment Limited (CIL),
  - Econet Wireless (now Zain)
  - M-Tel Ltd, which as a subsidiary of government-owned incumbent Nitel had the GSM spectrum reserved
- The operators were required to pay a non-refundable fee of **$20m** before the auction.
- Following the CIL's inability to pay the full sum of US$285m, it had its licensed removed.

**2002**

- The NCC awarded the fourth GSM license to:
- Glomobile (Globacom) as part of its multiple licenses (national Carrier services, mobile services, long distance communication and fixed wireless services) for a fee of US$400m.

**2006**

- The NCC awarded unified licenses for US$2.11m each to four CDMA operators ("private telecom operators," aka PTOs):
  - Multi-Links
  - Starcomms
  - Intercellular
  - Gicell Wireless.

**2007**

- In January, the NCC awarded a $400m license for provision of mobile, fixed and broadband services to Emerging Market Telecommunication Limited (Mubadala United Arab Emirates), now operating under the Etisalat brand.
- In March, after a tender, a qualification process and payment of US$15m to the regulator, the NCC awarded (3G) spectrum licenses. Each worth US$150m, the licenses went to three mobile operators:
  - MTN Nigeria,
  - Globacom
  - Celtel Nigeria (now Zain)
  - Alheri Engineering, a long-distance fixed operator (part of Dangote Group).

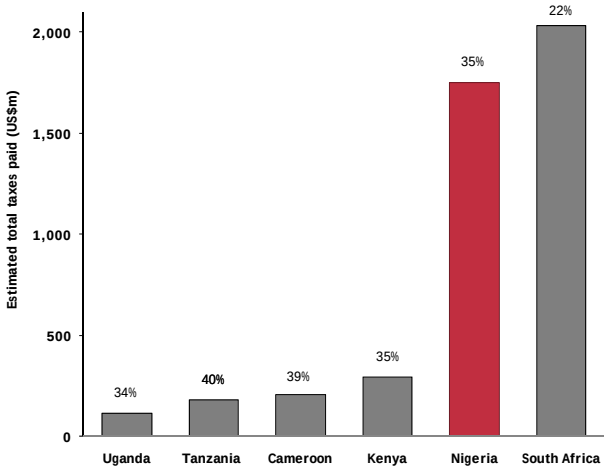
*Source: NCC website 2009; Pyramid Research, 2009*

Import duties and taxes from the telecommunications industry have also contributed substantial amounts of revenue to the federal government. As an example, MTN's license stipulates that it pays 2.5% of its assessed net annual revenue. The operator also implemented a policy to spend 1% of its annual after-tax profits on corporate social responsibility via its MTN Foundation, established in 2005 to finance initiatives in education, economic empowerment and health issues.

African mobile service providers pay a considerable amount of money in taxes and levies to their respective governments. For instance, in 2006, mobile operators in South Africa and Nigeria paid a total of $2bn and $1.7bn, respectively, in taxes.[11] This accounted for 22% and 35% of operators' revenues. In addition to income and revenue taxes, mobile operators generally pay other forms of taxes, which can be levied on airtime, network equipment, handsets and so on.

[11]GSMA, *Taxation of mobile services in sub-Saharan Africa*, May 2008

**Exhibit 30: Total taxes paid by mobile operators and their contribution as a percentage of total tax receipts in select African countries, 2006**




Note: Total tax is constituted of consumer tax, input tax, import duties, employment taxes and corporate tax
*Source: GSMA; Frontier Economics, 2008*

## 2.4 Employment and distribution networks of mobile operators

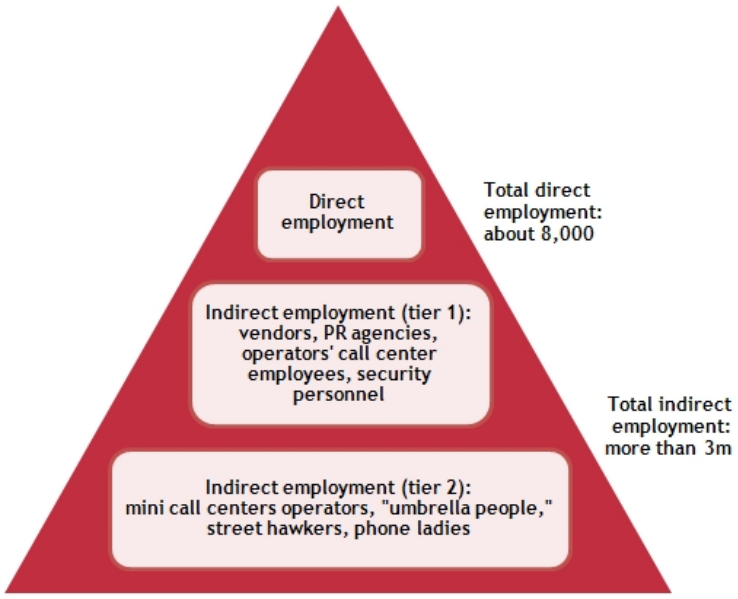
Mobile operators contribute to the economy by creating workplaces and jobs that rely on the distribution of mobile technology and services. This contribution also takes the shape of employment beyond the telecom operator ranks, by enhancing entrepreneurship, productivity and other commercial skills. The use of mobile phones enables professional and economic agents to multitask and carry out various activities simultaneously.

In total, according to a speech — "Telecommunications as Catalyst for Modern Industrialized Nigeria"[12] — by Mr. Ndukwe, executive vice chairman of NCC, telecom operators employed around 8,000 people directly and around 3m indirectly in 2008. Although direct employment is easier to quantify, indirect employment has a wider and more profound impact. There are several groups, which can be divided into two subgroups, that earn their living thanks to mobile services:

- The top category of indirect employment encompasses equipment sales, infrastructure deployment, advertising, marketing and public relations as well as security — workers involved in the protection of base stations. Reportedly, in 2008 Zain employed as many as 8,000 security guards.
- At the base of the pyramid, there are mobile service resellers, recharge card distributors, retailers, phone booth operators as well as street vendors. The so-called mini call centers consist of simply one or a few mobile phones and airtime bought in bulk from the operator. Call center operators allow other people to use the phone for a fee and quite often will take a message, also for a fee.

[12] *Telecommunications as Catalyst for Modern Industrialized Nigeria* by Ernest C.A. Ndukwe, Executive Vice Chairman Nigerian Communications Commission, available at: http://www.ncc.gov.ng/index10.htm

**Exhibit 31: Employment related to mobile sector in Nigeria, 2008**




*Source: Pyramid Research, 2009*

MTN Nigeria is a good example of how mobile operators spur indirect employment. The operator has reorganized its distribution network, bringing down the number of appointed distributors from 202 in 2007 to 111 in 2008. On top of that, there is a second and third level to the distribution channel, amounting to around 5,700 contractors and more than 30,000 identified informal distribution points as well as probably several hundred identified points that are currently being incorporated into MTN records.[13] Many of these people are involved in selling prepaid scratch cards (see Exhibit 32).

**Exhibit 32: Street hawker selling prepaid scratch cards, Nigeria**

*Source: NCC*

It is common in Nigeria to see people selling scratch cards among the cars trapped in a traffic jam or positioned on street corners under an operator logo-branded umbrella, selling airtime vouchers. Airtime for mobile operators, including MTN and Glo is available via umbrella stands among other points of sale (see Exhibit 33).

[13]http://www.mtn.com/AboutMTNGroup/GroupFootprint/WestAndCentralAfrica/WestAndCentralAfrica_Nigeria.aspx

**Exhibit 33: MTN and Glo points of sale, Nigeria**


*Source: NCC*

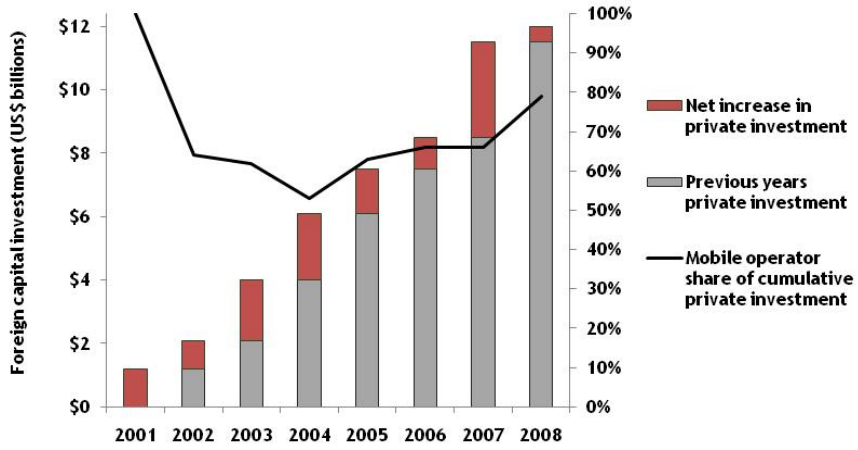
## 2.5 Investment in infrastructure by mobile operators

With every network rollout and upgrade, GSM operators bring money and employment opportunities to the market. According to MTN, operators in Nigeria have invested in building three networks: a core telecommunication network, a transmission network and a power supply network. This effort is a result of Nigeria's underdeveloped infrastructure. Nigerian operators have to not only budget for building the transmission backbone and infrastructure but also for power generators, bringing in skilled ICT employees and transportation.

Since the introduction of GSM services in Nigeria, mobile operators together have invested several billion dollars in infrastructure deployments, network rollouts, upgrades and expansions. To support the mobile infrastructure, operators have also embarked on building backbone networks. These consist predominantly of fiber-optic cables, base stations and satellite connections, transmitting traffic between cities and to other countries. MTN's famous Yellow Bahn fiber-optic cable, for example, is more than 5,500km (3,400 miles) long.

Pyramid Research estimates that capital investments in mobile networks and operations have accounted for 80% of total telecommunications foreign capital investments (a total of more than $12bn by the middle of 2008) since the Nigerian government successfully liberalized the industry in 2001. As of March 2010, the NCC reported $18bn in telecom sector capex, $16bn of which is invested by mobile operators.

**Exhibit 34: Private investment by telecom operators in Nigeria, 2001-2008**

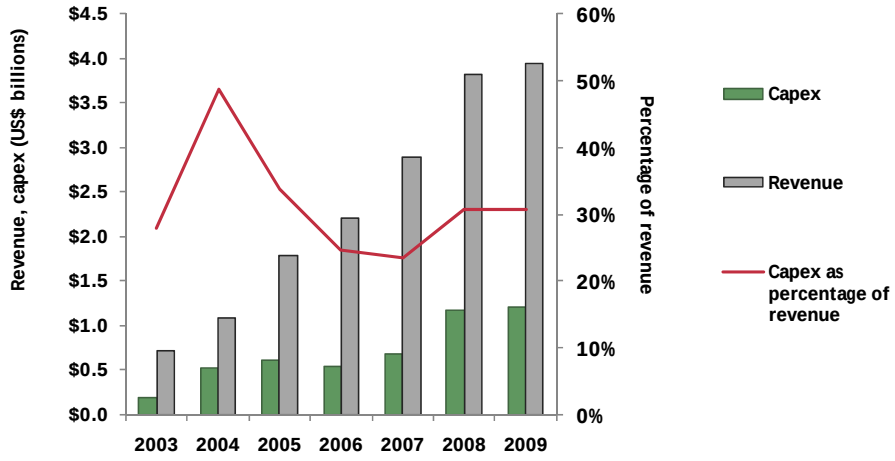



Note: 2008 figure does not reflect the full year.
*Source: NCC*

A look at a specific operator illustrates the magnitude of telecom players' role in the overall infrastructure and operational investment in Nigeria. Of the existing mobile operators, MTN has invested the most in Nigeria.

After the initial network rollout, which took the lion's share of its revenue in 2004, MTN claims to have allocated more than 30% of its revenue to capex. During this time, MTN has focused its investment on building up the transmission network to substitute for the lack of established telecom infrastructure. This, however, was not enough, and its network could not cope with the rapidly increasing number of customers, resulting in the NCC fining the operator $20m and banning advertising.

**Exhibit 35: MTN Nigeria capital expenditures, 2003-2009**




*Source: Pyramid Research; MTN annual reports*

In 2008, MTN increased its number of base transceiver stations (BTS) by 1,560, to reach 4,776; in 2009 additional 1,220 BTS were built, reaching a total of almost 6,000. In addition, MTN Nigeria has prioritized the rollout of 3G sites, and 551 3G sites were operational in 2008. MTN is also building metropolitan fiber rings around important commercial cities such as Lagos, Abuja, Ibadan, Port Harcourt, Kano, Aba and Warri. Additionally, MTN Nigeria's total capex for 2009 was $1.2bn and it estimates its total investment in network improvement in 2010 to be roughly $0.8bn.

Zain Nigeria is also investing a significant amount of resources in its network. The operator has more than 4,000 base stations and has contracted Nokia Siemens Networks to roll out its fiber-optic backbone, which will soon reach 4,000km.

New network rollouts require multimillion-dollar budgets. For example, in November 2008, Etisalat Nigeria awarded Alcatel-Lucent a multimillion-euro contract for the deployment of its new mobile cellular network in the country on a turnkey basis. Alcatel Lucent's radio access technology can accommodate a variety of standards, such as GSM/GPRS/EDGE/EDGE+ and W-CDMA/HSPA/HSPA+ — and in due course LTE. Alcatel-Lucent will also provide Etisalat with network deployment and integration services as well as related infrastructure, such as towers, masts and power systems.

Etisalat Nigeria Chief Executive Steven Evans has confirmed that the junior operator's capex plans are no less extensive than that of the other operators, and it will invest $2bn to build network infrastructure in Nigeria over the next three years.

Mobile operators have also begun sharing BTS sites, especially with the smaller CMDA operators. MTN,[14] for instance, has reported that it shares about 350 sites with other providers.

**Exhibit 36: A snapshot of a cell tower, Nigeria**

*Source: NCC*

During an open hearing in April 2009, Nigerian operators declared that $10bn in further investment is needed for network upgrades and expansion over the next 10 years.

[14]http://www.mtn.com/AboutMTNGroup/GroupFootprint/WestAndCentralAfrica/WestAndCentralAfrica_Nigeria.aspx

## 2.6 Introduction of new technologies by mobile operators

New technology, research projects and initiatives bring significant revenue and an employment boost to Nigeria. So far, most Nigerian mobile operators, such as MTN, Zain and Glo, have undergone a technological evolution from 2G to 2.5G and even 3G.

**Exhibit 37: Overview of mobile network technologies available in Nigeria**


- The main second-generation (2G) technology is the GSM standard, usually operating in the 900Mh and 1800MHz bands. It enables voice and basic data communications, including WAP (Wireless Application Protocol).
- Networks using 2G can be upgraded to 2.5G technologies that support higher transmission speeds — up to 115Kbps — through the implementation of GPRS (General Packet Radio Services), EDGE (Enhanced Data Rates for Global Evolution) or an even higher-bandwidth version of GPRS with transmission speeds of up to 384Kbps.
- Third-generation (3G) technology enables
  - Internet access
  - Mobile TV
  - Video calls
  - Other forms of content and value-added services.
- The HSPA (High Speed Packet Access) standard supports data transmission up to 14.4Mbps downlink and 5.8Mbps uplink.
- The UMTS (Universal Mobile Telecommunications System) standard in conjunction with HSPA enables data transfers up to 21Mbps.

*Source: Pyramid Research, 2009*

Following its later entry in 2003, Glo Mobile started operating on a 2.5G network and brought to Nigeria the benefits of value-added services: Multimedia Messaging Services (MMS), Glo Mobile Internet, Glo Fleet Manager and Glo Mobile Office. Glo Fleet Manager is a vehicle-tracking application that gives the subscriber the ability to track and trace equipped vehicles. This is an early implementation of an M2M (machine-to-machine) service. Glo was also the first operator to launch mobile access to the Internet, with other 3G licensees replicating the move soon thereafter. MTN launched an HSDPA-enabled 3.5G network in June 2008, while Zain launched its 3G service in early 2009.

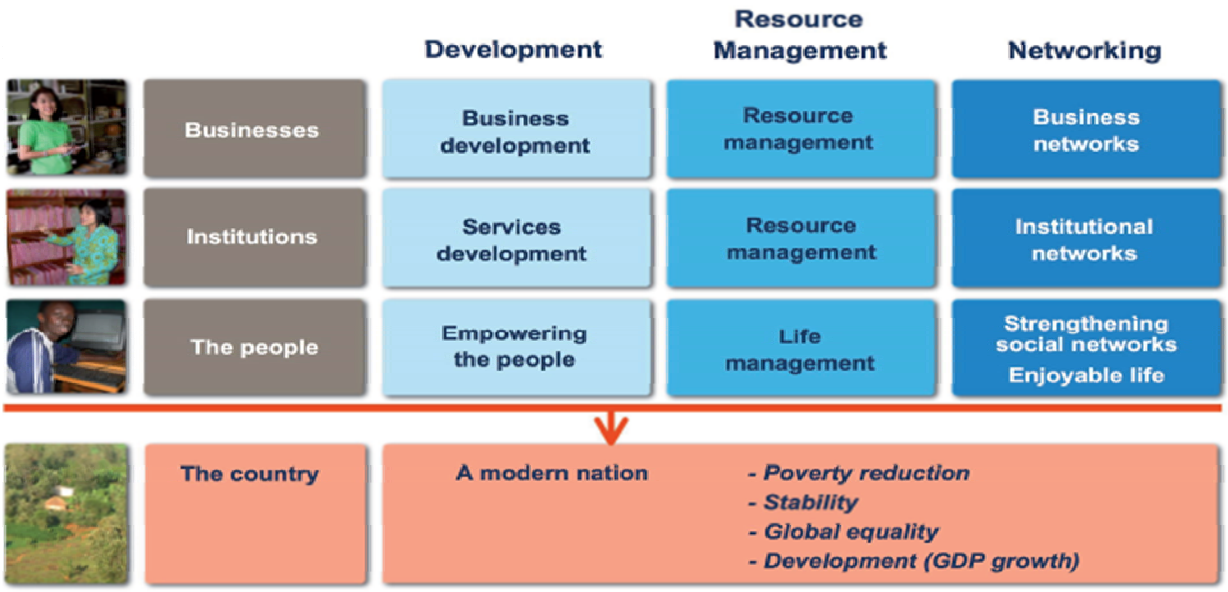
The introduction of BlackBerry handsets is another step in the transition to next-generation services. The BlackBerry was launched in Nigeria by Globacom in 2006, and MTN followed suit in March 2007. The BlackBerry platform is a powerful tool for business people across Nigeria, given the patchy fixed-line and Internet penetration in the country. In May 2009, Zain contributed to further popularizing the device by introducing prepaid BlackBerry service.

**Exhibit 38: Poster advertising BlackBerry handsets in a Nigerian airport**


*Source: Pyramid Research, 2009*

In Nigeria, and at the overall African level, the most immediate wave of innovation will come in the form of connectivity for the growing pools of laptop and smartphone users. In addition, mobile broadband has positive effects on societies through the development of human capital. After analyzing developments in Rwanda and South Africa, for instance, equipment manufacturer Ericsson maintains that the rollout of Internet services has positive "effects on three broad aspects of society: development, resource management and networking."[15] (See Exhibit 40). Additional benefits of mobile broadband can be seen in the case of the Gramjyoti project in India, which shows how 3G Internet access can have a beneficial impact on the development of a rural population (See case study Gramjyoti – "Light of the Village").

**Exhibit 39: Effects of Internet access across three broad aspects of society: Development, resource management and networking**

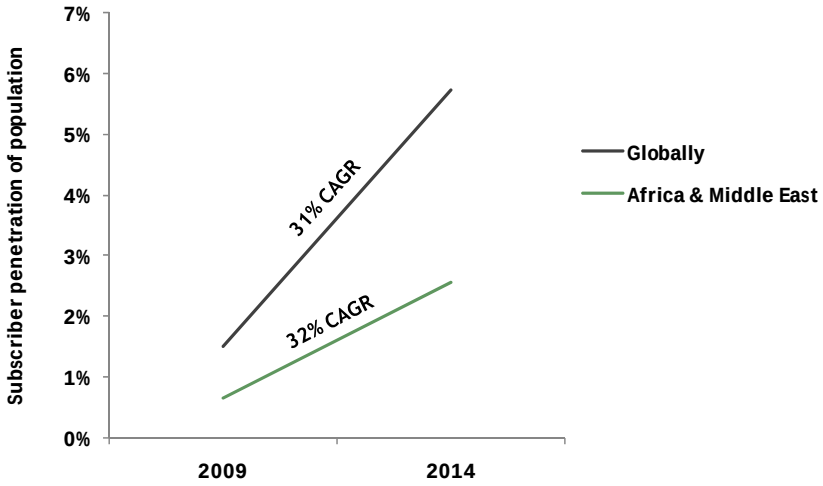



*Source: Ericsson, February 2009*

[15] Ericsson Whitepaper, *Accelerating global development with mobile broadband*, February 2009

Pyramid Research projects that mobile broadband (defined as mobile access to the Internet via data cards and modems) penetration in the AME region will grow more than fourth-fold between 2009 and 2014, from 0.7% of the population to 2.9% in 2014 (See Exhibit 40).

**Exhibit 40: Projected mobile broadband account penetration of the population, globally and in Africa and the Middle East, 2009 and 2014**




Note: Mobile broadband refers to computer access to mobile networks through data cards or embedded modems.
*Source: Pyramid Research Mobile Forecasts, 2010*

# CASE STUDY: Gramjyoti – "Light of the Village" – pilot program brought Internet access to a remote area of India

The Gramjyoti project was implemented in late 2007 by a partnership between Ericsson India, Apollo Hospitals, Hand in Hand (a local NGO), Edurite, One97, CNN and the Cartoon Network. A two-month pilot, it aimed to bring the benefits of mobile broadband to rural areas. The project targeted 18 villages and 15 towns close to Chennai, in India's southern state Tamil Nadu.

It provided:

- Healthcare: Appolo Hospitals provided the telemedicine services.
- Education: Edurite Technologies provided e-learning applications in schools in selected villages.
- Governance: Local NGO Hand in Hand provided three citizen centers.
- Agriculture news and information: One97 Communications provided a voice portal.
- Entertainment: Turner Broadband Systems aired information and entertainment services.

**Exhibit 41: Gramjyoti's Internet access sites**

*Source: GSMA, 2008*

The benefits of mobile broadband access were immense for recipient communities. People who usually do not have access to healthcare could take advantage of the Gramjyoti vans, which were equipped with broadband access. The van followed a regular route to enable the whole community to gain access to telemedicine via video conferencing.

Doctors located in a Chennai hosptal 70km away could hold surgery appointments and advise patients on medical treatements. Paramedics who run ECG tests, measure blood pressure and administer injections visited in the telemedicine vans. In a two-month period, 200 patients were treated and the majority given medication; more serious cases were referred to the hospitals.

**Exhibit 42: Gramjyoti's telemedicine provision**

*Source: GSMA, 2008*

In terms of education, students looked forward to coming to lessons and were able to take advantage of the Web-based training tools, sessions between schools and teachers in Ericsson's office in Chennai. The interactive approach worked well with students partcipating willingly. In fact, it worked so well that the principal postponed exams to enable more mobile education sessions.

Community members also benefited, for example by being able to fill in the forms online instead of having to travel to big cities.

A portal was created in the local Tamil language with the assistance of One97, with the latest agricultural prices, weather reports and other information helpful to farmers. Children were also considered; each night a cartooon was shown in the Gramyjoti van thanks to the Cartoon Network. The project ended when the licensing agreement expired.

The benefits are clearly visible, even from such a short-term project:

- Connectivity saves time and money due to reducing unnecesary travel
- People are able to get information on topics such as crop farming via the Internet
- End users react well to the delivery of information in a local language

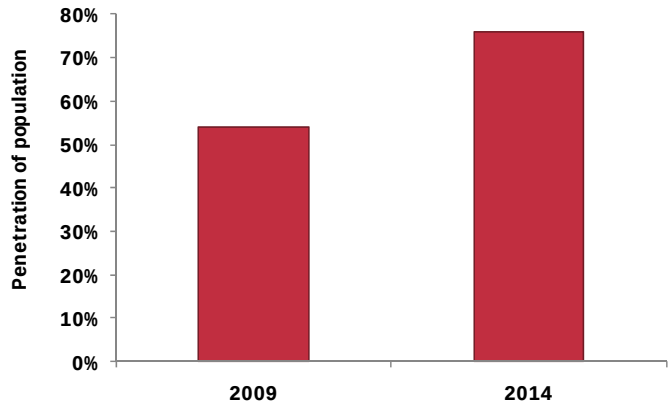
# 3. The impact of mobile services on overall Nigerian society

In this chapter, Pyramid Research analyzes the role mobile services play in social transformation in Nigeria by bringing connectivity to remote areas and to lower-income strata. In less than a decade, mobile technologies have enabled network access for a large share of the country's population, thanks to the inherent ability of these technologies to reach remote and sparsely populated areas both faster and more cost-effectively than fixed infrastructure.

## 3.1 Mobile services and market players' strategies in enabling connectivity

Across Africa and the Middle East, mobile services are already reaching a considerable share of the population, far surpassing the availability of fixed technologies. The lack of supporting infrastructure, such as an electrical backbone, is a challenge for mobile operators across most African countries as they continue to roll out networks, but we expect players will continue to enlarge their footprints in the next few years, resulting in an even more pronounced substitution of fixed-line services. Pyramid Research estimates that at year end 2009, fixed voice telephony penetration across the AME region stood at 23% of households, and we project the number of fixed voice lines will decline at a CAGR of 1.3% to arrive at a 21% household penetration rate by 2014. Also, we forecast that mobile subscriptions across the AME region will grow at a CAGR of 6.5% between 2009 and 2014 to reach more than 1bn subscriptions by year-end 2014, equivalent to 76% of the population.

**Exhibit 43: Forecast of mobile subscription penetration of population in Africa and the Middle East, 2008 and 2014**

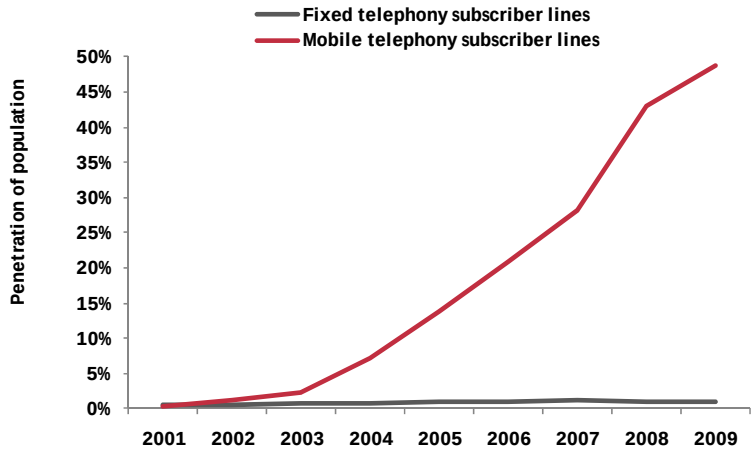



*Source: Pyramid Research Mobile Data Forecast, 2010*

In Nigeria, as in the rest of the AME region, penetration by mobile services is already considerably higher than that by fixed services. Copper-based telephony services provided by incumbent Nitel have witnessed a steep decline over the past few years, reaching 39,000 subscriptions at year-end 2009, from 541,000 in 2001.

In contrast, fixed wireless (FWA) lines are helping to keep the overall fixed subscription base relatively steady. FWA has increased from 60,000 access lines in 2001 to 1.3m in 2009. At the same time, the number of mobile subscriptions in Nigeria grew exponentially, from 422,000 in 2001 to 73m in 2009.

**Exhibit 44: Mobile and fixed-line penetration of population in Nigeria, 2001-2009**




*Source: Pyramid Research Forecast, 2010*

Since the introduction of GSM services in 2002, the popularity of mobile services has been the result of a combination of affordable rates, quality of service and wider reach when compared with fixed alternatives. In 2001, before the advent of mobile technology in Nigeria, incumbent Nitel had 711,250 lines, of which 408,558 were active and the remaining 302,692 were inactive. This resulted in an average of one telephone line for around 300 people. Almost 10m people were waiting to be connected, with the waiting period ranging from several months to several years. In addition, fixed communication was expensive. Before 2001, the official set-up cost of a telephone line from Nitel was about N60,000 ($600). Fixed calling rates were also high; reduced charges to Europe, the Americas and the Caribbean were N165 ($ 1.48) per minute, while calls to other African countries were N112.50 ($1.00) per minute. On top of that, there was an installation fee; in August 1999, the government ordered a reduction of the installation fee to $217 (N20,000) and, in early 2000, further lowered it to $162 (N15,000).

Mobile services faced challenges in 2001 but have since grown at a rapid pace. In early 2001, the Nigerian market had roughly 30,000 mobile cellular telephones that were not working properly. SIM card prices have also come a long way from the beginning of the mobile era in Nigeria: from around $300 (N33,000) in 2001 to less than $2 today. A look at mobile operators' advertised rates at their launch time in 2001 reveals just how much the cost of mobile communications has fallen. At the time of its launch, August 7, 2001, Econet Wireless (now Zain) was reportedly charging N32 ($0.29) per minute for airtime during the peak period (7am to 7pm) and N19 ($0.17) per minute for the off-peak period (7pm to 7am). International call rates ranged from N125 ($1.12) to N145 ($1.30) per minute depending on the zone. Business partners (corporate clients) paid a connection fee of N11,000 ($99.00)and N4,000 ($35.96) for a SIM card. Subscribers also paid a monthly rental fee of N4,000 ($35.96). Similarly, MTN, which launched within 24 hours of Econet Wireless, on August 8, 2001, offered rates of N30 ($0.27) per minute during the peak period and N20 ($0.18) per minute for the off-peak period. Considering that nominal GDP per capita was $381 at that time, a mobile phone was clearly a stretch for the average Nigerian.

Changes in packages and plans also significantly spurred adoption of mobile services. In September 2001, Econet Wireless launched its prepaid service, known as Buddie, and on the day of its introduction it sold more than 30,000. The Buddie starter pack cost N30,000 ($269.70) and consisted of a SIM card, a phone and free airtime worth N6,000 ($53.94). Econet also initiated airtime recharge cards in three different denominations — N1,000 ($9.00) , N2000 ($17.98) and N5,000 ($44.95) — with airtime windows (the period when the card is active) of 10, 20 and 60 days, respectively. MTN followed suit and lunched MTN Pay-As-You-Go in November 2001 with four denomination cards — N750 ($6.74), N1,500 ($13.48)

N3,000 ($26.97), and N6,000 ($53.94) cards — giving access for five, 15, 30 and 60 days, respectively. Since late 2004, the competition between V-Mobile (now Zain), MTN, Globacom and Mtel has been the driving force behind tariff reductions and expanded access to mobile services.

The cost of acquiring a mobile handset is another area where market players have made a lot of progress. Back in the early 2000s, only a few Nigerians could afford to own a personal mobile phone. In rural areas, the government and private players established calling centers to allow the public to rent airtime (see Exhibit 45).

**Exhibit 45: Nigerians using calling centers and visiting GSM village**


*Source: NCC*

Mobile phones were considered a luxury item. Eight years after the introduction of GSM services in the market, most Nigerians now have more than one mobile subscription, owing to starter pack price reductions as well as a greater variety of affordable handsets. Initiatives to further reduce the cost of handsets are underway across developing markets.

**Exhibit 46: Sample programs to reduce acquisition costs of mobile phones**

| Program | Country | Details |
|---|---|---|
| Ultralow-cost handset | Nigeria | Partnership between Zain and ZTE to circulate low-cost ($10) handsets. |
| Shared community phone | South Africa | Enables access to mobile telephony services without the need of owning a mobile phone and a SIM card. |
| Solar power | Kenya | Partnership between ZTE and Safaricom to provide solar-powered handsets, bypassing issues with the lack of availability of a power source. |

*Source: Operators; Pyramid Research, 2009*

According to the World Bank,[16] 54% of Nigeria's population currently lives on less than $1 a day; hence initiatives targeting access barriers are of utmost relevance in the country. Two recent initiatives stand out:

- Zain's ultralow-cost handset initiative in Nigeria allows subscribers to acquire a sub-$20 handset.
- Movirtu's MXShare application allows subscribers to acquire a phone number and communicate without the need to own a personal handset.

[16]World Bank Nigeria Country Brief; last updated March 2009

# CASE STUDY: Mobile phones for all — ultralow-cost handsets by Zain and ZTE

Part of Zain's region-wide ultralow-cost handset (ULCH) program, this initiative is aimed at making GSM phones more affordable to low-income strata of Nigerian society, thus empowering the people at the base of the income pyramid (those living on $ 1-2 a day).

In March 2008, Celtel (now Zain) Nigeria introduced a sub-$20 handset in the Nigerian market.

**Exhibit 47: Example of ultralow-cost handset provided by Zain**

*Source: Zain, June 2009*

- ZTE-branded phones were sold to retailers and consumers for N2,600, bundled with a Zain SIM card and N50 airtime.
- An additional N200 worth of airtime was credited to the subscriber upon activation, raising the combined value of airtime to N250 per handset.

Local media reported that the ULCH initiative was met with enthusiasm by Nigerians. Some even brought gifts to retailers as thanks for the ability to buy the Zain bundle.

At year-end 2008, Zain announced that more than 1m handsets had been sold.

# CASE STUDY: A mobile number for all

In late 2009, Movirtu tested MXShare (virtual mobile telephony system) in cooperation with African mobile operators.

- Movirtu is a nonprofit organization aimed at alleviating poverty and bringing mobile connectivity to people at the bottom of the income pyramid — those living on less than $2 a day.
- Movirtu developed a technology enabling access to mobile telephony services without owning a mobile phone and a SIM card.
- A piece of hardware (see Exhibit) is installed at the core of the operator's network, which enables a "Share Paid" account.

**Exhibit 48: MKADI service server**

*Source: Picture used with permission. Copyright © 2009 Movirtu Limited. All rights reserved*

There is no need for a SIM card and handset:

- The user gets a phone number and a card with log-in details.
- The user can log in to any mobile phone or street phone.
- Once the activities are finished, it is billed to the prepaid account.
- The person allowing someone to use the phone receives a thank you note with a reward, be it airtime credit or a bonus.

The idea behind the project is that:

- Everyone needs to communicate, and people living at the edge of the poverty line are spending a substantial amount of their income on mobile services.
- Despite the ULCH initiatives, for some people a mobile handset is still unattainable either because of the cost or other constraint, such as fear of being robbed.
- People are already sharing phones with family or using community phones, although letting someone use their own SIM card is unpopular due to the fear of dismantling and breaking the handset.

- The secondhand phones imported to Africa have earned a bad reputation and are highly unpopular.
- Last but not least, operators would like to tap into the market of people who are sharing phones but are not accounted for as individual users.
-

As Movirtu CEO Nigel Waller said, the user will have all the benefits of mobile ownership without actually having to physically possess a device:

- Prepaid balance
- Missed calls
- Dialed numbers
- Phonebook
- Inbound calls
- Outbound calls
- SMS
- Mobile money

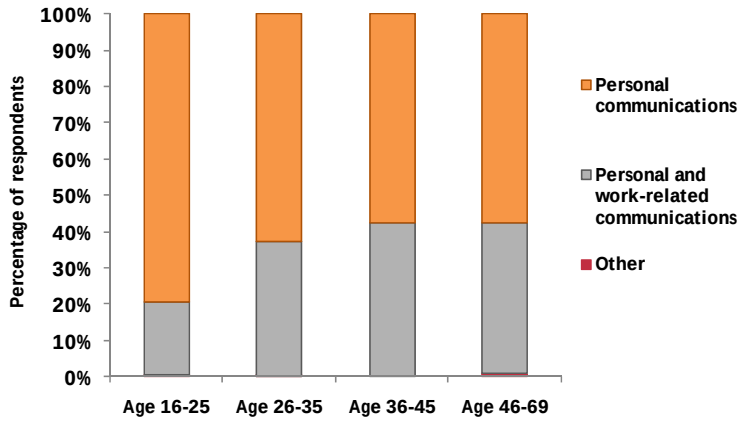
**Exhibit 49: Snapshot of the application screen, and a person enabling access to the shared phone who will also benefit.**


*Source: Picture used with permission. Copyright © 2009 Movirtu Limited. All rights reserved.*

### 3.2 Nigerian end users' perspective on the overall impact of mobile services

In order to analyze the influence of mobile services on Nigerian society, Pyramid Research carried out a survey of 1,500 Nigerian end users. The survey covered people of different age brackets and sections of the country (see: Annex: Methodology of end-user survey).

**Exhibit 50: Breakdown of mobile phone use among Nigeria's mobile service users by age group, 2009**




*Other refers to religious activities

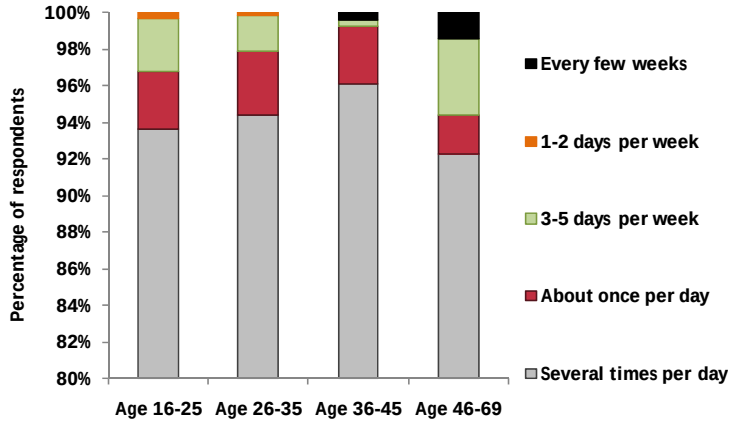
Note: n=1,500.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Interviewees use mobile services predominantly for a mix of personal and work-related communications, suggesting they see value in mobile services across a variety of activities. The age segment that stated using mobile service for personal communication most frequently (80% of the time) is the youngest segment of the sample, those 16-25 years old.

Mobile services are an intrinsic part of the interviewees' lives, with the majority using mobile communications frequently throughout the day. More than 90% of respondents use their mobile phone several times a day, with respondents in the 36-45 age bracket using the phone most regularly.

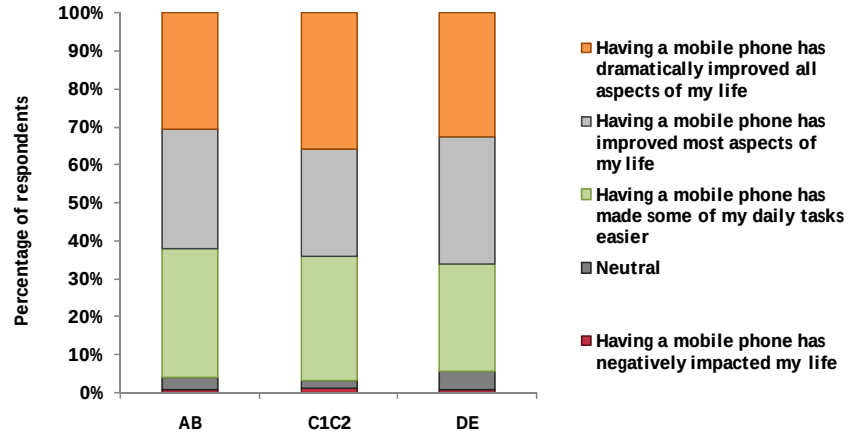
**Exhibit 51: Frequency of mobile phone use among Nigeria's mobile services users by age group, 2009**




Note: n=1,500.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Mobile services are highly valued. Of all interviewees, 95% said mobile services have helped to improve their daily lives. This positive perception of mobile services is common across income strata, age groups and genders.

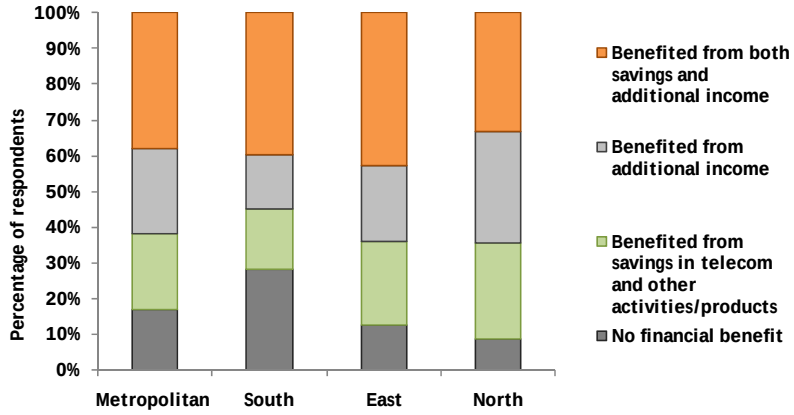
**Exhibit 52: Impact of mobile phone use on interviewees' lives among Nigeria's mobile services users by socio-economic group, 2009**




Note: n=1,500.
Note: AB = higher socio-economic group; C1C2 = middle class; DE = low-income earners.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

The majority of interviewees (84%) also recognize that using mobile services has resulted in financial benefits. The proportion of people who benefited from both savings incurred across activities and from additional income as a result of being connected is slightly more pronounced in the metropolitan and southeast areas of the country.

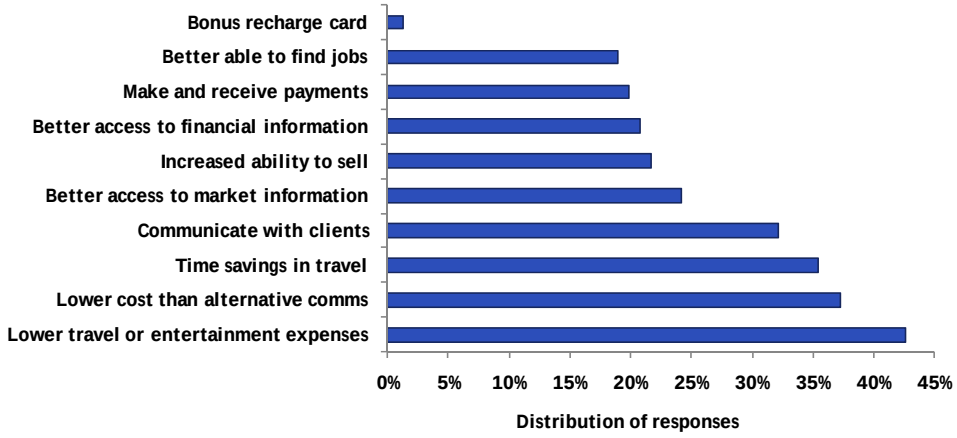
**Exhibit 53: Financial benefits of mobile phone use among Nigeria's mobile services users by location, 2009**




Note: n=1,500.
Metropolitan: Abuja, Lukbe, Lagos, Ikorodu
South: Ibadan, Maniya, Akure, Ikere
North: Kano, Jogana, Kaduna, Rido, Jos and Bukuru
East: Aba , Osisiome, Enugu and Emene.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Among the interviewees who declared seeing a positive financial impact through the use of mobile phones, the most frequently stated reason was the ability to reduce their overall expenses. Eliminating unnecessary travel by using a mobile phone saves Nigerians time and money. Instead of undertaking unnecessary journeys, people make phone calls to obtain the needed market and financial information. The lower cost of mobile communications compared with fixed telephony is often held up as one of the main financial gains, especially in areas outside Lagos.

**Exhibit 54: Types of financial benefit derived from mobile phone use among Nigeria's mobile services users, 2009**



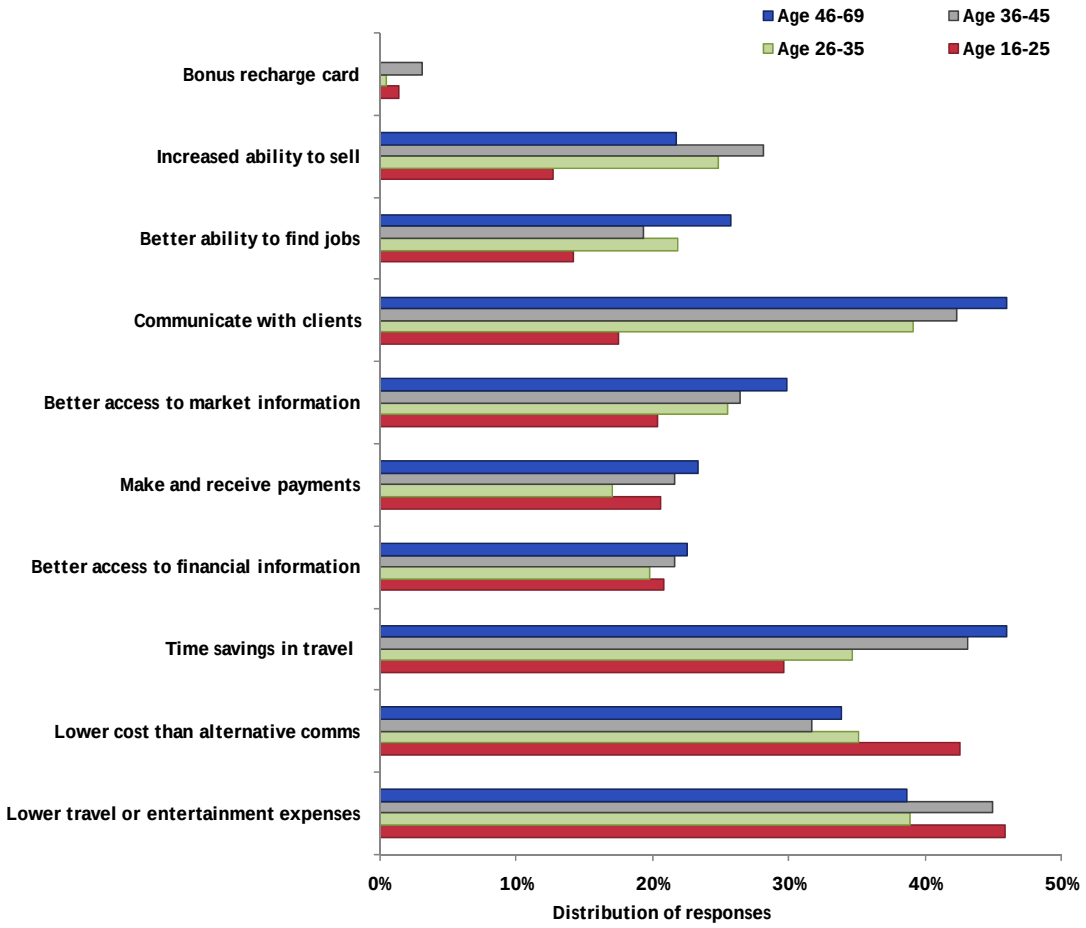

Note: Multiple answers were accepted; n=4,588.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

A closer look at the financial benefits derived from the use of mobile phones in different age brackets demonstrates aspects that are more valuable to particular age groups:

- In the 16-25 age bracket, savings in the areas of social and entertainment expenses are the most valued.

- Among respondents 26-35 and 36-45 years old, the ability to communicate with clients is seen as the main factor producing financial benefits from using a mobile phone. In addition, respondents see mobile service as a low-cost alternative among communications services.
- The older segment of the population in our sample (those 46-69 years old) also values the ability to communicate with clients and pointed out that time savings in overall travel and transportation are a key gain of using a mobile phone.

**Exhibit 55: Type of financial benefits derived from mobile phone use among Nigeria's mobile services users by age group, 2009**

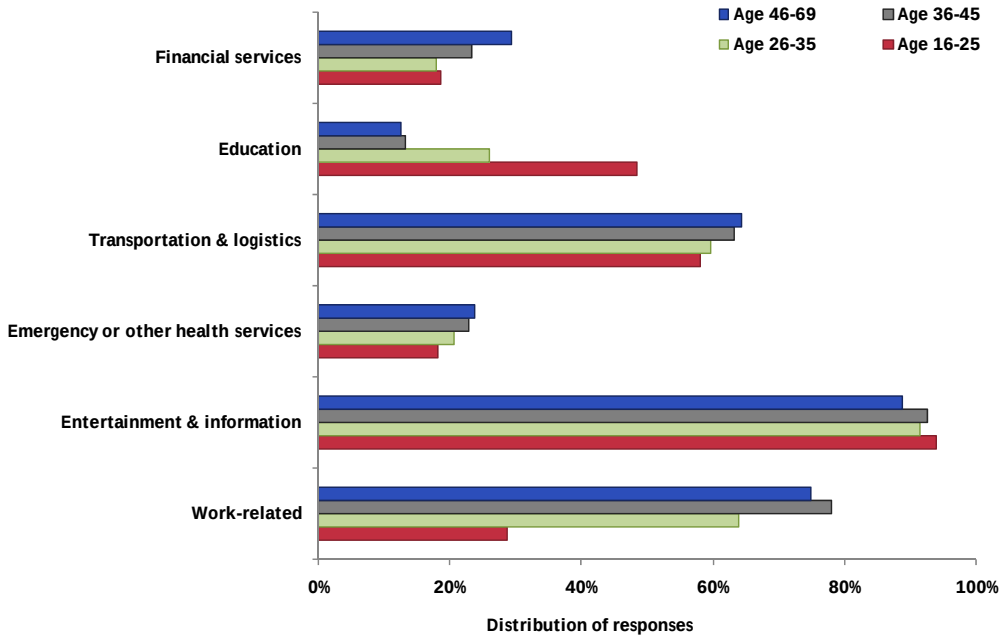



Note: Multiple answers were accepted; n=4,588.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

When Nigerian end users were asked about the types of activities for which they use mobile communications, access to entertainment and information is the most frequent response, followed by work-related activities in the older age brackets. More than 40% of the respondents in the 16-25 age bracket claimed use of mobile communications for education-related activities, while use in health-related activities is lowest across all age groups.

**Exhibit 56: Specific activities performed on handsets by mobile service users, by age group, 2009**

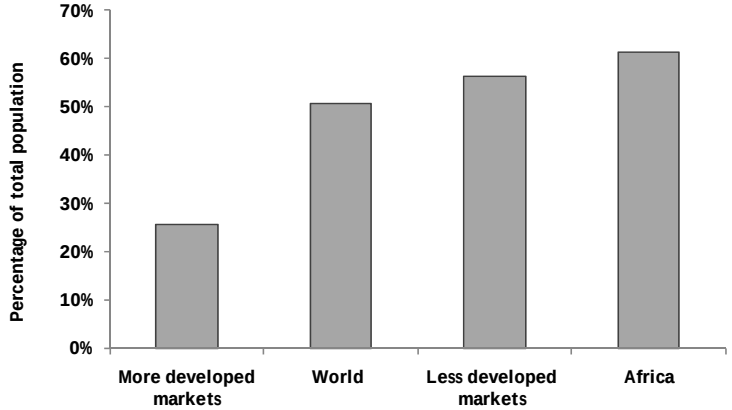



Note: Multiple answers were accepted; n=5,327.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

## 3.3 The impact of mobile services in breaching the urban-rural divide

In Nigeria, as in other emerging markets, a connectivity and infrastructure divide remains between urban and rural areas. Rural regions lag in terms of electricity, potable water, roads and fixed-line communications. According to the World Bank, roughly 61% of Africa's population lives in rural and semi-rural areas, making it a sizable addressable market for mobile services.

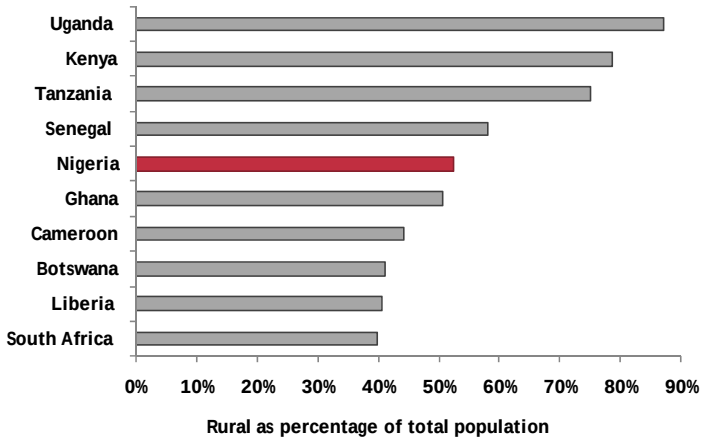
**Exhibit 57: Rural population as a proportion of total population globally, 2007**




*Source: United Nations, World Urbanization, 2007 revision*

Eastern African countries, such as Uganda and Kenya, have some of the lowest rates of urbanization in the world. They also lack vital amenities, such as schools, hospitals and banks as well as access to ICT services and equipment. Approximately 52% of Nigeria's population — slightly more than the global average — lives in nonurban areas.

**Exhibit 58: Rural population as a proportion of total population in select African countries, 2007**




*Source: United Nations, World Urbanization, 2007 revision*

Given the particular challenges of deploying telecom networks in remote areas, where inhabitants tend to have lower per-capita incomes and therefore are particularly sensitive to prices, mobile operators are collaborating with local governments and international institutions to bridge connectivity gaps. Infrastructure sharing and universal service initiatives are helping these efforts.

Pyramid Research has identified a multitude of initiatives around the world that leverage mobile services to bring social change and to enrich the recipient society. These are often sponsored by international organizations, NGOs and specific funds or charities.

**Exhibit 59: Sample of rural connectivity projects leveraging mobile technology**

| Program | Country | Details |
|---|---|---|
| Gramjyoti Rural Broadband Project | India | Connecting 18 rural villages to high-speed Internet services and introducing mobile broadband services. |
| Millennium Villages | 10 African countries | Connecting rural villages to mobile broadband and connectivity. |
| Village Phone | Six African countries | Providing loans to villagers and building a sustainable business model. |

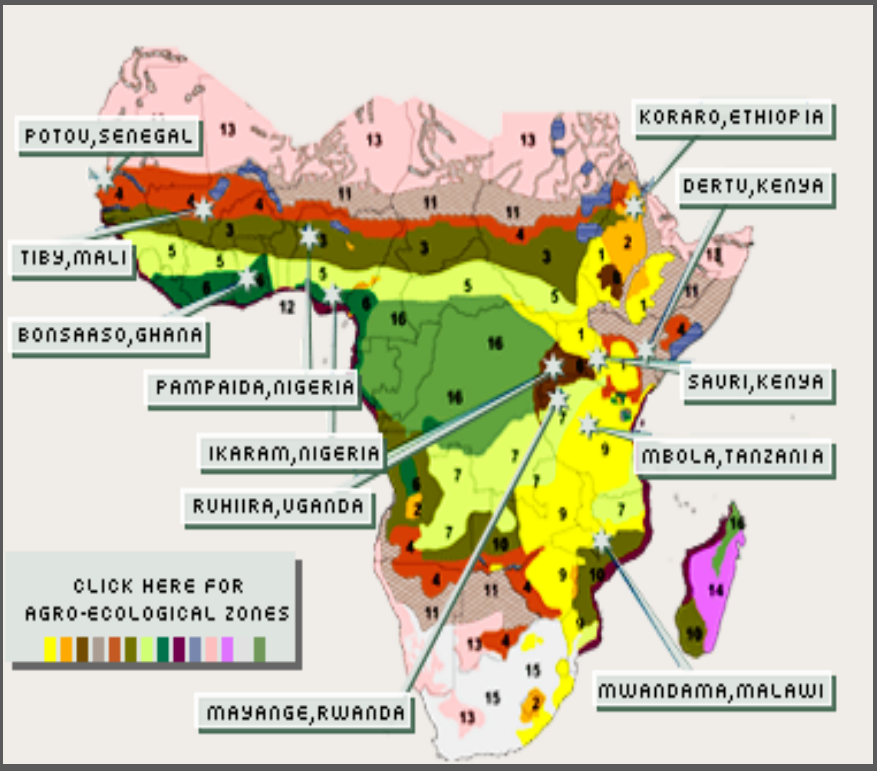
*Source: Pyramid Research, 2009*

# CASE STUDY: Millennium Villages

The Millennium Village project is run by UNDP, the Earth Institute and Millennium Promise.

- The objective of the Millennium Village Project is to bring mobile communications and Internet services to more than 0.5m people in select villages in 10 countries in sub-Saharan Africa.
- This initiative stems from the Millennium Development Goals, which were agreed upon by the UN in 2000 and revisited again in 2005.
    - In 2005, at the World Summit, leaders of United Nations member states rededicated themselves to achieving the Millennium Development Goals, while leaders at the G8 Summit in Gleneagles agreed to double aid to Africa to $50bn per year by 2010 (approximately $70 per African per year) and to cancel debts for the poorest countries.
    - Special focus was assigned to sub-Saharan Africa, addressing issues such as poverty (including extreme poverty), high illiteracy levels, shortage of educational health facilities as well as widespread disease (including HIV and AIDS).

**Exhibit 60: Millennium Villages across Africa, 2009**




*Source: Millennium Villages, 2009*

# CASE STUDY: Village Phone Uganda

In November 2003, the Grameen Foundation, MTN Uganda and a group of microfinance institutions launched Village Phone Uganda.

- Village Phone is a mobile "pay phone" service enabling:
  - Rural connectivity
  - Promoting entrepreneurship skills and microloans to "un-bankable" individuals
- The Grameen Foundation is an organization supporting microfinance mostly in developing countries. It developed and pioneered Village Phone in Bangladesh (its initiative extended to six sub-Saharan countries).

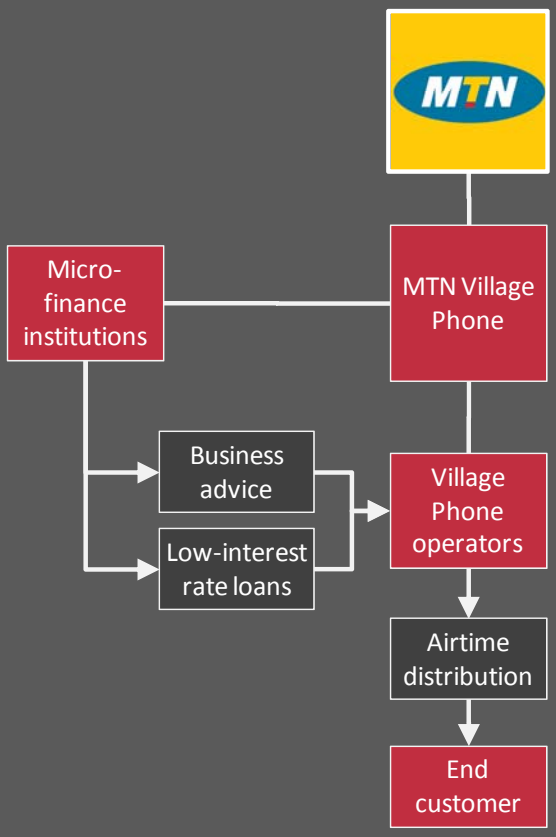
**Exhibit 61: Village Phone kit and Village Phone operator**


*Source: Grameen Foundation, 2009*

The Grameen Foundation acted as an equity partner providing business support and the technology (as of 2007, MTN fully owns the project).

- MTN provides:
  - The communications infrastructure
  - Airtime
  - Customer support via a toll-free number.
- The microfinance institutions (MFIs) have the following roles:
  - Identify the Village Phone operators (VPOs),
  - Provide loans to MTN Village Phone operators, along with training and business skills development,
  - Assist the operator with its business, including marketing, call recording and technical assistance.

**Exhibit 62: MTN Uganda Village Phone – Business model and partners**




*Source: MTN Uganda; Pyramid Research*

The program targets rural and semirural areas outside Kampala. In order to ensure the feasibility of the business venture, there are quotas on how many VPOs are in a two-miles radius. The potential Village Phone operators

- Approach one of the microfinance institutions
- Complete an application
- Provides the MFI with security guarantee that they will pay back loan.

If approved, the operator receives their Village Phone kit including a handset, charging solution, an antenna, a sign post, business cards and a SIM pack including USh100,000 of prepaid airtime (around $50), which costs only USh60,000 ($29). A potential VPO can purchase a phone from the MFI either in cash or through a loan system. However, for many rural inhabitants, owning a personal mobile phone is out of reach.

**Exhibit 63: Village Phone operators training**

*Source: Grameen Foundation, 2009*

The initial goal of the Ugandan initiative was to establish 5,000 new mobile phone businesses in five years. The execution of the program has exceeded the expectations in the space of three years. Within three years, the MTN Village Phone program established 6,700 new businesses, with a growth rate of more than 150 businesses per month. Currently, there are 16,397 total active Village Phone operators.

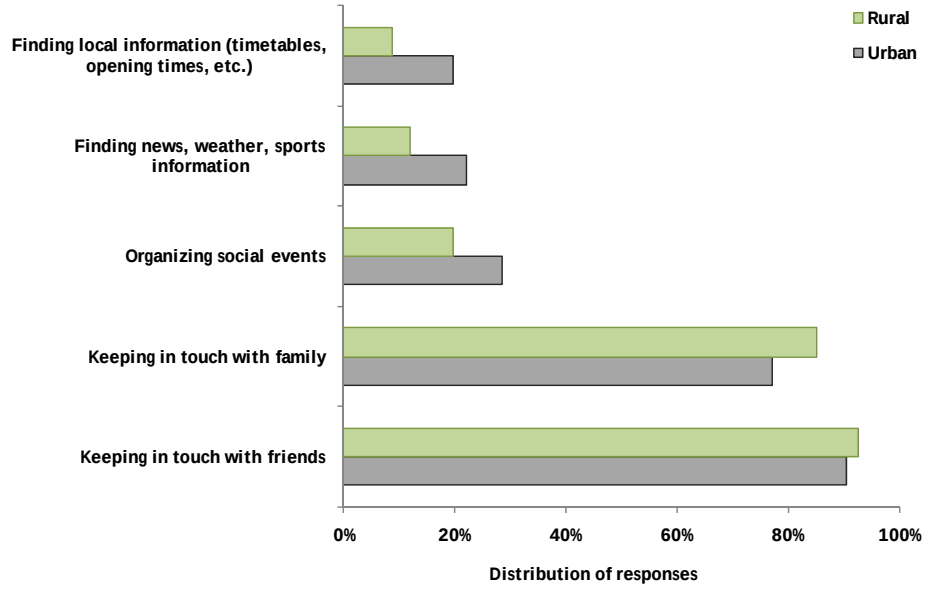
The impact on the rural community has been unimaginable. The Village Phone operators sell five times more airtime than is used by a typical urban customer on his mobile phone. The people who benefit the most are the VPOs, who are able to educate their children, access private healthcare and grow or expand their businesses. This, in turn, benefits a wider group of people by creating more jobs within the community. The mobile technology also provides a link between regional entrepreneurs and their clients, bringing more business to small enterprises. According to MTN Uganda estimates, for each shared phone there are about 500 unconnected people who use it.

In the beginning, the Village Phone was directed at women but is now also aimed at men. Mobile telephony also brings the benefits of mobile banking; the villagers can send and receive money, as well as get information. Recently Google, Grameen and MTN launched free SMS services directed at VPOs that provide them with information about healthcare, agriculture and weather (see: Case Study: Grameen helps deliver market information to Uganda's farmers).

### 3.4 Adoption and use of mobile services in rural and urban environments in Nigeria

Mobile services are having a positive influence on the day-to-day activities of rural-area residents in Nigeria. The chief benefit of mobile communications is the ability to contact neighboring locations more easily. Rural inhabitants' appreciation of keeping in touch with family and friends (93% and 85% of the sample, respectively) is higher than that of urban people (90% and 77%). The rural resident, through a quick phone call, is able to gain information. Correspondingly, 20% of rural respondents claim to use mobile services for organizing social events, whereas 12% of them opt for finding news, weather and other information — tasks that previously often required a lengthy and costly journey. Instead, information can be obtained through a simple phone call or SMS message.

**Exhibit 64: Use of mobile phone for social purposes among Nigeria's mobile services users by urbanization, 2009**

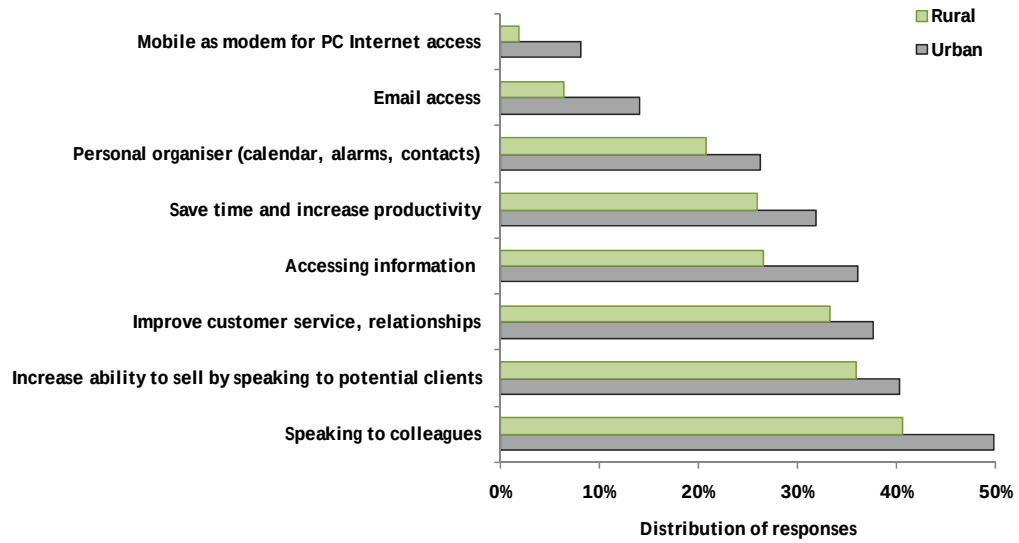



Note: Multiple answers were accepted; n=3,477.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Among our interviewees in rural areas, the most common use of mobile services is for business communications (41% of respondents), which is directly linked to their ability to sell products (36%). Due to increased mobile use, interviewees claim that relationships with customers are also improving (33%). The benefit of saving time and lowering travel-related expenses is of particular importance to villagers. Time that is not spent on traveling can be allocated to work, thus increasing profits.

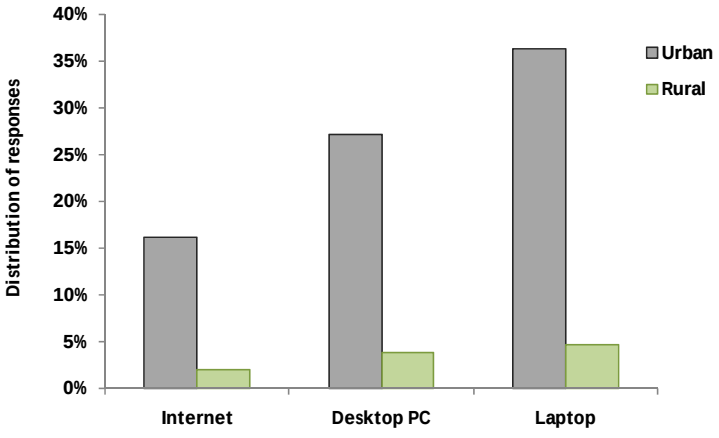
**Exhibit 65: Use of mobile phones for work purposes among Nigeria's mobile services users by urbanization, 2009**




Note: Multiple answers were accepted; n=3,424.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Pyramid Research identified a notable disparity between mobile users in rural and urban areas in the access to both Internet services and equipment. The lack of infrastructure, together with limited computer literacy, in rural areas makes this particularly challenging.

**Exhibit 66: ICT penetration among Nigeria's mobile services users by urbanization, 2009**




Note: Multiple answers were accepted; n=1,762.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Increasing the penetration of mobile phones in rural areas is an area of focus for mobile operators. For instance, in South Africa, as part of its license (reviewed in 1993), Vodacom was required to provide affordable mobile connectivity to underserved areas. Even though it started off as a government initiative, it quickly became a very profitable venture, generating more than 50% of network traffic in 2004 from the 4,400 franchised community phone shops. In total, 22,000 community phone shops were established, as required by the license.

**Exhibit 67: Community phone shop, South Africa**


*Source: Vodacom*

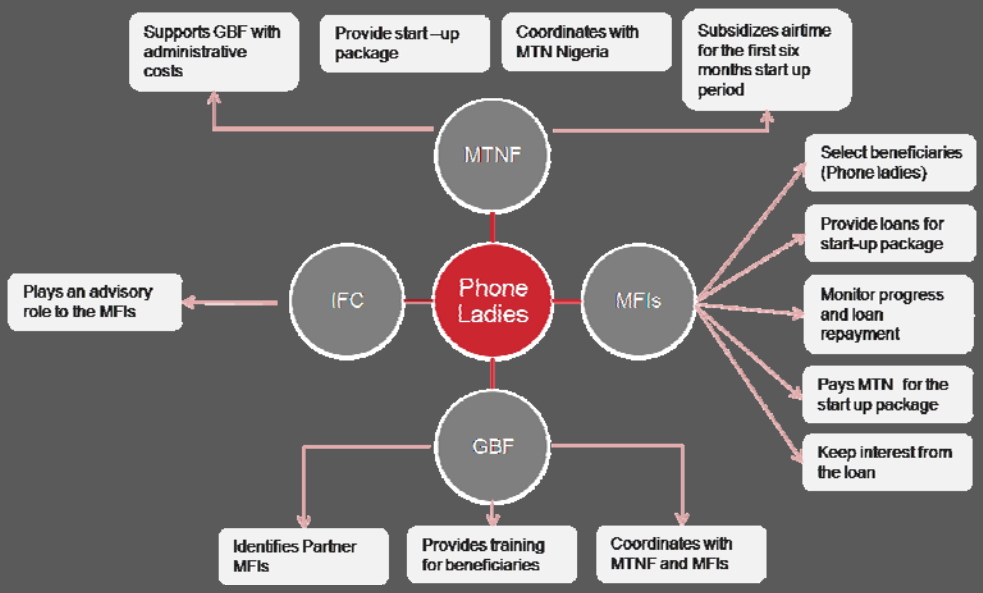
Similar projects have been launched in Nigeria since the start of the GSM revolution: M-Tel's Orange Train Campaign, MTN's Rural Telephony Project (together with Growing Businesses Foundation), Zain's ROSE (Rolling Out Services Everywhere) project and Glo Mobile's We Live Where You Live are all targeting remote locations.

In addition, there is an overarching Rural Telephone Project in Nigeria that was launched in the early days of mobile telephony. With mobile penetration at about 2% in 2003, the Rural Telephone Project was a way to provide connectivity for rural and semirural Nigeria, targeting mostly villages and population clusters on the outskirts of major towns. The goal of the program is to provide a sustainable model for communications in low-income areas by empowering women from these communities through a business model that adjusts to their needs. Once enrolled in the program, these "phone ladies" are provided with the necessary tools and financing to run a public telephone business in their community.

# CASE STUDY: Rural Telephone Project in Nigeria brings communications to low-income segments through a sustainable business model

The program is a cooperation between the Growing Businesses Foundation (GBF), a Nigerian NGO, MTN Foundation (MTNF), which is the CSR arm of MTN Nigeria, the International Finance Corporation (IFC) and a group of small communal microfinance institutions (MFIs).

**Exhibit 68: Rural telephony program partners and their role, 2004-June 2009**




*Source: Pyramid Research, June 2009*

- Through its local contacts, GBF selects local MFIs in targeted regions of the country and brings them in as program partners.
- These MFIs, such as LAPO, are already established in the local communities and support a variety of projects with the aim of empowering local individuals.
- The core business of MFIs is to administer short-term micro-loans to its members, payable usually within 6-8 months.
- In the case of the Rural Telephony Project, the MFIs present the program to select and proven members of the cooperative, recommend these members to GBF and administer a loan to cover the cost of the startup package, which is provided by MTNF. These loans range between N14,200 and N21,400 ($95 and $140), depending on optional material in the package, payable over a six-month period, and carry a 15% annual interest rate.
- The startup packages include a Nokia phone, an MTN SIM card, an optional antenna to boost the wireless signal, a solar charger, subsidized MTN airtime, promotional material and an MTN Booster Card — an MTN product that allowed for preferential communication rates but which was taken off the market in early 2009. The promotional material includes a table, an umbrella, chairs, banners showcasing call rates, a hat and a T-shirt.

**Exhibit 69: Rural Telephony Project startup package and a phone lady on the outskirts of Suleja, a city of 105,000 inhabitants north of Abuja**

*Source: Pyramid Research, 2009*

Once the beneficiaries are selected, GBF trains them for a week in basic accounting principles, customer service and the use of GSM technology. After launch, GBF and local MFIs carry on monitoring and providing support to the beneficiaries for a period of one year.

To date, the program has benefited 1,500 Phone Ladies in rural and semirural Nigeria. These beneficiaries operate in 21 of the country's 36 states. Success stories of the program abound, with beneficiaries testifying to a significant and much-needed improvement in their living standards. Since most MFIs focus their efforts on the most deprived and most desperate elements of society, most of the beneficiaries are local women with limited resources and a family to support.

**Exhibit 70: Testimonial of a Rural Telephone Project beneficiary**


*Source: Pyramid Research, 2009*

After the death of her husband seven years ago, Fumilayo found herself in charge of four young children. With the assistance of the Suleja branch of LAPO, a microfinance institution, Fumilayo was able to get a microloan and open a small photography shop. In 2007, with her elder son pursuing higher education and the rest of her children in school, Fumilayo turned once again to LAPO and was introduced to the Rural Telephone Project. Today, Fumilayo has two successful businesses employing three people and

supporting her family of five. Fumilayo also expanded her Rural Telephone business into a full-blown business center for the community, providing Internet access, photocopying, email and faxing services.

Results vary depending on the location of the beneficiaries. Increasing mobile penetration, lower call rates, affordable handsets, competition from other entrepreneurial members of the community and competing programs from CDMA operators, namely Visafone, have somewhat crowded the market space in semirural areas and have lead to relatively lower revenue for program beneficiaries. Preliminary interviews have shown that in semirural areas, it is the beneficiaries who are established in high-traffic areas — on a main road or in the village market — who benefit the most from the program. This shows a move from the use of rural telephony on a need basis (lack of personal access to mobile phone) to a preferential basis (use of phone at one's convenience).

These changes in market dynamics have also brought new benefits to the community. Increasing mobile penetration has created a need for recharge cards. In most semirural areas, Phone Ladies are witnessing an upsurge in revenue from airtime, which they say is more than compensating for the fall in revenue from phone calls.

A new stage of the program creates further opportunities:

- By the beginning of 2009, the MTN Foundation Board approved increasing the scope and reach of the Rural Telephone Project.
- The new funding from MTNF will allow the project to target 3,000 new beneficiaries in 30 different states. This new stage falls well within MTNF's strategy to realign its efforts with the core business of MTN Nigeria, says Wale Goodluck, corporate services executive at MTN Nigeria.

This stage introduces a new structure for the project, which will help take it a step further toward sustainability, says Ndidi Nnoli Edozien, founder and CEO of GBF. The new organizational structure for the project will see the introduction of State Coordinators, previous Phone Ladies nominated by the MFIs and screened by GBF and the IFC.

These new State Coordinators will gradually take on the responsibility of coordinating, training and evaluating the beneficiaries. The coordinators will also be provided with laptops and MTN data cards, sponsored by MTNF in order to be able to send monthly reports. With many of its previous responsibilities delegated to State Coordinators, GBF will be able to focus its efforts on impact assessment and project documentation. In addition to the new laptops and data cards provided to the State Coordinators, MTNF will give the beneficiaries access to a more competitive tariff plan, which will help the beneficiaries in semiurban areas compete with offers from CDMA operators and improve their level of profitability in light of decreasing gross income. MTNF is also working closely with MTN in order to introduce new value-added services.

# Millennium Village: Pampaida, Nigeria

The Nigerian part of the Africa-wide Millennium Villages initiative is taking place in Pampaida, a village of 5,000 people.

- The Millennium Village project is run by UNDP, the Earth Institute, Millennium Promise and the governments of Kaduna and Ondo state with the involvement of Zain and Ericsson.
- The total planned project expenditure is $7m.
- Pampaida has grown to become a benchmark for how to pursue rural development in Nigeria and beyond.
- The project was expanded in May 2009 to three new villages, covering the whole of Saulawa District and reaching more than 22,000 people.

**Exhibit 71: New mobile tower in Pampaida, Nigeria**

*Source: Millennium Villages, 2009*

On May 21, 2009, the Pampaida Millennium Village launched a new base station, which will provide mobile communications to this rural Nigerian community thanks to Zain and Ericsson's partnership. The mobile technology will help increase Pampaida's agricultural productivity, which is the main source of income in this region, thus reducing poverty. Additionally, it will enable access to healthcare, education and infrastructure. The Pampaida ICT Center benefits from both the fixed wireless Internet terminals provided by Ericsson and the free power generated from the base station. On top of that, Ericsson donated 10 handsets with Zain's SIM cards and one year's worth of phone calls among the lines free of charge. Zain will provide a toll-free number and establish emergency numbers to improve access to healthcare and emergency services, especially to connect patients with on-duty medical personnel, while Sony Ericsson has provided handsets to community health workers.

Since the launch of the program less than three years ago, Pampaida has undergone an outstanding, by African standards, infrastructural makeover. The following developments were made: A 12km road, electrification project, local resource center (ICT center), cereal bank, health clinic, school kitchen, market stalls, junior secondary school (see Exhibit) and Zain's GSM base station. In addition, in order to provide safe drinking water 22 boreholes were drilled in tactical locations within Pampaida.

**Exhibit 72: Transformation of the school facility: on the left before the Millennium Village, on the right after**

*Source: Millennium Villages, 2009*

## 4. The impact of mobile services by vertical sector

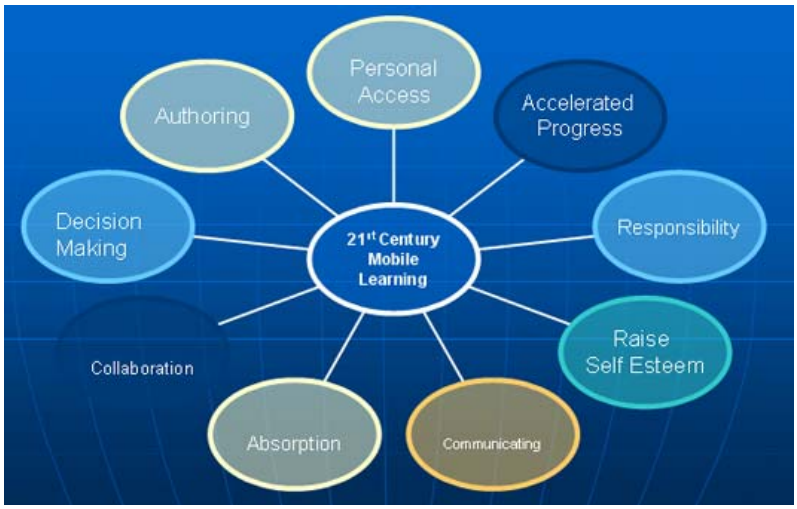
Mobile services are affecting operations and end-user access to information in different verticals. In this section, Pyramid Research takes a closer look at developments in the education, health, extraction and agricultural areas, because of their relevance to overall society and their role within the Nigerian economy.

### 4.1 The impact of mobile services on the education sector

Mobile technology and connectivity are bringing significant benefits to education globally. Most significantly, mobile services are helping to improve communication between teachers, classmates and colleagues. Across all levels and age groups, mobile phones are allowing instant access and sharing of time-critical information; this also applies to communication between teachers and parents, ultimately benefiting students.

Mobile connectivity is also helping to change the way education is being conducted. Many students in distance learning programs and online universities access educational information and programs from the comfort of their home thanks to mobile broadband access. Even students who visit a classroom and interact directly with a teacher identify mobile technology as a valuable tool in their learning activities. Both students and teachers see it as an attractive complement to in-class education. Input collected from students by Learning2Go, the largest collaborative mobile learning project for pupils in the UK, identifies a wide range of perceived benefits and usage for mobile education applications.

**Exhibit 73: Self-perceived uses and benefits of m-learning by Learning2Go project learners**




*Source: Learning2Go, 2009*

**Exhibit 73: Self-perceived uses and benefits of m-learning by Learning2Go project learners (Cont'd)**


*Source: Learning2Go, 2009*

In emerging markets, 2.5G+ networks — including EDGE, GPRS, HSPA and UMTS — are becoming essential for connectivity in general, given the lack of fixed infrastructure. These networks are allowing governments, NGOs and school bodies to introduce Internet connectivity to students. Additionally, a multitude of education-focused applications are also making their way onto students' and teachers' handsets. These applications provide a variety of services and, depending on functionality, have different network requirements.

**Exhibit 74: Sample programs leveraging mobile technology and connectivity in emerging markets**

| Project | Country | Details |
|---|---|---|
| Dr. Math | South Africa | Dr. Math leverages MXit, a mobile social networking tool, to provide math tutoring and education. |
| Elimu kwa Teknolojia | Tanzania | The program allows teachers to download videos to support their courses. |
| Longman Ladybird Mobile Reading | Nigeria | Reading, spelling and grammar activities downloaded to mobile phones. |
| SNDT Women's University | India | A mobile education program for remote teaching and learning in rural communities. |
| K-Nect | North Carolina, US | Helps improve students' math skills through mobile access to a social networking tool. |

*Source: Pyramid Research, 2009*

### 4.1.1 Examples from abroad of leveraging mobile technology in the education sector — Tanzania and South Africa

In markets with high 2.5+ G penetration rates, data-heavy applications can be provided through mobile networks. In South Africa, Dr. Math, a math tutoring and teaching program, leverages a social networking program. 2.5G+ networks are also being used to introduce media content to the classroom. Media content is a very appealing tool for students. In Tanzania, an extensive partnership of organizations is helping to introduce locally tailored media content to classrooms with impressive results. However, such applications are hard to replicate in markets with low 2.5G + penetration. In many emerging markets, SMS is being used as a tool to introduce two-way communication and interaction.

# CASE STUDY: Mobile technology brings interactive education to schools in Tanzania

Elimu kwa Teknolojia (education through technology) was launched in Tanzania in 2007.

- The program is a partnership between the International Youth Foundation (IYF), the Ministry of Education and Vocational Training (MoEVT), the Forum for African Women Educationalists (FAWE), Nokia Corporation and the Pearson Foundation.
- The program is supported by a $2m grant by the US Agency for International Development (USAID).
- The program leverages mobile technology in order to bring interactive, multimedia education programs to teachers and students between the ages of 10 and 12.
- The initiative was initially launched in 2003 in the Philippines as "Text 2 Teach," where it has grown to reach 203 schools, 1,000 teachers and almost a million students.
    - The program provides a package that includes a mobile phone, a prepaid SIM card, a 29-inch color TV, a TV rack and teachers' guide.
    - Nokia N95 8GB mobile phones, supplied by Nokia, are used to access a library of more than 387 interactive educational videos in math, science and English.

**Exhibit 75: Classroom using Bridge IT video to assist in school teaching**

*Source: International Youth Foundation (IYF), 2009*

In Tanzania, the technology that was used in the Philippines had to be readjusted to account for the lack of widely available satellite technology to transmit thevideos and set-up boxes to store the videos. Instead, 3G technology is deployed (2.5G technology is used in areas where there is no 3G) to transfer videos. The videos are stored on the Vodacom office's server. In addition, Vodacom provides free broadband access for video downloads and technical assistance. The teachers can also send SMS queries to the helpline, which provides assistance to them.

In the classroom, the Nokia N95 with 8GB acts as a downloading and storage device, each phone connected to the TV. The short videos, between five- and seven-minutes long, are deployed as part of a lesson, introducing a more interactive approach to schooling. The teachers can also download lesson plans as well as receive training on how to make the best use of available material.
Some of the content was already developed and used in other countries, while some of it was adjusted to fit local culture and dubbed in Swahili. In cooperation with the Ministry of Education, new math and science videos were also developed in line with the curriculum requirements. In particular, videos on subject matters that the teachers are not comfortable teaching, such as reproductive health and AIDS/HIV, were developed, for a total of 95 local videos.

Currently, the program operates in 150 schools in seven regions, benefiting around 25,000 students. Since the implementation of the program, schools are reporting an increase in attendance levels. One school's head teacher stated that attendance levels have gone up 80-89%.

# CASE STUDY: Dr. Math leverages a mobile social network in South Africa

The Meraka Institute in South Africa launched Dr. Math, a mathematics education and tutoring program in January 2007.

- Dr. Math provides mathematics solutions to pupils from Grade 3 to Grade 12 with an instant online tutor.
- The application uses MXit, the hugely popular mobile social network, as a platform.
- MXit is a mobile instant messaging platform used by an estimated 8-10m children in South Africa.
- The idea behind the Dr. Math model is that there is a Dr. Math buddy on your contact list, and students can ask questions online.
- Tutors and teachers make themselves available at certain times of the day (between 2pm and 8pm) to answer questions.
- Tutors, otherwise known as Dr. Math, are students from the University of Pretoria's Engineering, Built Environment and Information Technology Department, who are required to complete 40 hours of community service as part of their course.
- Dr. Math induces a prompt online when tutors are available, and students then send questions.
- Students can send in queries on their way home, on the bus, etc.
- The system can handle some 50 enquiries an hour.
- In addition, there are competitions when tutors are not available – multiplication tests, etc. — and there is a highest score ranking.

**Exhibit 76: Students using the Dr. Math application**

*Source: Gallo Images, 2009*

- The user base has grown via word of mouth to more than 5,500 users.
- The Dr. Math application will be rolled out across the country in conjunction with the Ministry of Education.

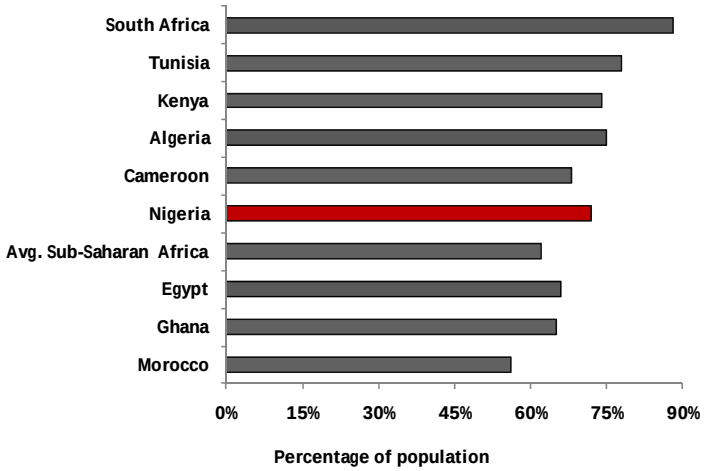
Dr. Math takes advantage of the pervasive use of mobile phones and MXit and uses it as a communication tool in South African schools. Dr. Math has changed the way teaching and learning is perceived. One rural school teacher, who was very skeptical initially, said "I teach the kids math, the kids teach me technology." This is extremely important because students consider learning more of a team effort, not just one-way teaching. The students are very open to using mobile phones, and the teachers also appreciate it.

More than 5,500 users benefit from the application. Scaling up the program could prove difficult since it relies on tutors to answer the questions. A recent partnership with the Ministry of Education will help roll out the program across the country.

### 4.1.2 Mobile services and the education sector within Nigeria

Mobile services can help narrow the significant educational gap that still remains in Nigeria. According to UNESCO Institute for Statistics database, Nigeria's adult literacy rate[17] of 72% exceeds Sub-Saharan Africa's average of 62%; and ranks better than some Northern African countries such as Morocco and Egypt. However, there is a visible gender inequality as 80% of men and 64% of women are literate.

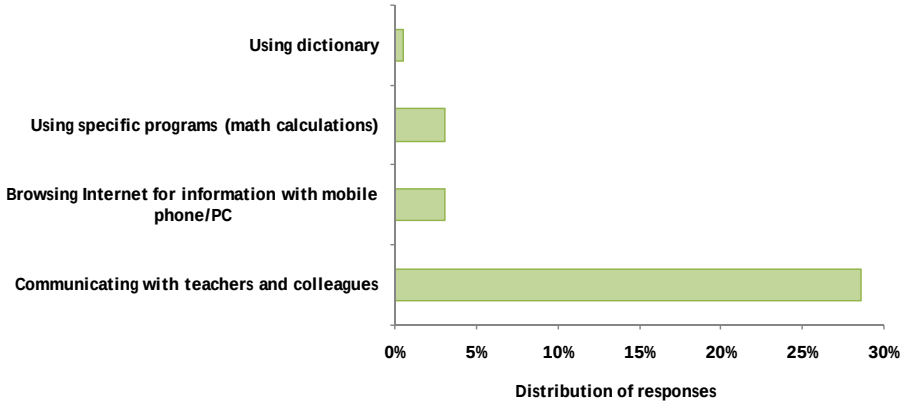
**Exhibit 77: Adult literacy rate (15 and over) in select AME countries, 2000-2007[18]**




*Source: UNESCO Institute for Statistics, EFA Global Monitoring Report 2010, statistical annex*

In Pyramid Research's survey of mobile users in Nigeria, 29% of interviewees claim to have used their mobile phone for education-related activities. The most common use is for communicating with teachers and colleagues, of those who report mobile phone use for educational purpose 73% reports to do so, equivalent to 29% of total sample.

**Exhibit 78: Use of mobile technology for education among Nigeria's mobile services users, 2009**




Note: Multiple answers were accepted; n=589.

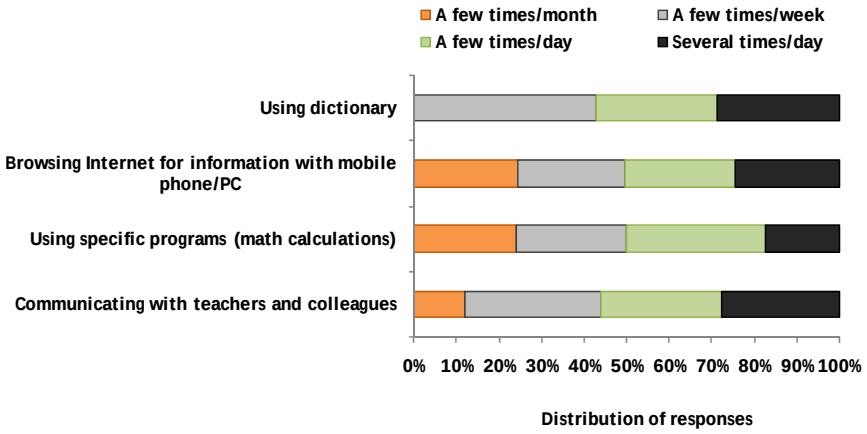
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

[17] Number of literate persons aged 15 and above, expressed as a percentage of the total population in that age group.
[18] Data are for the most recent year available during the period specified

Around 3% of the interviewees claimed to use mobile Internet, and a very small percentage of respondents, 0.5%, also indicated that they use their phones to access a dictionary. This is in line with the country's overall low penetration of smartphones, which are needed in order to access Internet-based applications.

The use of mobile technology for educational purposes is much higher in urban areas than in rural areas. Browsing for information, for example, is twice as high in urban areas than in rural areas. This reflects the differences in availability of high-capacity networks and the low adoption of 2.5G+-capable phones in rural areas.

**Exhibit 79: Frequency of mobile use for education among Nigeria's mobile services users, 2009**




Note: Multiple answers were accepted; n=589.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Our survey also indicates that among those who use their mobile phones for educational purposes, at least 46% do so on a daily basis. The prevalence of SMS use in the youth segment in Nigeria makes the platform ideal for reaching a wider base of students and teachers. As 3G coverage extends, mobile data networks will play an even greater role in Nigeria's educational services. 2.5G+ networks can also bring handset-based interactivity and multimedia experience. Longman Nigeria Plc's Ladybird Mobile Reading program, for example, capitalizes on GPRS networks to offer reading, spelling and grammar activities to be downloaded by elementary school students.

# CASE STUDY: Longman Nigeria introduces Mobile Reading to Nigeria

Longman Nigeria PLC, a subsidiary of Pearson Education Limited, introduced the Ladybird Mobile Reading program in July 2009.

- The program was launched as a pilot in seven schools in Lagos State.
- The content is based on the Ladybird Keywords Reading books.
- The program targets students 5-9 years old.
- Students download reading, spelling and grammar activities to their parents' mobile phones.
- Student complete the activities at home and discuss them with their teachers in class.
- The activities last five minutes each, and students can download up to five sessions per week.
- Longman partnered with Mobile Xcetera Limited, a Nigerian mobile content provider, to deliver the content.
- The application is WAP-based and requires a GPRS or 3G handset and an Internet connection.

**Exhibit 80: Sample Ladybird Keywords Reading books**


*Source: theweeweb.co.uk, 2009*

Longman believes that the program allows students to get a head start in their learning and is a great tool for parents to get involved in their kids' education, by assisting in the completion of downloaded tasks. Longman is waiting for the results from trial schools and is planning to roll out the program nationwide.

## 4.2 The impact of mobile technologies on health services

Mobile technology has the potential to be a transformational tool for the health sector. New and innovative applications are emerging to improve the way healthcare is administered and managed. The most common use of mobile technology in the health sector is to provide access to emergency services and to increase awareness about the treatment and prevention of rapidly spreading diseases, such as HIV.

In developed countries, the aging of the population has created a growing need for healthcare and emergency response applications for the elderly, and many of these are leveraging mobile technology. Products such as the Philips Lifeline medical alert allow aging individuals and those with limited mobility to have access to emergency services with a touch of a button. These communicators are carried on the neck, wrist or pocket of the individual and connect to a fixed or mobile network in order to notify emergency services personnel about life-threatening situations. Once notified, emergency services personnel decide what the appropriate course of action will be.

**Exhibit 81: Emergency personal communicator product line by Philips**


*Source: Philips.com, 2009*

In emerging markets, health-related communications needs are driven by different realities. Lack of fixed infrastructure generally means that access to a mobile network is the only connection many communities have to emergency and first-response services. Mobile and satellite communications infrastructure are also more suitable vehicles for connecting to emergency response than fixed infrastructure, in cases of natural disasters. The redundancies many mobile operators build into their wireless networks are helping overcome the choke points and disruptions that fixed networks experience in disaster areas.

Mobile technology is becoming an important tool for epidemic and disaster monitoring, as well as preventive campaigns. NGOs working in isolated regions of Africa, Asia and the Amazon are using mobile networks and satellite communications to monitor the spread of pandemics and viruses. Weather-monitoring stations equipped with mobile communications or installed in mobile operator base towers, such as Zain's initiative in East Africa, are helping provide an advance warning system and the necessary data for early preventative action.

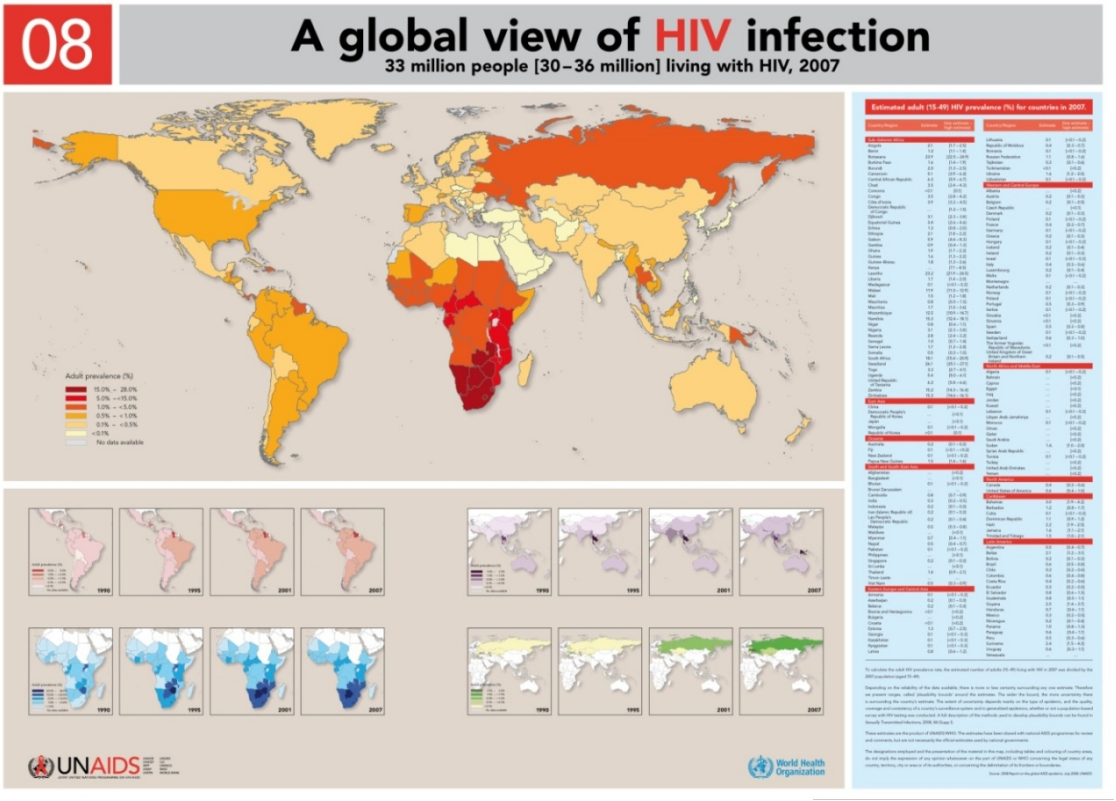
Mobile communications is also proving crucial in the collection and dissemination of health-related information for both educational and emergency situations. A Nokia pilot project in Brazil helps NGOs and health organizations to better collect, communicate and store field data using smartphones with Internet connectivity. Implementation models with low

technology requirements are also being put to use. To fight the spread of malaria, SMS-based models of distribution of bed nets are being applied in many African countries through partnership programs with UNICEF, other international organizations, local NGOs and mobile operators.

### 4.2.1 Examples from abroad of leveraging mobile technology in healthcare —South Africa and Uganda

Fighting AIDS/HIV in Africa is a top priority for international organizations and local governments. The continent has the highest level of HIV infections, which is perceived to be one of the main inhibitors for growth and development. The 2008 UNAIDS report on the global AIDS pandemic states that "in the countries most affected, HIV has lowered life expectancy by 20 years, slowed economic growth and deepened household poverty."[19]

**Exhibit 82: UNAIDS map of HIV infections across the globe, 2007**




*Source: UNAIDS Report on Global AIDS Pandemic, 2008*

Over the past few years, a multitude of initiatives leveraging mobile services has emerged to address HIV/AIDS. Although some of these initiatives focus on prevention, others assist in treatment. The majority of these projects are based on a multipronged approach, combining education with other elements such as antiviral treatment, counseling, orphan care, etc.

[19] UNAIDS, 2008

**Exhibit 83: Sample of AIDS/HIV initiatives leveraging mobile technologies in Africa**

| Program and partners | Country | Details |
|---|---|---|
| **Multi-country HIV/AIDS Program for Africa** (MAP)<br>World Bank | Multi-country | • Finances cost of prevention and care work for local communities, CSOs, youth groups, organizations of people living with AIDS and orphan care<br>• Finance treatment and training |
| **SOS Children's Village** | Multi-country: Africa and Eastern Europe | • Social centers for HIV-infected children and HIV orphans without support<br>• Social support programs for children who stay in their community |
| **Project Masiluleke**<br>PopTech, frog design, iTeach, the Praekelt Foundation, MTN South Africa, Nokia Siemens Networks (NSN) and the National Geographic Society | South Africa | • Education and advertisement for AIDS support helpline through SMS<br>• Reminders for antiviral treatment sessions |
| **Text To Change**<br>AIDS Information Center-Uganda\Others | Uganda | • Education through SMS-based interactive quizzes<br>• Reminders for antiviral treatment sessions |
| **My Question, My Answer**<br>OneWorld UK and partners | Nigeria | • Counseling and education through SMS and voice interactions<br>• Awareness and education through an SMS-based competition |

*Source: Pyramid Research, 2009*

Project Masiluleke in South Africa uses "Call Me Back" SMS to advertise an HIV/AIDS helpline. Text To Change (TTC) in Uganda developed an SMS-based quiz that aims to educate participants about basic facts related to HIV/AIDS.

# CASE STUDY: Project Masiluleke targets HIV in South Africa

PopTech, frog design, iTeach, the Praekelt Foundation, MTN South Africa, Nokia Siemens Networks (NSN) and the National Geographic Society launched project Masiluleke in South Africa as a two-year pilot in October 2008.

- Project Masiluleke, which means "lending a helping hand" in Zulu, aims to increase awareness of HIV and AIDS among South Africans.
- The program already has two components in operation:
  1. Advertisements for the National AIDS Helpline embedded in "Please Call Me" (PCM) messages.
  2. TxtAlert, which targets anti-retroviral (ARV) therapy patients and aims to improve their attendance at the sessions:
     - It sends PCM-based reminders to ARV patients to attend a clinic or take medicine.
     - If patients cannot attend the appointment, they can simply send an SMS and the appointment can be rescheduled.

**Exhibit 84: Please Call Me HIV message**


*Source: PopTech, June 2009*

In South Africa, Please Call Me is a service that mobile operators offer to subscribers who wish to request a call from another individual. Every PCM message contains the words "please call me," the phone number of the sender and space for an additional 120 characters, which is usually used to embed an advertisement. The service is usually free and financed by the advertisement.

Broadcast either in English or in local languages, Project Masiluleke helpline messages are different every week. These messages act as personalized billboards and have proven to be effective.

Approximately 1m AIDS helpline advertisements are embedded in PCM messages per day. Within the first three weeks of the pilot, incoming calls to the National AIDS

Helpline quadrupled, from 1,000 to 4,000 calls. The project is estimated to have generated over 1,400,000 calls since it was started.

Results for TxtAlert have also been encouraging, with attendance levels in participating hospitals reaching 95-100% in two years, compared with a 10% average attendance nationwide.

Looking ahead, Project Masiluleke plans to create virtual call centers with 5,000 trained HIV patients volunteering as virtual operators. These virtual operators will be handpicked form the pool of current patients who have made significant progress.

Awaiting governmental approval, the organization also plans to introduce a low-cost diagnostic tool for at-home HIV testing, with mobile counseling support. Marcha Neethling of the Praekelt Foundation says that the at-home testing kit would make a huge difference, since only about 5% of South Africans have been tested for HIV. The distributed diagnostics kit — analogous to a pregnancy test — would provide a free, private and reliable way for anyone to take the critical first step of finding out status, with quality information provided via a mobile handset.

Project Masiluleke also aims to increase its coverage to other African markets where MTN is present, looking at Uganda, Ghana, Tanzania and Cameroon as possible target markets. In the absence of reliable call center support, Project organizers are considering a USSD-based service to transfer information to people and tell them where to find the nearest testing center.

# CASE STUDY: Text To Change targets HIV in Uganda

Text To Change (TTC) launched a pilot AIDS/HIV education program in Uganda in partnership with the AIDS Information Centre Uganda and other partners in February 2008.

- The program deployed an SMS-based interactive quiz in conjunction with a rewards system, aiming to raise awareness of HIV/AIDS and improve participation and attendance at HIV counseling and service centers.
  1. Participants received an interactive text message with a multiple choice quiz on their mobile phones.
  2. If they provided the correct answer, they received free HIV testing and counseling, and were entered in a drawing for a prize.
  3. Winners of the HIV quiz were invited to the prize-giving ceremony in April 2008, where they received new mobile phones.
- The pilot targeted Zain's subscribers from the Great Mbarara region.
- The pilot lasted until April 8, 2008, and the program was expanded in 2009.

**Exhibit 85: Text To Change users**

*Source: Text To Change, Flickr, 2009*

The program proved successful: out of the target group of 15,000 mobile users, 2,610 people or 17.4% responded. During the trial period's six weeks, 255 participants (183 males and 72 females) came to HIV testing and counseling services, a 40% increase over previous attendance levels.

**Exhibit 86: Text To Change winners**

*Source: Text To Change, Flickr, 2009*

In 2009, TTC launched a new program that was carried out in January 2009 in Arua, Uganda. The program was to be scaled up nationwide. Expansion to other East African countries — Kenya and Namibia at first — began in mid-2009.

The success of the Ugandan initiative has led to the TTC mobile platform being used by the UN's Department of Economic and Social Affairs (UN-DESA) and the Ugandan Ministry of Health to launch Texting4Health.

**Exhibit 87: Texting4Health initiative**


*Source: Office for ECOSOC Support and Coordination, Department of Economic and Social Affairs, United Nations, 2009*

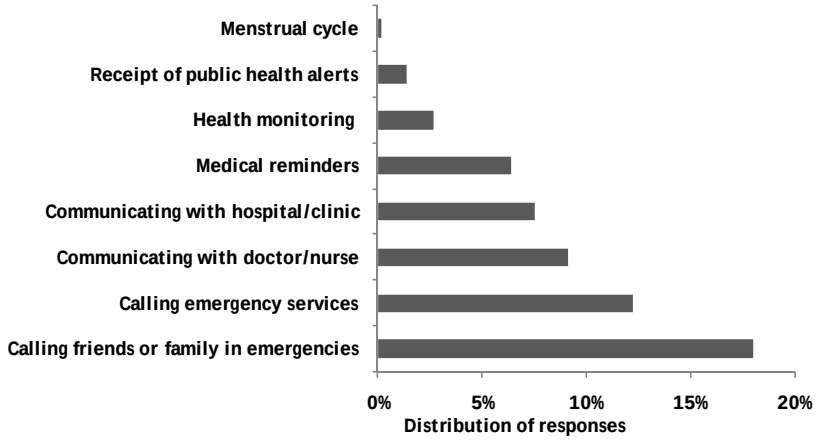
Launched in Uganda in July 2009, Texting4Health will also be introduced in Ghana. The program runs for 10 days and distributes information to participants via the following multi-optional questions, using text messages.

- Question 1: Children under five and pregnant women are most vulnerable to malaria?
- Question 2: Infected pregnant women cannot pass HIV to their baby during pregnancy?
- Question 3: When your child has diarrhea, you should give the child more to drink than usual and feed the child?

### 4.2.2 Mobile services and the health sector within Nigeria

Pyramid Research's survey of mobile users in Nigeria found that 20% of respondents use their mobile phones for health-related needs. Within the group that uses mobile technology for health services, the most common activity is to make calls in emergency situations by either reaching out to friends or family or by calling emergency services. A small percentage of respondents indicated that they receive health monitoring assistance or public health alerts on their mobile phones, suggesting there is room for further information services related to health.

**Exhibit 89: Use of mobile health services among mobile service users in Nigeria, 2009**



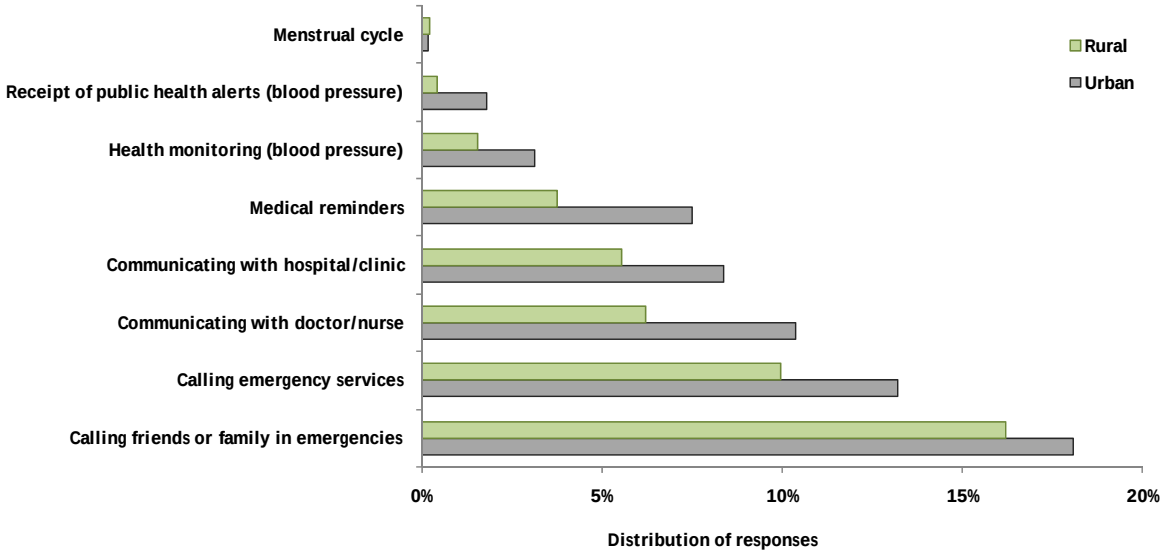

Note: Multiple answers were accepted; n=857.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Overall, our sample showed a marked difference between female and male users in their use of mobile technologies for health-related purposes, with adoption among females 7% higher. In certain cases, such as mobile calls to a doctor or nurse, uptake among female interviewees was 11% higher. A look at health-related usage by age group, meanwhile, shows the highest uptake of mobile services for health-related purposes within the oldest group, those 49-69 years old, and the lowest use among the youngest group, 16-25-year olds.

In general, mobile users in urban areas are more prone to rely on their mobile phone for health-related activities and information.

**Exhibit 90: Use of mobile health services among Nigeria's mobile service users by urbanization, 2009**




Note: Multiple answers were accepted; n=857.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

The Nigerian government is increasingly involved in initiatives to inform and respond to major illness such as malaria, TB, cancer and most proactively HIV/AIDS. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS) report on Global AIDS Pandemic, published in 2008, there were 2-3.2m HIV-infected children, men and women in Nigeria in 2007, representing 1.4-2.2% of the country's total population. The United Nations Special Session (UNGASS) Nigeria Report, published in 2007, puts the ratio at 4.5% for 2005, which is comparable to estimates made by local NGOs involved in various AIDS/HIV projects.

Efforts to deal with the AIDS/HIV issues in Nigeria have intensified in recent years, led by a consortium of government entities and NGOs implementing programs focused on education, prevention and treatment. One of these initiatives is Learning About Living (LAL). This partnership aims to create content accessible on and off the Internet that is incorporated in the Nigerian Family Life and HIV/AIDS Education (FLHE) curriculum, an integral part of the program in Nigerian schools. LAL banks on other ICT initiatives such as One Laptop per Child, Classmate PC and government computer programs.

LAL brings together an extensive group of partners: OneWorld UK, Butterfly Works, Action Health Incorporated, the Nigeria Education Research and Development Council (NERDC), Education as a Vaccine Against AIDS (EVA), Girls Power Initiative (GPI), the Nigerian Ministry of Health and the Nigerian Ministry of Education. Funding for the program is provided through grants from Oxfam, Novib (Netherlands), the John D and Catherine T MacArthur Foundation, Butterfly Works and Finalist IT Group. One component of the LAL program is My Question, My Answer. This program was set up as a partnership between OneWorld UK, EVA and the Nigerian National Agency for the Control of AIDS (NACA), with contributions from private mobile operators MTN and Zain.

# CASE STUDY: My Question, My Answer — an HIV/AIDS counseling and education program in Nigeria

OneWorld UK, Education as a Vaccine against AIDS (EVA) and other Nigerian NGOs launched My Question, My Answer, an HIV counseling and education program, in 2007.

- OneWorld UK is an international NGO that leverages innovation and user-generated platforms to promote social development.
- EVA is a Nigerian youth-focused AIDS/HIV counseling and education NGO. The organization was founded in 2000.
- The program aims to build a direct link with the population through mobile technology. The program has two components:
  - My Question is an HIV counseling and education service that allows individuals to ask AIDS-related questions by sending a free SMS to a short code (38120), calling a toll-free phone number (08027190780-2) or emailing through the Learning About Living website. These questions are then answered by trained counselors working for EVA and other NGOs.
  - MY Answer is a monthly competition that engages young people by asking an AIDS/HIV-related questions, which is then answered through a mobile phone or SMS.

**Exhibit 91: My Question, My Answer's three interfaces**

Internet


Voice SMS

*Source: OneWorld UK, 2009*

OneWorld UK acts as the platform partner, providing the technology for the SMS and Web components as well as technical support.

EVA and three other Nigerian NGOs are implementation partners in charge of:

- Training counselors
- Staffing
- Developing the database of answers
- Answering telephone and SMS inquiries
- Marshaling resources within Nigeria
- Coordinating with the government
- Marketing the service.

Additionally, the program attracts contributions from mobile operators:

- MTN provides monthly airtime prizes for the My Answer competition.
- Zain contributes:
  - Free-of-charge voice lines for EVA counselors.
  - A subsidy on the cost of SMS messages originating from subscribers on its network, reverse-charged to the program at N5 per message as opposed to the prevalent rate of N15 charged by other operators.

For the SMS component, the program commercially engaged the services of VAS2NET, a VAS services provider. VAS2NET's services comprise:

- A dedicated short-code number for the SMS enquiries

- A package of bulk SMS messages
- A billing platform connecting to the mobile operators for the reverse billing used by the organization.

Grants secured in 2008 by OneWorld UK from the McArthur Foundation and Oxfam will cover the program's basic costs until 2012.

**Exhibit 92: EVA staff monitoring SMS- and Web-based questions**

*Source: Pyramid Research, 2009*

By most standards, the program has been successful. One World and EVA state that there were 60,000 inquiries between the program's launch in October 2007 and January 2009, three times the original target, and that the number of inquiries has shot up to 88,500 by the end of May 2009.

Kemi Akinfaderin, EVA's executive director, says the anonymity offered by mobile technology has proven to be a major factor in the success of the program. Despite the effort to market the service through mass media such as radio, billboards and newspapers, the limited resources of the program meant that word of mouth has been the most efficient way in spreading awareness and participation in program so far. EVA says most women report that they heard about the program from their peers.

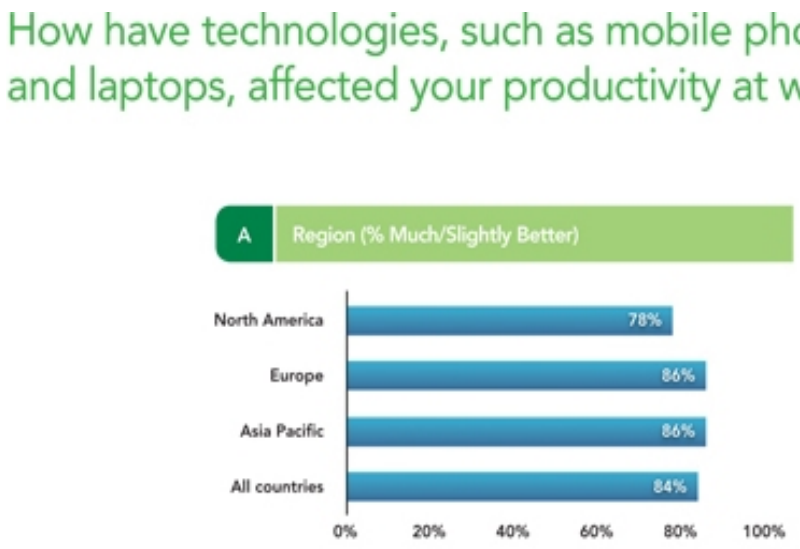
However, EVA and its partners are looking at increasing their marketing capacity, especially among women. At present, EVA reports that 75% of requests were originated by men and that a push for more funding is required in order to expand marketing activities.

Moving forward, the program partners are looking at a new phase. Capitalizing on an E1 line provided by Zain, which allows for 30 voice lines and two data lines, the National Agency for the Control of AIDS (NACA) is planning to establish a national call center to be staffed by counselors and managed by NACA. Effiong Eno, deputy head for public-private partnerships at NACA, says the call center will increase call capacity from the current 5,000-10,000 calls per month to 15,000-30,000 calls per month after implementation.

### 4.3 The impact of mobile services on digitalization and productivity of enterprises

Mobile communications play a wide range of roles in an enterprise environment, with varying effects on productivity and processes. The flexibiltity of mobile communications makes them a relevant tool for personnel at all levels of an organization. The 2009 Kelly Global Workforce Index, a survey of 100,000 individuals across 34 countries, conducted by Kelly Services, a global workforce services provider, indicates that 84% of all interviewees see the introduction of mobile technology as making their productivity either slightly better or much better.

**Exhibit 93: Perception of how technologies such as mobile phones, PDAs and laptops affect productivity**




*Source: Kelly Services, 2009*

In large organizations, the impact of mobile communications is widespread. Mobile access makes collaboration and interaction with colleagues and clients seamless. Time-sensitive information can be shared instantanously. Mobile communication and connectivity can also improve efficiency and generate time savings. Checking emails on the move, calling a client while traveling and accessing market information instantly are tasks that are easily conducted over mobile phones during traditionally unproductive times, such as commutes.

Another contribution of mobile technology and connectivity is the freeing effect it has had on work. Telecommuting and working from remote locations is becoming increasingly attractive options among employers, enabling them to maintain input quality while improving the work/life balance of employees.

More recently, telemetry and M2M services are broadening the impact of mobile services, particularly within companies with large fleets or those providing utility services (electricity, water, etc.). The application of M2M technology is helping companies in many industries reduce data collection and monitoring costs. Utility companies are also fitting household electricity and gas meters with sensors that monitor and report usage on a regular basis. Oil and gas companies are fitting their pipelines with sensors to detect leakage. Pyramid Research estimates that M2M-related SIM cards contributed about 18% of total enterprise mobile subscriptions in the UK in 2008.

### 4.3.1 Examples from abroad of leveraging mobile technology in the digitalization and productivity of enterprises — the US and Senegal

Enterprises in emerging markets tend to be less structured and digitalized than those in developed countries. There is also a greater proportion of individuals working in labor-intensive occupations, particularly in agriculture. In Senegal, for example, mobile technology is used to provide access to market information in order to help farmers, fisherman and all types of other small entrepreneurs make better decisions on where, when and how to allocate resources. In developed markets, mobile networks are gaining ground thanks to corporations moving to provide connected laptops to more of their employees.

**Exhibit 94: Sample of mobile applications enabling productivity**

| Program benefit | Project/company | Details |
|---|---|---|
| Access to market information | Project Manobi (Senegal) | Provides market information for fishermen and farmers. |
| Improve efficiency and save time | Intel (US) | Provides laptop to employees for connectivity on the move. |
| Ability to speak to colleagues and customers | FCMB Nigeria | Subsidized mobile communications. |
| Smart metering | EDF Energy (Europe) | Gas and electricity meters sending real-time updates of consumption and cost. |

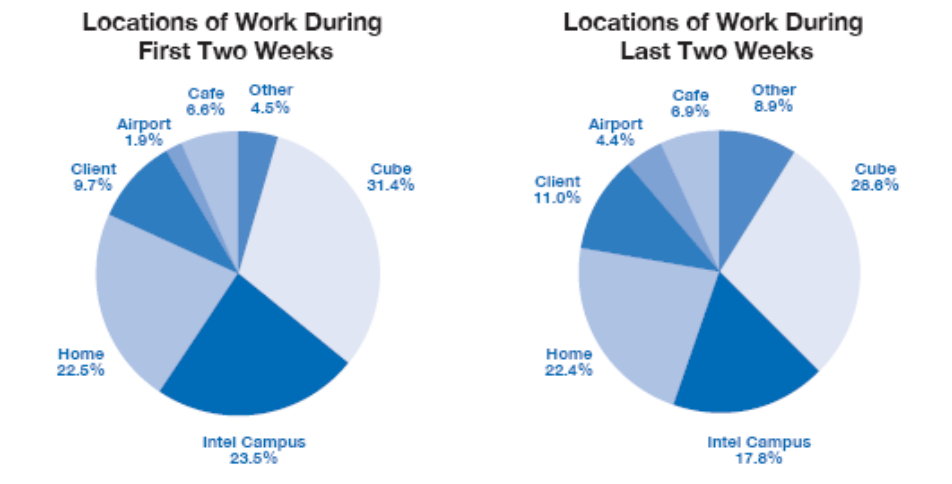
*Source: Pyramid Research, 2009*

# CASE STUDY: Mobility pays for Intel

In 2003, Intel conducted a study to find out about the effects of introducing mobility to its own workforce.

- Intel looked at how wireless technology was helping a sample of its employees save money and improve productivity.
- It equipped 100 of its employees with mobile laptops. These employees were spread out in four categories:
  - Project/program and people management
  - Technical support
  - Design, engineering and programming
  - General office and business support
- The results showed significant improvements in productivity and up to 5% time savings (which translated into 100 hours per year per employee) because:
  - Work location became more flexible.
  - Employees began slicing time.
  - Employees started distributing work time around personal and other professional obligations ("time shifting").

**Exhibit 95: Flexibility of work location as a result of increased mobility**




*Source: Intel, 2009*

After its internal assessment, Intel started issuing its workforce with mobile network-capable laptops, moving away from the general 20/80 laptop-to-desktop ratio that was standard in most companies at that time.

# CASE STUDY: SMS-based market information in Senegal boosts productivity

Manobi, a private mobile value-added services provider based in France, launched Xam Marsé, an SMS-based market information program, in Senegal in 2001.

- The Xam Marsé service informs farmers in real time about the current prices of their products on the principal markets via SMS.
- The main objective of the project was to grant access to last-minute market prices, weather reports and other information services via SMS and WAP (Wireless Application Protocol).

**Exhibit 96: Manobi Xam Marsé service advertisement**


*Source: Manobi, 2009*

- In 2003 the program was extended to target fishermen, offering market prices, weather forecasts and geo-localization for emergency rescues.
- The program is a partnership between the Manobi Development Foundation, local fishermen's unions, Alcatel, Sonatel (France Telecom) and the Canadian International Development Research Centre (IDRC).
- To support the program, Sonatel installed base stations near the beach in Kayar, extending mobile phone coverage to up to 14km off-shore.
- The service uses data collectors in the markets for constant price updates.

**Exhibit 97: Manobi SMS Marsé enables access to the latest market data because of its network of data collectors**

*Source: infoDev*

The fisherman-focused service started as a pilot, with mobile phones enabled to log departures and estimated times of return to monitor the safe return of boats from the sea. Combined with real-time weather reports, this improved the safety of the fishermen an improved their commercial responsiveness.

Today the Xam Marsé service has almost 40,000 subscribers, and it appears to have had a deep impact on Senegalese fishermen, many of whom view the service as a powerful tool for both productivity and safety.

Manobi is looking to expand its geo-localization tool: the company has already developed a geographical information system for large multinationals outside Senegal, and is further developing the geo-localization tool.

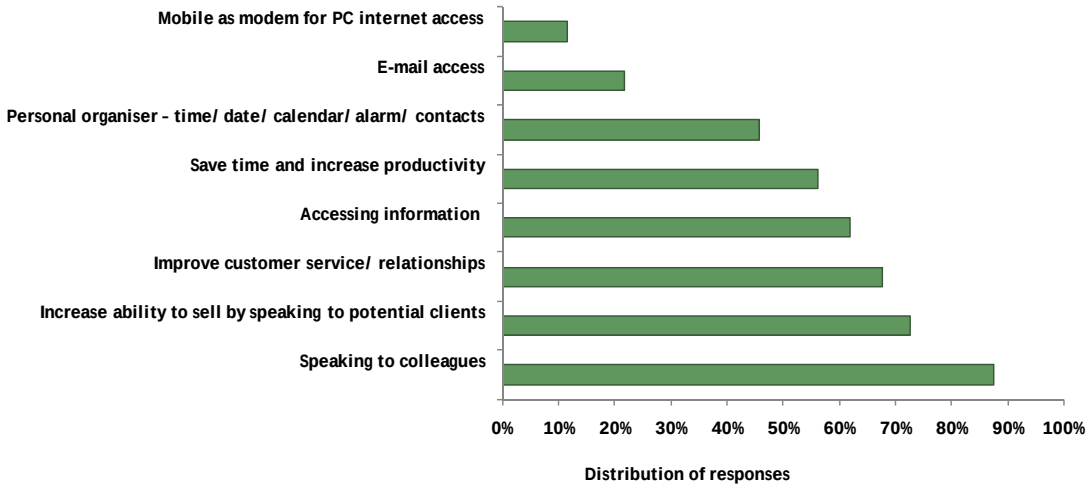
### 4.3.2 Mobile services and the digitalization and productivity of enterprises in Nigeria

Pyramid Research's survey of mobile users in Nigeria shows that as many as 54% of interviewees use their mobile phone for work-related purposes.

Among those who use mobile technology for work purposes, the biggest benefit identified by interviewees is the increased ability to speak to colleagues. This benefit is proving essential for time-sensitive sharing of information and remote collaboration. An enhanced ability to sell and improvements to customer service were also identified as important benefits by the survey's interviewees.

It is worth noting thought that among the youngest group of interviewees, those aged 16-24, the leading work-related benefit of mobile communications after the ability to speak to colleagues was access to information. This reflects the increasing tech savvy of young adults, who crave relevant and timely information.

**Exhibit 98: Uses of mobile phone for work-related purposes among Nigeria's mobile service users, 2009**

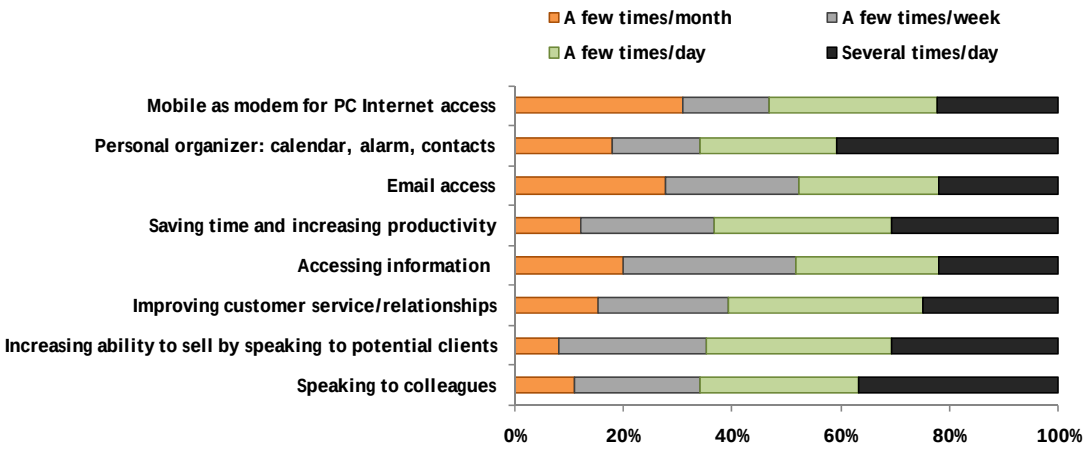



Note: Multiple answers were accepted; n=3,424.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Daily use of mobile phones for work-related activities is common. Of those Nigerians who use their mobile phones to speak to colleagues, 66% do so on a daily basis. A similar frequency of use is noted among those who use their phones to speak to potential clients.

**Exhibit 99: Frequency of work-related use of mobile phones among Nigeria's mobile service users, 2009**




Note: Multiple answers were accepted; n=3,424.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Due the lack of reliable fixed communications infrastructure, mobile telephony is a necessity for Nigeria's economic entities, both large and small. Most large companies in Nigeria sponsor or subsidize the cost of mobile communications for their employees. For the larger companies, postpaid contracts are the norm, while smaller companies pay by topping up employees' prepaid phones. The level of corporate sponsorship of mobile communications for employees in Nigeria varies between industries and companies. FCMB, one of Nigeria's leading banks, sponsors the communications costs of 10% of its employees for up to N1,500 (US$10) per month. In contrast, one of Nigeria's leading companies in the extraction, oil and gas sector sponsors the cost of mobile communications for a third of its employees through postpaid contracts for up to N45,000 (about $3,000) per month. This is in line with the higher mobility and need for coordination between different locations that characterize this sector.

# CASE STUDY: First City Monument Bank finds mobile technology indispensable

First City Monument Bank (FCMB) is one of the leading commercial banks in Nigeria, with a focus on corporate and investment banking.

- The bank has 149 branches and 3,000 staff.
- To keep its branches connected, FCMB relies mainly on fiber-optic networks and VSAT satellite networks. Each location also has a local PBX.
- Recently, FCMB started deploying a VOIP system in its branches.
- The bank is equipped with over 2,000 desktop computers and more than 1,000 laptop computers.
- FCMB sponsors about 300 postpaid subscriptions for its different employees via contracts with Globacom and Zain. Many of these subscriptions are for BlackBerrys, which are highly valued for their email access capabilities. The subscriptions cost N10,000 ($67) or N15,000. Billing for these lines is directed to the bank, which is responsible for charging employees for excess usage.

FCMB believes mobile connectivity is essential to its staff, and while it recognizes that mobile phones are commonly used for personal communications, equipping employees with mobile access allows the bank to keep its staff connected with current and potential clients.

**Exhibit 100: Usage distribution by type of activity**

| Type of usage | Percentage of total usage |
|---|---|
| Personal use | 40% |
| Speaking to colleagues | 10% |
| Increased ability to speak to potential clients and improve customer relationships and service | 25% |
| Email access | 10% |
| Personal organizer | 6% |
| Other | 9% |

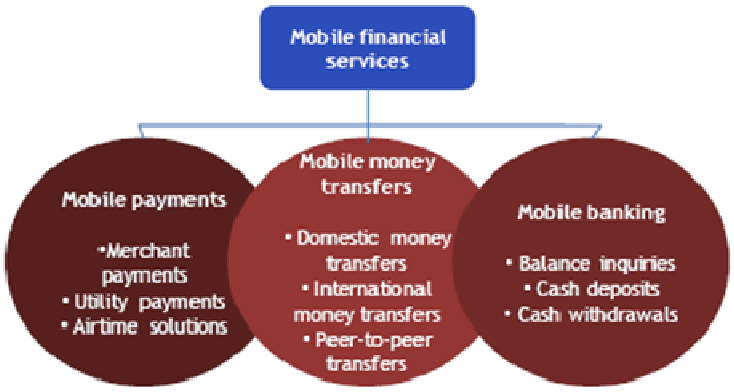
*Source: FCMB estimates, 2009*

Looking forward, Mr. Olayinka Oni, FCMB's vice president and head of IT, expects mobile communications to play a greater role in helping improve efficiency and reduce travel-related costs. Mr. Oni also sees mobile broadband as a service of increasing interest.

## 4.4 The impact of mobile services on financial sector

Mobile financial services take a variety of shapes and serve three main purposes: mobile payments, mobile money transfers and mobile banking. Depending on the environment, these services can be championed by financial institutions, mobile network operators or third parties, such as platform developers, money transfer companies or NGOs.

**Exhibit 101: Overview of mobile financial services**




*Source: Pyramid Research, Mobile Financial Services in Africa: The Business Case for Operators and Banks*

The platforms that these services use also vary depending on the target audience. While WAP- and Java-based applications offer the best interfaces, SMS- and USSD-based services are more successful in reaching out to the masses. The underlying reason is the compatibility of the technology platform with the capabilities of handsets used in the target market. All phones, including the ultralow-cost variety, have SMS and USSD capabilities; Java and WAP, however, are limited to midrange and high-end handsets. A look at mobile financial service offerings in South Africa reveals a variety of technology platforms. This variety showcases the different needs and characteristics of the target markets that these service providers are going after.

**Exhibit 102: Technology platforms of mobile financial service providers in various markets**

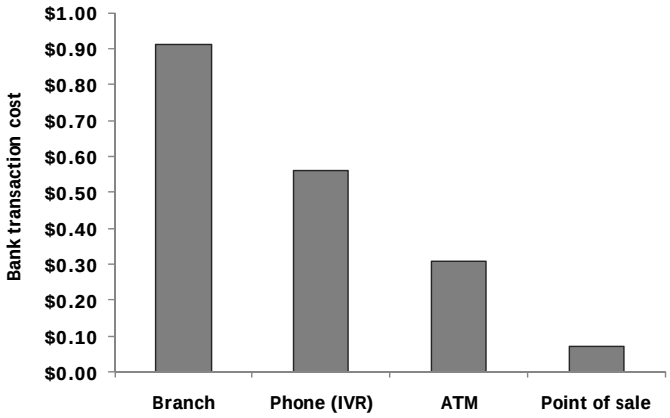
| Service provider | Country | SMS | USSD | WIG | WAP | Java |
|---|---|---|---|---|---|---|
| MoneyBox Africa | Nigeria | ✓ | | | | |
| Money TextMe | Multi-country | ✓ | | | ✓ | |
| FNB Banking | South Africa | ✓ | ✓ | | ✓ | |
| ABSA | South Africa | | | ✓ | ✓ | |
| Wizzit | South Africa | | ✓ | | | |
| MTN Banking | South Africa | | ✓ | ✓ | | |
| Standard Bank of South Africa | South Africa | | | ✓ | ✓ | |
| ANZ | Australia | | | | ✓ | ✓ |
| UBA Mobile | Nigeria | | | | ✓ | ✓ |

*Source: Service providers; Pyramid Research, 2009*

Despite the growing interest in mobile financial services, some serious hurdles still inhibit development. In addition to security concerns, regulation is the main inhibitor of the spread of mobile financial services. New initiatives driven by pan-regional operators to deploy standardized services across their African footprints are facing serious limitations from both telecommunications and financial regulatory authorities. Pan-regional operators Zain and MTN have already invested much time and effort in Africa and the Middle East to develop such applications; however, service deployment is still slow and nowhere near covering their total footprints.

The prevalence of mobile technology has made mobile phones and networks a natural platform for addressing the shortcomings of traditional banking in Africa and other emerging markets. Financial institutions' traditional distribution channels, based on branch and ATM banking, are proving to be inadequate for responding to the needs of the large base of low-income individuals and agents of the informal economy. Research conducted by Financial Sector Deepening Trust, a nonprofit organization in Kenya, shows that the breakeven transaction costs of financial transactions ranges from $0.07 at a point of sale (such as a retail store) to about $1 at a branch, making it impractical to deploy branches and ATMs for low-value transactions

**Exhibit 103: Breakeven cost by type of financial transaction**




*Source: Financial Sector Deepening Trust, Kenya*

### 4.4.1 Examples of leveraging mobile technology in the financial sector: Australia and Kenya

While there are major differences in financial services needs between developed and emerging markets, the structure of key business models is relatively similar. Mobile financial models rely on banks using mobile platforms as a differentiating factor to appeal to existing clients, such as in the case of Australian bank ANZ's m-banking offering. An alternative approach pursued mainly by mobile operators is to leverage their existing subscriber bases to reach unbanked customers, as exemplified by Safaricom M-PESA service in Kenya.

# CASE STUDY: Australian bank ANZ offers WAP- and Java-based m-banking service

ANZ launched a WAP- and Java-based m-banking service for its registered Internet and phone banking users in Australia in February 2008.

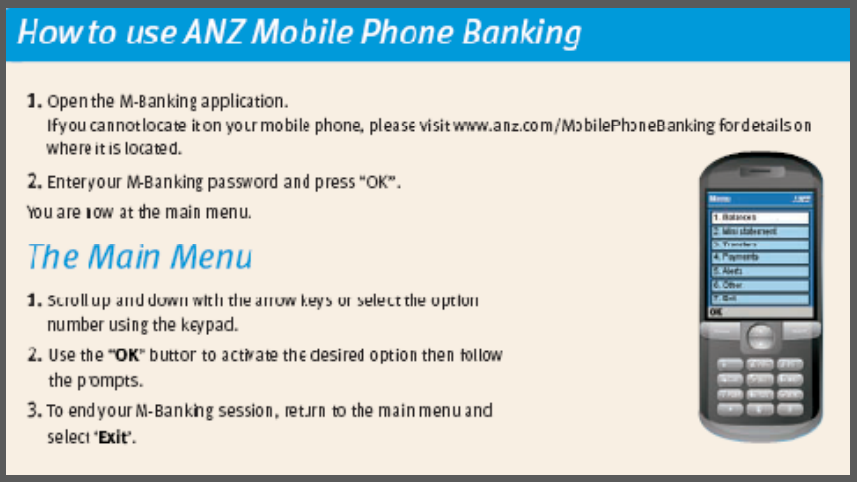
- ANZ is an international bank with operations in Australia, New Zealand and 26 other markets in the Asia-Pacific region.
- The m-banking service was the first of its kind to be deployed in Australia and allows ANZ customers to
    1. Check account balance
    2. View 10 most recent transactions
    3. Schedule and receive account alerts
    4. Transfer money between their ANZ accounts
    5. Transfer money into someone else's account
    6. Access details for up to 10 different ANZ accounts

The application requires a JAVA- and GPRS-enabled phone. To download the application:

1. Customers log on to the ANZ website and request the application download
2. An activation code is provided to the customer.
3. An SMS is sent to the customer with a download link.
4. Customers click on the link and download the application.
5. Customers enter the activation code.
6. Customers chose a new m-banking code to replace the activation code.
7. Once the application is downloaded and the account activated, users can access and navigate the m-banking menu through the application icon.

In addition to the password authentication process, ANZ implemented Secure Sockets Layer (SSL) encryption. The bank also limited transactions to a single registered handset per account.

**Exhibit 104: ANZ m-banking menu**




*Source: ANZ Australia, 2009*

Within a couple weeks of launching the service, ANZ reported over 1,000 registered users for its m-banking service. The bank indicates that this uptake is significant given the lack of advertizing and promotion around the service.

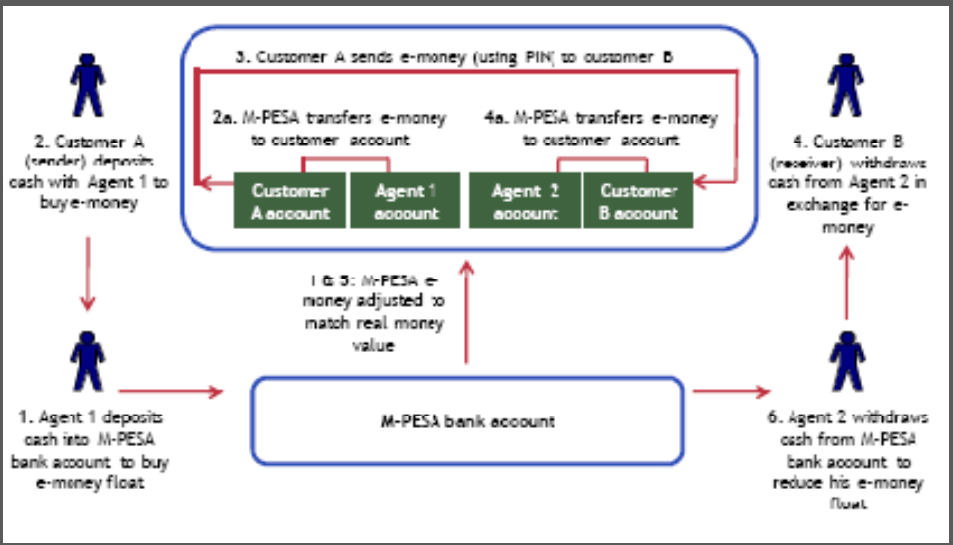
Looking forward, ANZ expects to register a more significant proportion of its 1.4m Internet banking users.

# CASE STUDY: Safaricom Kenya targets the bottom of the income pyramid with M-PESA mobile banking

Safaricom Kenya launched M-PESA, an SMS-based mobile payment service in 2007.

- Owned by Vodafone UK, Safaricom Kenya is the leading mobile operator in Kenya, with 15.1m of the country's 18.8m mobile subscribers at year-end 2009.
- M-PESA's main services are airtime top-ups and domestic money transfers to any mobile subscriber on any network.
- Once registered for free, subscribers will have to swap their SIM card for a new M-PESA SIM card. They will then receive an ID card.
- To deposit money, users must follow the following steps:
    1. The sender goes to an M-PESA agent and purchases M-PESA value.
    2. The agent enters the transaction into the M-PESA system with an SMS.
    3. The sender and the agent receive an SMS confirming the transfer with a PIN.
    4. The customer selects "Send Money" from the M-PESA menu and enters the recipient's number and the PIN.
- To withdraw money,
    1. The recipient goes to an M-PESA agent, presents a phone number and an ID.
    2. The recipient selects "Withdraw Money" from the menu.
    3. The recipient enters the agent's number, the amount and the PIN.
    4. The sender and the agent receive an SMS confirming the transfer.
    5. The agent disburses the cash.

**Exhibit 105: M-Pesa operating model**



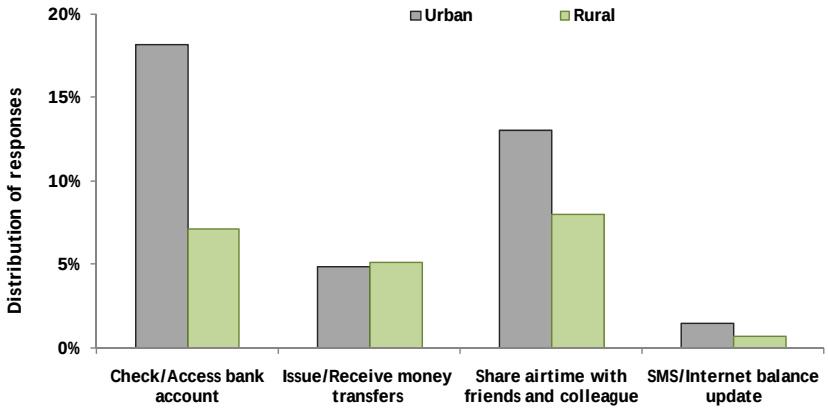

*Source: Safaricom, 2009*

Uptake of Safaricom's M-PESA service beat most expectations. Sixteen months after launch, nearly 3.3m users or 30% of the operator's subscribers were registered with the service. By June 2008, M-PESA was adding 10,000 subscribers per month and transferring $100m per month. Additionally, the M-PESA agent network expanded dramatically, reaching about 3,500 by the beginning of the fourth quarter of 2008.

### 4.4.2 Mobile services and the financial sector within Nigeria

Among Nigerian mobile end users interviewed by Pyramid Research, 20% of respondents use mobile platforms to access financial information and activities. The majority of these individuals, 15% of the total, use their mobile phones to access information about their existing bank account. Another 12% use airtime as a means to distribute wealth by forwarding credit to friends and family.

**Exhibit 106: Use of mobile technology for financial purposes among rural and urban mobile service users in Nigeria, 2009**




Note: Multiple answers were accepted; n=486.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

For almost all the mobile applications related to financial activities that we analyzed, use within urban areas is higher than that in rural areas, except for money transfers, where uptake is almost the same in the two environments, at 5%.

Generally, full-fledged mobile financial services in Nigeria are still in the early stages. Despite a population of 140m in 2008 and an official workforce of almost 60m, Nigeria had an estimated 18m bank accounts in 2008 — merely 13 accounts per 100 people. Overall, the 4,500 commercial branches in operation in Nigeria (2007) translate into ratio of 3.2 branches per 100,000 residents, compared with a worldwide median of 8.5 branches per 100,000 inhabitants, according to World Bank statistics.

After a consolidation and reform period in 2005 and 2006, Nigerian banks have emerged as sound and competitive financial institutions. The banks' retail footprint is the result of an increasingly competitive environment that demanded a stronger focus on commercial banking and less reliance on government deposits. While the increased efficiency of these banks have allowed them to better address the needs of corporations and high-end consumers, the vast majority of Nigerians are still unbanked or under-banked.

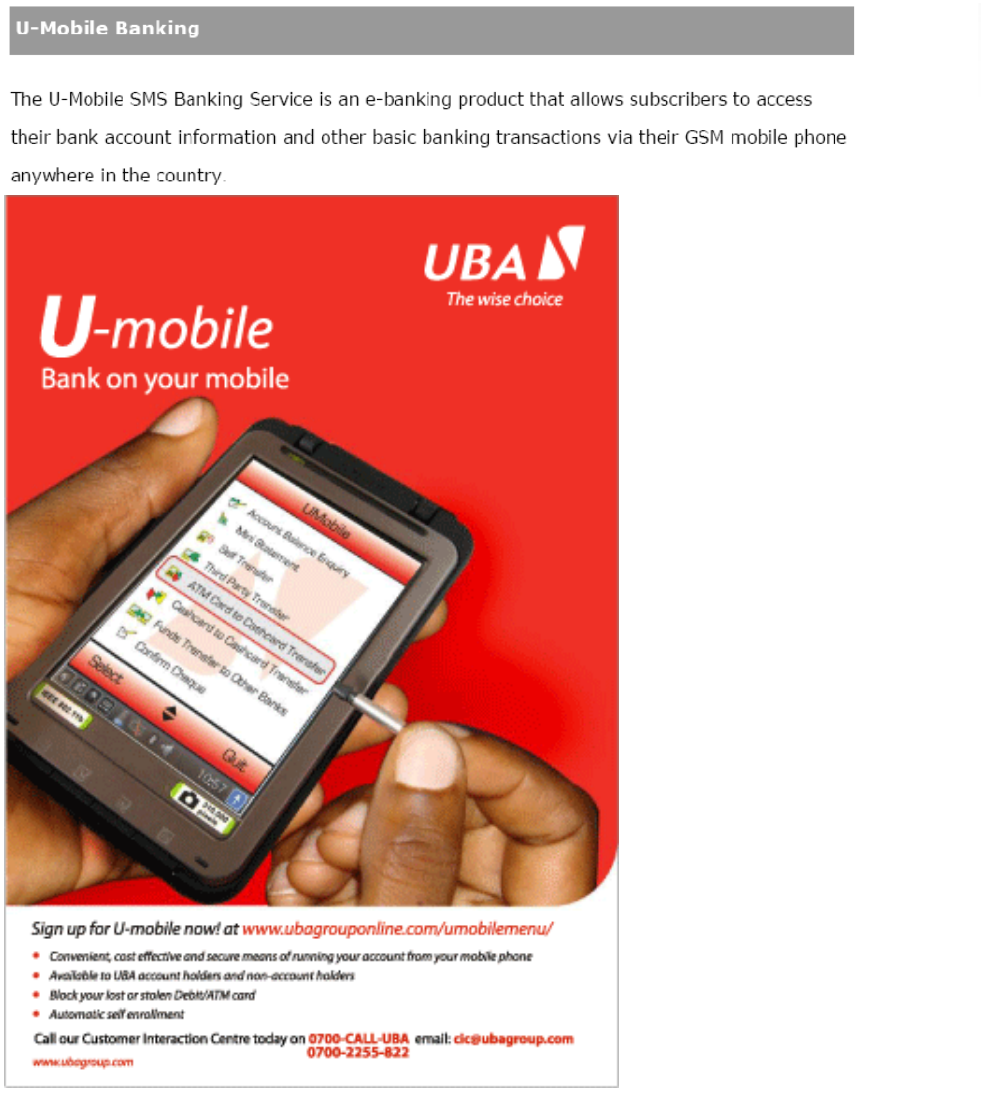
**Exhibit 107: Financial institutions compete over prime real estate and advertising space in urban commercial centers in Nigeria**


*Source: Pyramid Research, 2009*

In June 2009, Mr. Aigboje Aig-Imoukhuede, CEO of Access Bank Nigeria, said that 80% of total deposits in Nigeria are generated by fewer than 5% of all bank accounts, and that his bank's priority is to manage its balance sheet and leverage information technologies instead of continuing to expand its network of physical branches. This illustrates that the most prominent of the supply side barriers to increased adoption of banking services is the distribution channel. Financial institutions reach out to their customers mainly through costly branches and ATM locations, which require heavy investments that need to be justified.

Many of Nigeria's banks, including GT Bank, Zenith Bank and UBA, have already rolled out mobile banking services to capitalize on the efficiency of mobile telephony as a key distribution channel for time-sensitive information. However, the main target audience of these offerings is existing bank account holders, and offerings for the unbanked remain scarce. This creates opportunities for the development of specific money transfer applications in the near future.

**Exhibit 108: UBA offers added value to its customers through its U-Mobile service**




*Source: Zenith Bank, 2009*

Emerging service offerings based on innovative business models and driven by mobile operators and third parties, such as MoneyBox, can prove efficient in addressing the needs of the lower-income strata. A first step is to target the under-banked, providing cheaper money transfers and other complementary financial services; subsequent services would expand to the unbanked, providing complete banking and savings systems.

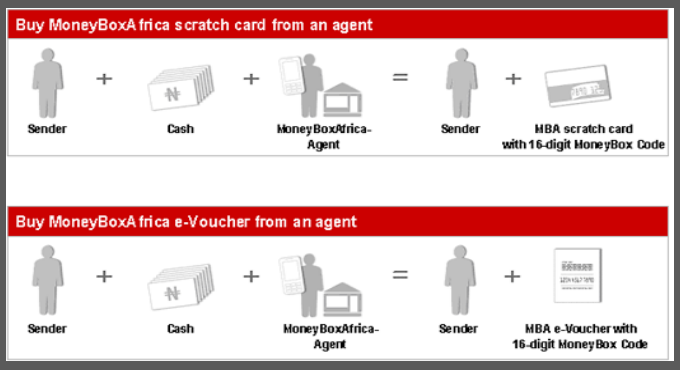
# CASE STUDY: MoneyBox Africa promotes m-banking services in Nigeria

MoneyBox Africa received a license in February 2008 from the Central Bank of Nigeria (CBN) to launch a comprehensive m-banking platform.

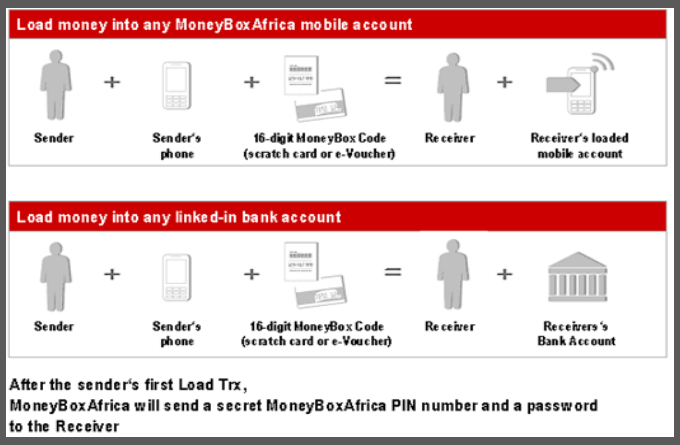
- The company was set-up to "deploy a mobile commerce application to allow users to virtually store and move money, make payments over distance and enable a host of transactions — all with the use of mobile phones."
- MoneyBox Africa is a joint venture between ICSL (an investment and financial institution), Salt and Einstein Ltd (a business logic company) and MISS Ltd (a mobile technology company).
- The company aims not only to use mobile technology to deliver its services but also to adopt the same business model that helped mobile operators succeed in low-income and growth markets. That means combining a system of:
    1. Prepaid scratch cards
    2. An SMS-based platform
    3. A distribution system of umbrella vendors.
    4. Customer service 24/7
    5. Strong security measures
- MoneyBox Africa expects to launch two different products in 2010:
    6. Quick Save:
        - A service based on scratch cards.
        - The ability of end users to store money on their phones instead of carrying loads of cash with them.
    7. The stored value can then be transferred from the phone:
        - To a bank account
        - To a relative
        - Withdrawn at a later time from a MoneyBox Africa agent.
    8. Accounts on the Streets (AOTS):
        - A service allowing merchants to open mobile bank accounts.
        - These accounts can be linked to regular bank accounts through a network of trained MoneyBox Africa agents and partners.
- For its platform, MoneyBox Africa chose paybox solutions AG of Germany, which has since been acquired by Sybase.

**Exhibit 109: MoneyBox Africa Quick Save service**

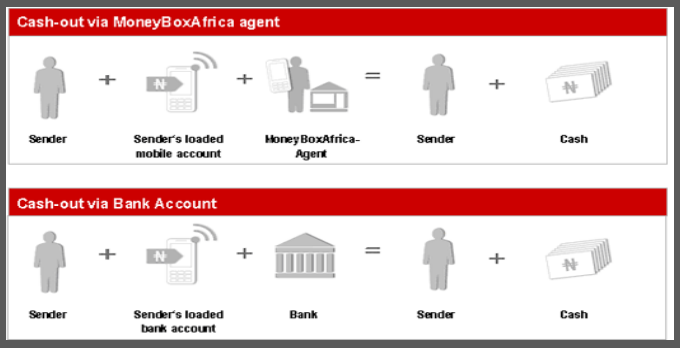
Purchase credit




Load credit




Cash-out credit




*Source: MoneyBox Africa, 2009*

Quick Save was developed to provide a banking service for Nigeria's street merchants and other participants in the informal economy, who generate amounts of cash regularly but do not wish to interact with a bank for lack of identification, lack of bank branches, a high frequency of deposits and withdrawals, or merely a lack of understanding or trust in the banking system.

The service capitalizes on existing cultural practices and current needs:

- Mobile phone top-up cards are a common gift in Nigeria and an informal way to transfer money between friends and relatives.
- The widespread use of esusu agents, informal financial intermediaries helping street merchants and families save money and store their cash for a fee.

The scratch card process is also an integral part of MoneyBox Africa's second and more ambitious product offering, Accounts On The Streets (AOTS). This service targets the unbanked and under-banked, but it also has the potential to appeal to the banked.

With an extensive network of dealers, AOTS offers a convenient access point to banking services. The service also lowers the required threshold for customer identification by establishing a three-tiered system of accounts for the unbanked, semi-banked and banked.

**Exhibit 110: MoneyBox Africa's identification requirements for Accounts On The Streets**

| Customer segment | Maximum amount per transaction per day | Requirements |
|---|---|---|
| Unbanked | • N30,000 per day<br>• N3,000 per transaction | Name, phone number, photograph, thumb print |
| Semi-banked | • N10,000 per transaction<br>• N100,000 per day | Name, phone number, address, photo ID |
| Banked | • N 100,000 per transaction<br>• N1m per day | Name, phone number, address, photo ID, utility bill, two guarantors, two references already banking with partner bank. |

*Source: Pyramid Research; MoneyBox Africa, 2009*

Moneybox Africa estimates that there are about 2.5m small street retailers in Lagos state alone, compared with 200,000 registered small businesses. These small retailers, street hawkers and mom a pop shops, says Damien Oguchi, the Chief Finance Officer of MoneyBox Africa, are the true target audience and beneficiaries of its products.

MoneyBox Africa expects the unbanked segment to contribute about 80% of its AOTS accounts, followed by the semi-banked category with a 15% share and the balance from high-volume banked customers.

Ayodeji Ige, MoneyBox Africa's chief sales officer, says that the company expects a phased launch with a focus on Lagos, where 60% of Nigeria's commercial activities take place.

Benchmarked against Safaricom's successful M-PESA mobile financial service in Kenya, which attracted 3m subscribers within six months of service launch in 2008, MoneyBox Africa conservatively expects to win 10% of financial transactions in the informal economy for its Quick Save service and 1% of total mobile service users for its AOTS within the first year.

## 4.5 The impact of mobile services on the agricultural and extraction sectors

Increasing rates of mobile service penetration in urban areas are pushing operators to target lower-income customers and widen their network coverage beyond the population centers. The expanded coverage and commercial interest of operators in rural areas are bringing extensive benefits to companies in industries such as extraction and agriculture that operate in remote locations.

In developed and emerging markets alike, operators are now targeting these industries with M2M services. Remotely managed irrigation systems are more efficient and cost-effective. M2M in agriculture helps both manage and monitor equipment as well as whole systems.

**Exhibit 111: Sample initiatives leveraging mobile technology for agriculture**

| Project | Country | Details |
|---|---|---|
| The Women of Uganda Network | Uganda | Access to information on market prices through text messages |
| SMS Sokoni Project | Kenya | Agricultural information through SMS, for a fee |
| Trade Net Africa | 10 African countries | Agricultural information via SMS and WAP |
| M2M managed irrigation | US | Irrigation systems controlled remotely, offering efficiency, lower costs and improved productivity and responsiveness |

*Source: Pyramid Research, 2009*

### 4.5.1 Examples from abroad of leveraging mobile technology in the agriculture sector — Uganda and India

In both developed and emerging markets, the ability to connect to markets and suppliers through mobile phones is helping farmers improve their decision making process, save time and benefit financially. Depending on the availability of high-speed networks and the needs of local communities, market information applications can be based on either WAP or SMS.

In Uganda, for example, the Grameen Foundation developed a comprehensive system to help deliver market information to farmers. In India, a joint venture between One World, BT plc, Cisco Systems and local agricultural establishments and NGOs is helping deliver market information to farmers.

# CASE STUDY: Grameen helps deliver market information to Uganda's farmers

Since January 2008, the Grameen Foundation has been testing new uses of the Village Phone infrastructure via such programs as Application Laboratory.

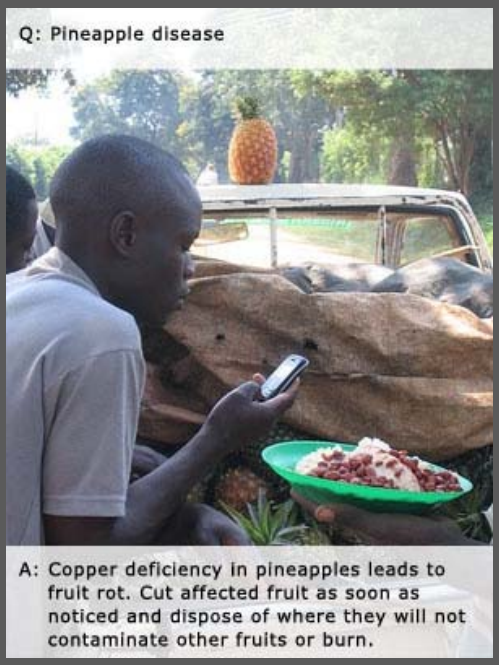
- On June 29, 2009, the Grameen Foundation announced the launch of a group of mobile phone applications developed with Google and MTN Uganda in the Application Lab, which leverages MTN's network of village phones and other operators of shared phones (a total of 35,000 public-phone operators) to test and deliver mobile information services to rural communities.
- In July 2009, an SMS-based service was deployed in cooperation with Google.
- In order to improve service delivery and penetration:
    1. The suite of services leverages MTN's network of village phones and other shared-phone operators.
    2. The Grameen Foundation trained and established a network of community knowledge workers (CKWs) to become "knowledge hubs" for smallholder farmers in Uganda, giving them advice and information on how to carry out their activities.
- A grant from the Bill & Melinda Gates Foundation helped finance the hiring and training of the community knowledge workers.
- A group of content developers were brought on board. For instance, the content for the Farmers' Friend service was developed by the Busoga Rural Open Source Development Initiative (BRODSI).

**Exhibit 112: The community knowledge worker at work**

*Source: Grameen Foundation, 2009*

All the services are SMS-based and designed to work with basic mobile phones to reach the broadest possible audience. The new services in Uganda can be accessed by existing village phone operators, who extend service to people without mobile phones. The customer sends in the query and the answer is returned later. Currently the service is free, but there are plans to introduce minimal charges. Even though the standard cost of an SMS message in Uganda is Ush220 ($0.10) the services will be offered for half of that.

**Exhibit 113: Snapshots of users using Google SMS applications**





*Source: Grameen Foundation, 2009*

# CASE STUDY: LifeLines Soochna Se Samadhan in India provides guidance to India's farmers

The LifeLines program was launched in India in 2006.

- The program is a joint venture between One World, British Telecom (BT) and Cisco.
- The service also partners with the Indian Society of Agri-Business Professionals (ISAP), TARAhaat (an NGO focused on sustainable rural development), the Datamation Foundation and IRRAD (also a rural development NGO).
- LifeLines' agriculture service provides advice and guidance to farmers through an agriculture advisory and livelihood information service.
- LifeLines uses mobile telephony as the user interface, while an Internet- and computer-based program provides answers; users also get help from various experts.
- Because of India's high illiteracy rates, the information is provided as a voice recording in a local language.
- The service costs Rs5 ($0.10) per query.
- The service is promoted through a network of field volunteers — Ek Dunya fellows, also called field coordinators — who facilitate the use of the LifeLines service by encouraging farmers to use it, explaining the way services works and assisting end users in the process of registering their queries via mobile phones.

**Exhibit 114: A field coordinator interacting with a farmer and explaining the service to a farmer during a home visit**

*Source: One World South Asia, 2009*

This is how it works: The user (either farmer or field worker) dials the LifeLines number, and the call reaches the interactive voice response system, where the question is registered. A query ID is attached and stored in the database server. The knowledge worker in charge of answering the query looks for an answer in the system's database of frequently asked questions (FAQs) and their answers. The FAQ database contains more than 200,000 questions and answers and is constantly growing. If the solution to the caller's problem is already available in the database, the answer is added to the original query as a voice clip; if not, the Knowledge Worker forwards the inquiry to the relevant

experts at the Indian Society of Agribusiness Professionals (ISAP) or other partnering institutions. The answer is usually available to farmers within 24 hours. The user calls in, enters the query ID and obtains the recorded answer.

The system also allows users to send photographs — of crops or cattle, say —with their inquires.

**Exhibit 115: Farmers calling the LifeLines service**

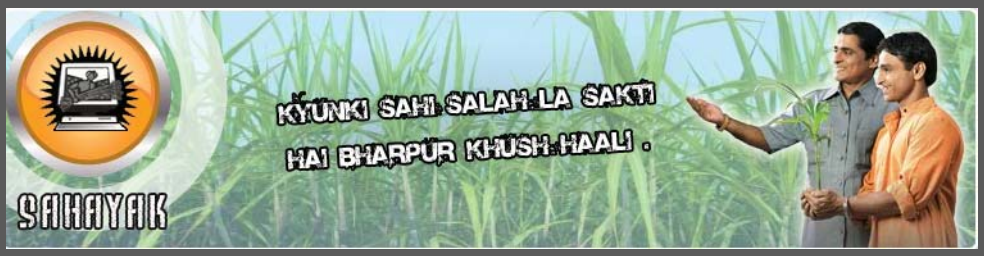
*Source: One World South Asia, 2009*

Currently the service covers more than 2,000 villages across 25 districts in four states of India: Himachal Pradesh, Madhya Pradesh, Uttar Pradesh and Haryana. Over 100,000 farmers have used the service so far, and more than 450 queries are received every day.

LifeLines has proven to be beneficial to farmers by directly improving their crop yield and earning potential. An early sample study of farmers across three villages – Mashobra, Jhansi and Nalagarh – discovered a consistent increase in product quality and productivity, which resulted in boosting farmers' profits by 25-150%. In another survey of 5,000 farmers who made use of the LifeLines service, 96% said they were satisfied and 70% said that they had put into practice the query answer and that it had proved to be useful.

In June 2009, Tata Indicom, a telecom services provider in India, added the LifeLines service to its Sahayak value-added service offers. Users can access the subscription-based service any number of times at any time during the day.

**Exhibit 116: Sahayak, Tata Indicom's mobile value-added service for farmers**



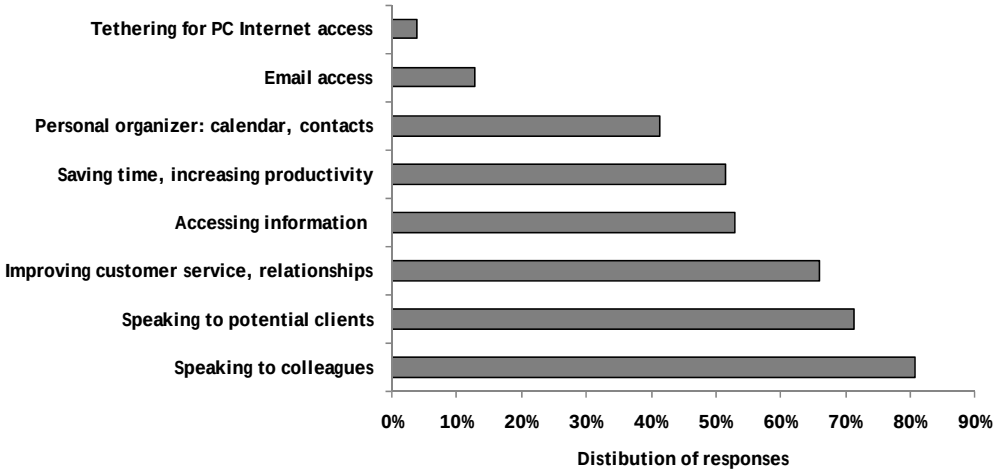

*Source: Tata Indicom, 2009*

### 4.5.2 Mobile services and the agriculture sector within Nigeria

Pyramid Research found intense use of mobile services among users in rural locations of Nigeria. Despite the shortage of mobile-based agriculture applications in Nigeria, farmers still use the mobile phone as a viable tool to increase productivity. Among the 451 interviewees from rural and farming communities, 227 respondents, or 50%, indicated that they use their mobile phones for work-related purposes.

Among those who use mobile technology for work-related purposes in rural areas, the most common activity is to communicate with colleagues, followed by interactions with existing and prospective clients. This means mobile services lead to wider collaboration and sharing of knowledge among people working in the agricultural sector. Through an SMS, a quick phone call or a "call me back" call, the trade takes less time. In addition, farmers are able to communicate better with their suppliers. The acquisition of key materials such as seed and fertilizer in Nigeria is a complex process that involves federal government agencies, state government bodies and independent elements. The improved access afforded by mobile technology is helping to shorten the distribution cycle and to streamline the logistics involved in the process.

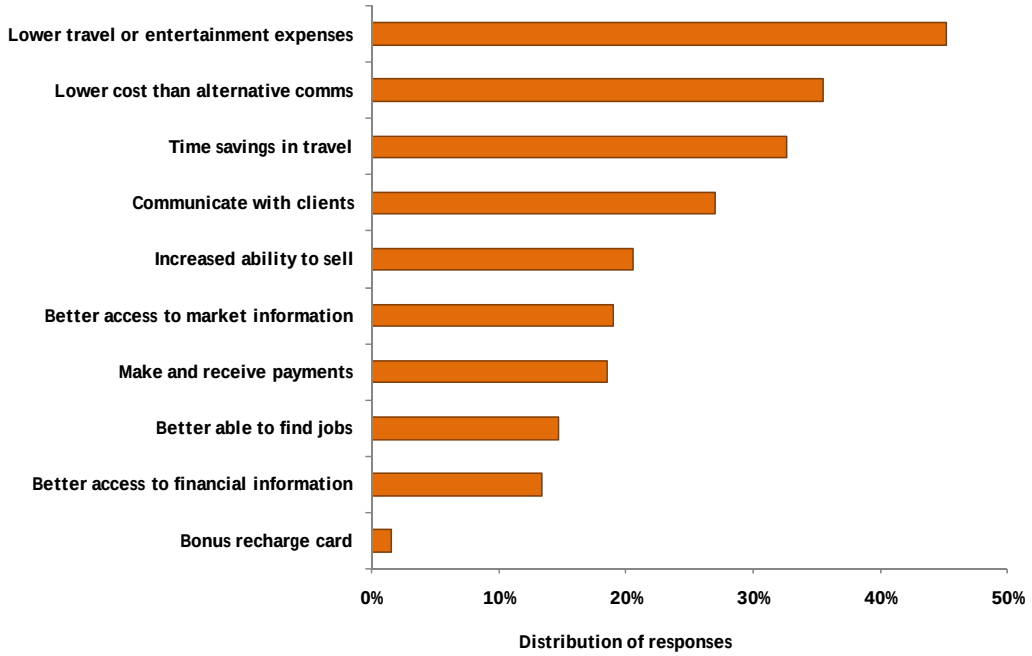
**Exhibit 117: Use of mobile technology in rural areas for productivity purposes among Nigeria's rural mobile service users, 2009**




Note: Multiple answers were accepted; n=864.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

The majority (86%) of interviewees in rural areas claimed that they had made a profit by using mobile telephony. Mobile phones help people residing far from cities avoid unnecessary travel: farmers who can access market information can better decide when to take their products to market, which market offers the best price and whom to sell to. Entrepreneurial farmers can maximize profits by reaching out directly to customers.

**Exhibit 118: Type of financial benefits derived from mobile phone use among Nigeria's rural mobile service users, 2009**

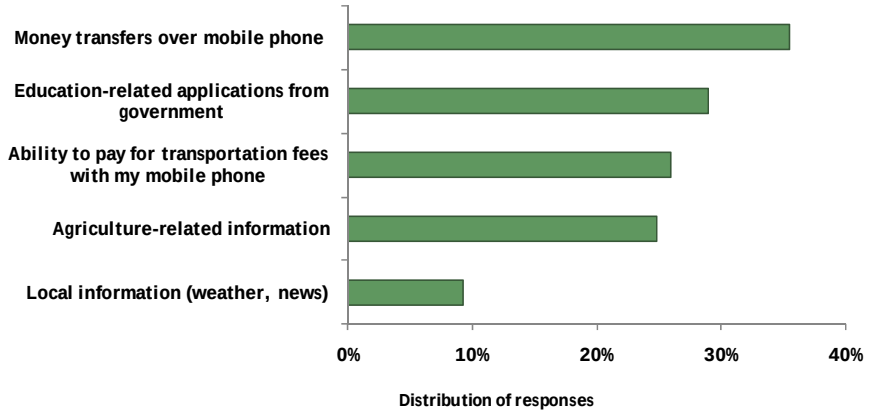



Note: Multiple answers were accepted; n=887.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Dr. Richardson Okechukwu, a scientist with the International Institute of Tropical Agriculture in Nigeria (IITA) and the coordinator of the Network of Agricultural Market Information Providers of Nigeria (NAMIN), believes mobile technology is a major tool for the democratization of market information and for securing the livelihood of farmers. Dr. Okechukwu states that "the lack of transparency allowed the middle man to take advantage and force farmers to sell their products at prices substantially lower than market levels, hence contributing to the poverty of farmers." Dr. Okechukwu says the main impact of mobile technology lies in allowing farmers to make informed decisions.

Asked what applications they would like to see in the mobile market in the futire, rural users either pointed at applications that use the mobile phone as a payment tool or convey more information that is relevant to their day-to-day activities. Most frequently mentioned were programs that would enable them to transfer money over mobile phone.

**Exhibit 119: Preferred new applications among Nigeria's rural mobile services users, 2009**




Note: Multiple answers were accepted; n=563.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

New initiatives led by Nigeria's Ministry of Agriculture are looking into further streamlining the complex distribution structure for government-subsidized fertilizers, a lifeline for many farmers. These initiatives are looking at better identifying these farmers, understanding their needs and shortening the distribution cycles. The use of mobile technology by cassava growers to access market information is one example of such initiatives. The project used Agri-Business Information Points and trade agents to provide better access to this information.

# CASE STUDY: Cassava growers receive a mobile boost

The Integrated Cassava Project (ICP) is funded by the Federal Government of Nigeria, the Niger Delta Development Commission, Shell Petroleum Development Company of Nigeria and the US Agency for International Development.

- The project aims to disseminate market information using the Agri-Business Information Points (ABIPs) and trade agents:
  - ABIPs are market information centers. Their services include:
    - Prices, volumes and offers
    - Trade assistance
    - Trainings
    - Business center-type services
    - Tools: Internet and online marketplace Trade Net Africa
  - Trade agents are micro-entrepreneurs serving local traders and producers. Their services include:
    - Prices, demand volumes and offers
    - SMS Alerts
    - Technical messages
    - Tools: Trade Net Africa and mobile phones

**Exhibit 120: A marketplace in Nigeria with an Agri-Business Information Point**


*Source: Cassava Project, 2009*

### 4.6 The impact of mobile services on the transport and logistics sector

The transportation and logistics sectors have for a long time been at the forefront of implementing new technologies, including mobile services. The impact of mobile services in these verticals can be seen from two different angles: from the perspective of companies providing transportation services, which are in constant search of tools to make their operations more efficiently, and from the perspective of end users, who evaluate the convenience and cost of transportation services vis-à-vis direct and indirect substitutes.

With regard to companies providing transportation services, mobile coverage is proving particularly suitable for fleet-management and route planning. Implementation of technological advances by transport and logistics companies can significantly improve the management of information, stock and human resources in order to advance productivity and security, cut costs and save time. Recently, mobile technologies such as M2M (machine to machine) have been enabling an even wider variety of value-added services. The deployment of M2M for road and emergency signal management, for example, is an increasingly common use of mobile technology within the transport sector that helps central offices connect and communicate remotely with monitoring equipment.

From the perspective of consumers, the availability of relevant information via mobile services helps them make the most of transportation services and should increase overall satisfaction. Mobile services are an optimal medium for receiving traffic updates and even reporting incidents. Another notable impact of the growing adoption of mobile technology is that it reduces the need for users to travel in order to engage in certain activities when these can be conducted efficiently via a phone-based conversation. With network access getting faster and more affordable, companies and individuals searching for efficiencies are continually evaluating the costs and benefits of travel and conference calling. In technologically advanced countries, new services such as video conferencing are resulting in travel substitution while helping to enrich overall business transactions.

**Exhibit 121: Sample mobile applications used in the transport and logistics sector**

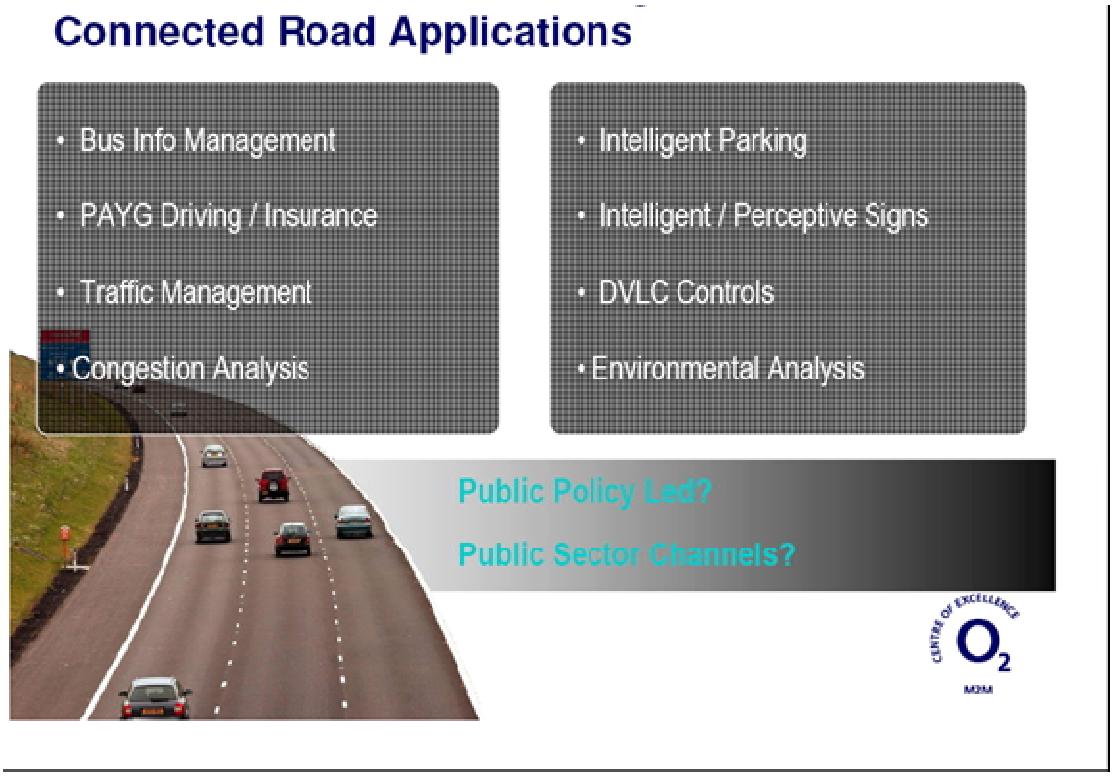
| Application | Company | Country | Description |
|---|---|---|---|
| **OnStar**<br>Telematics | General Motors | US<br>Canada | In-vehicle security, diagnostics and communications service. |
| **Opto Africa**<br>Waste management | Pikitup waste management | South Africa | RFID readers automate weighing transactions in landfill. Data is sent over GPRS to a central server and analyzed, an end user report is generated, and an SMS notification is sent in case of discrepancies. |
| **Vianet vOpen**<br>Vending machine management | Ideal Services | United Kingdom | Vending machines are equipped with sensors for stock and failure notifications. The information is used to plan vending routes, manage machine inventory and control warehouse stock. |
| **Ctrack Assist**<br>Vehicle tracking | Ctrack | South Africa<br>Nigeria | Vehicle locations and other data is sent over mobile networks to track fleet positions and movement and monitor gas and mileage consumption. |
| **VAS2NET**<br>SMS short code services | Hot FM Abuja | Nigeria | Listeners send SMS messages or call to provide traffic and accident updates. |
| **eNowNow**<br>SMS traffic updates | eNowNow | Nigeria (Lagos) | Users can request and receive traffic updates via SMS. |

*Source: Service providers, Pyramid Research, 2009*

### 4.6.1 Leveraging mobile technology in the transport and logistics sector around the world

The implementation of mobile services by transportation and logistics companies requires close collaboration from pure-play vehicle vendors, traffic authorities, mobile device manufacturers and mobile operators. In European countries such as the UK and Germany mobile operators including O2 and Vodafone have been promoting M2M services for a few years now to support traffic monitoring with cameras in remote locations that are linked via mobile networks. The main users of "connected road" applications will be transportation authorities of different geographical regions within each country, but we expect the impact to also reach individual users, given that congestion analysis and other uses serve to alleviate traffic bottlenecks.

**Exhibit 122: Overview of M2M applications in the traffic space in Western Europe**




*Source: O2 UK, 2008*

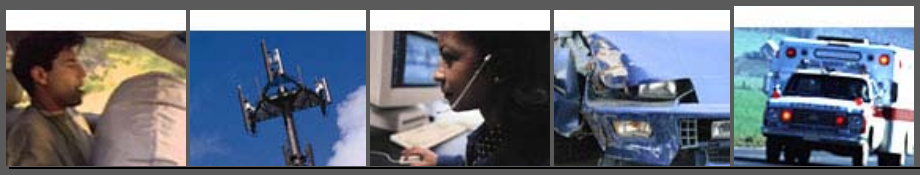
Another example of the use of mobile technologies in the transport industry is the OnStar service by car manufacturer GM in the US. The service is aimed at improving the driving experience of end users. It combines GPS and mobile networks on different plans, including mobile voice calling.

# CASE STUDY: OnStar brings telemetry to the consumer market in the United States

General Motors (GM) launched the OnStar service in the US in 1995. The in-vehicle security, diagnostics and communications service is subscription-based.

- The service is currently available in the US and Canada.
- By 2007, all of GM's new vehicles came equipped with OnStar; the system cannot be installed by dealers or third parties.
- OnStar provides a wide variety of services:
  1. Emergency
     - Automatic crash response
     - Automatic airbag deployment response
     - Emergency services
     - Crisis assist
     - Roadside assistance
  2. Security
     - Stolen vehicle assistance
     - Remote door unlock
     - Remote horn and lights
  3. Navigation
     - Information/convenience store
     - OnStar turn-by-turn navigation
  4. Diagnostic services
     - OnStar vehicle diagnostics
  5. Hands-free calling
     - Hands-free voice-activated calling

**Exhibit 123: OnStar automatic airbag deployment response service**



| | | | |
|---|---|---|---|
| In-vehicle sensors detect airbag deployment after accident. | Emergency signal sent automatically to the OnStar center. | An advisor attempts to communicate with the driver. | In case of no reply or if the driver reports an emergency, advisor contacts closest emergency service. |

*Source: OnStar 2009*

- Access to OnStar services requires a monthly subscription to either of the two plans:
  1. The Directions and Connections plan includes all the services for $28.90 per month.

2. The Safe and Sound plan includes all the services except the turn-by-turn navigation for $19.90 per month.

- Every new activation comes with 30 free minutes of voice communications through hands-free voice-activated calling. However, customers have to purchase prepaid minutes for additional talk time.
- OnStar's interface is simple and easy to use, relying on a set of three buttons that come preinstalled in the vehicle.
- OnStar service relies on a combination of:
    1. On-vehicle monitoring devices
    2. Mobile communications
    3. GPS technology
    4. Customer service and support 24/7

As of mid-2009, the service had about 5.5m subscribers. OnStar's statistics are compelling: between October and December 2008, it generated a monthly average of:

- 2,600 automatic crash responses
- 10,400 emergency services
- 6,000 good Samaritan calls
- 600 stolen vehicle assistance
- 62,700 remote door unlocks
- 54,500 remote vehicle diagnostics
- 3.4m OnStar vehicle diagnostics emails
- 30,200 roadside assistance calls
- 961,000 turn-by-turn routes
- 29m OnStar hands-free calling minutes purchased

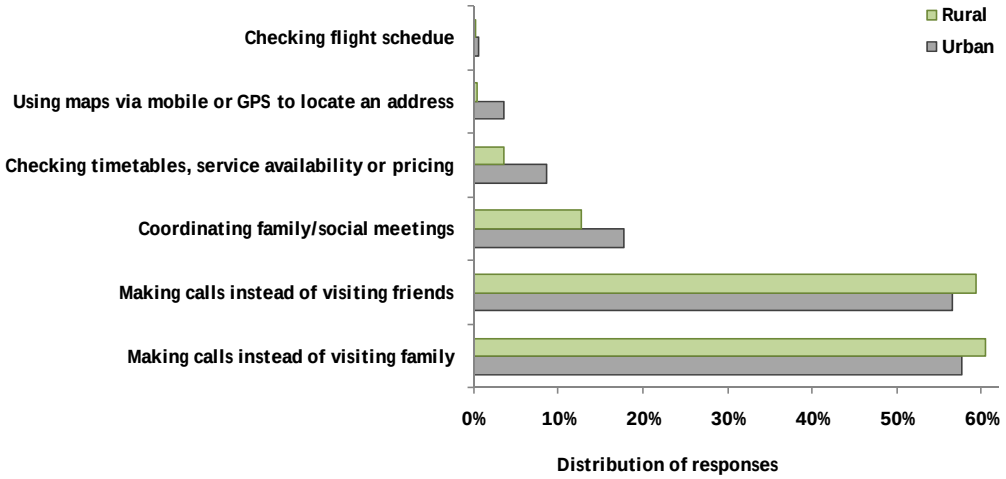
Given its success, GM launched the service in China in December 2009 through Shanghai OnStar, a joint venture with SAIC, its local Chinese manufacturer. China Telecom provided the joint venture with mobile connectivity support, and the service went live in December 2009.

### 4.6.2 Mobile services and the transport and logistics sector within Nigeria

The availability of mobile applications specifically for transport and logistics in Nigeria is still at a nascent stage. Mobile end users have seen a reduction in their transportation needs thanks to the wider availability of mobile phones and mobile service, which enable them to conduct social and work-related conversations from remote locations. In addition, Pyramid Research has identified a series of innovative services leveraging SMS that aim to help the general public avoid or alleviate traffic bottlenecks.

According to Pyramid Research's survey of Nigerian users, mobile services are helping to reduce the need for physical transportation. Roughly 60% of interviewees say that making mobile calls is affecting how often they travel, which should reduce their travel costs. This trend affects visits to family and friends as well as business trips, and is slightly more notable among rural mobile users. The use of applications to check timetables, make reservations or acquire tickets is almost non-existent, which suggests these are opportunities for future development that should benefit from the growing availability of 3G, smartphones, local content and local applications in Nigeria.

**Exhibit 124: Scope of use of mobile services related to transport and logistics activities among rural and urban mobile users in Nigeria, 2009**




Note: Multiple answers were accepted; n=2,137.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

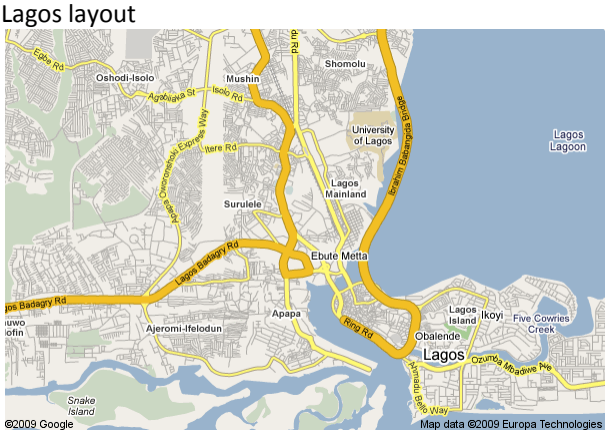
That people opt to call rather than travel is a phenomenon driven not only by costs but also by convenience and a desire to optimize the use of time. Intra-country travel depends largely on the state of infrastructure. The lack of an adequate railway system means that roads are the main source of transportation, but with less than 50% of the road system paved, this presents challenges to the transportation of people and goods. New initiatives at the state and federal levels aim to address the issue in Nigeria: a nationwide rail system is being planned and deployed, and spending on road projects is increasing at the state level. Other initiatives include the establishment of a regulatory body, the National Transport Commission, which in conjunction with the National Council for Privatization (NPC) and the Federal Ministry of Transport (FMOT) have finalized a new national transport policy.

Traffic challenges are also notable in the metropolitan areas. While Lagos epitomizes Nigeria's transport network ills, Abuja's roads emerge as an example of a well-organized and well-maintained network. It is difficult to compare Abuja to Lagos given the differences in their size and layout, but the two cities face similar issues when it comes to booming populations and increased stress on the existing network of roads, leading to constant traffic bottlenecks. Given the rapidly increasing population, commuting is common in Nigeria's metropolitan areas. In Abuja, about 60% of the city's

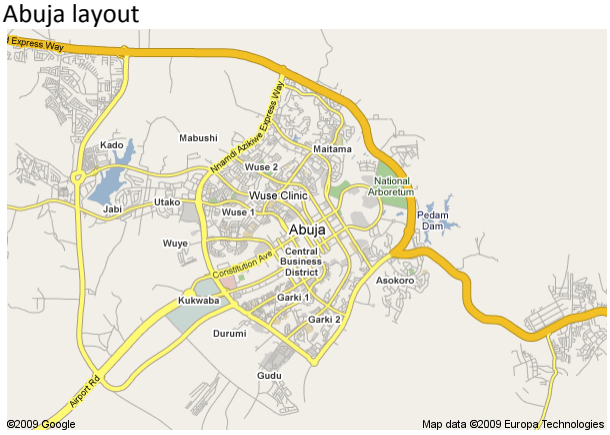
workforce reportedly lives in areas that are 15-20 kilometers outside the city. Taxi and bus drivers, city dwellers, government officials and private entrepreneurs, whether living in Abuja Model City, one of many high-end gated communities outside Abuja, or in distant shanty towns like Suleja and Gwagalada — all take the roads leading into and out of Abuja on a daily basis. This leads to heavy traffic on highways such as Airport Road, the A2 Highway and Murtala Mohammed Expressway during morning and evening rush hours.

**Exhibit 125: Lagos and Abuja city layouts and traffic**

Lagos layout

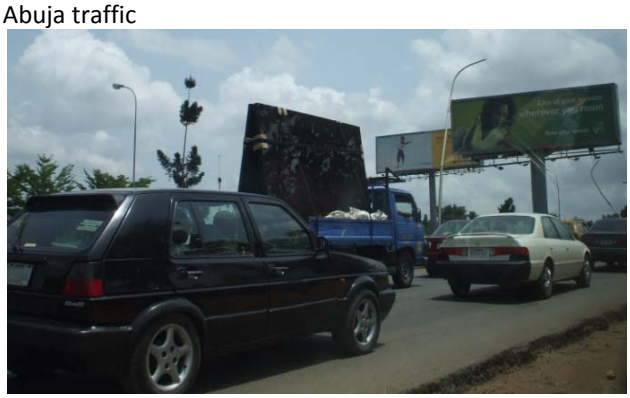



Abuja layout




Lagos traffic

Abuja traffic



*Source: Pyramid Research; Google Maps, 2009*

Private initiatives continue to emerge to respond to traffic challenges. Private helicopter transportation is widespread, catering to the needs of the oil and gas industry, while a radio station in Abuja started a traffic monitoring system leveraging its listener base and mobile technology.

# CASE STUDY: HOT FM leverages SMS for traffic monitoring in Abuja

Hot 98.3 FM, a radio station in Abuja, launched the Traffic Jam show in 2006.

- The show broadcasts 4pm to 8pm daily and relies on listeners for live updates on traffic patterns and road safety issues via mobile calls or SMS.
- Hot FM's broadcast coverage extends beyond Abuja to many parts of Kaduna, Plateau, Niger, Nasarawa, Kogi, Benue and Imo states.
- The station uses a toll-free phone number for the calls.
- The SMS messages are sent to a dedicated short code (33535).
- The SMS system, provided by VAS2NET, is simple and straightforward. It includes a short code and a platform to track incoming SMS messages.

**Exhibit 126: Hot 98.3 FM traffic jam show**


*Source: Pyramid Research, 2009*

- Drawing increased audiences in prime time and thus more advertising revenue, the Traffic Jam has grown into a staple program for the station.
- The radio station receives an average of 50-60 traffic-related calls and texts per day; about 80% come in the form of phone calls.
- The text messages are sent to a dedicated short code (33535).

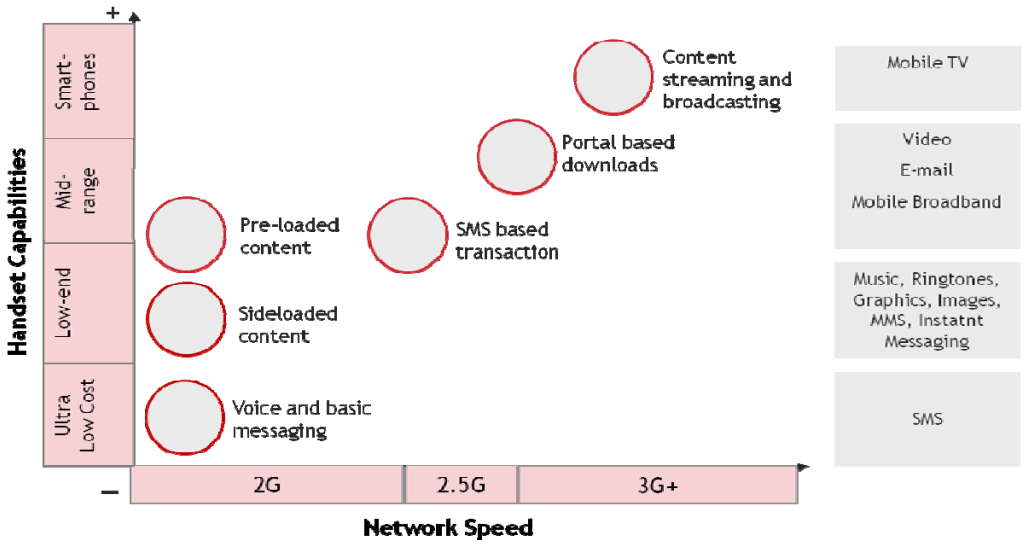
Listeners like to call because it lets them interact with the show, express their views on the different topics that are raised in the show, request songs or say hello to family members, says Ndu Anyanwu, the station's managing director. He believes mobile service was the right choice for providing a valuable service to the community. Mr. Anyanwu notes that listener contributions go beyond traffic reporting, addressing concerns of travelers such as police behavior, corruption, road crime, accident reporting and infrastructure monitoring.

## 4.7 The impact of mobile services on the entertainment and marketing sectors

At the global level, the mobile entertainment industry has experienced explosive growth over the past few years propelled by the growth in mobile data. Pyramid Research estimates that global service revenue from data services [20] reached $214bn at year-end 2009. Messaging, information services (news, weather provided through SMS) still account for the bulk of mobile data revenue: 50% in 2009, down from 54% at year-end 2008. Going forward, we expect mobile applications (music, video, browsing/WAP) as well as mobile broadband access to be the main drivers of the market.

Consumption and delivery of mobile entertainment content tends to follow an evolutionary path driven by advances in handset capabilities, by the availability and cost of bandwidth and by the pace of development of the local content industry. During the initial stages of a country's mobile entertainment industry, which applies to most emerging markets with low consumer spending, mobile users generally leverage basic platforms such as SMS and side-load the content informally and often for free from friends and peer-to-peer websites. SMS-based transactions also help the delivery of content, most frequently ringtones and music, to prepaid subscribers. These transactions are initiated by a request sent by subscribers to a short code designated by the operator or a third-party content provider for a premium rate that covers the content price, which is deducted from the subscribers' balance. Once the transaction is complete, the content is then downloaded to the subscriber's handset over the air. In more developed markets, consumers access entertainment services more directly, often using smartphones and 3G networks to connect through mobile-operator or third-party mobile-specific portals to multimedia content.

**Exhibit 127: Evolution of mobile entertainment services**




*Source: Pyramid Research, 2009*

Entertainment applications for mobile handsets are not limited to the downloads that can be offered on a mobile portal. Handset vendors have entered into agreements with content developers to pre-load games and music on their devices. In

[20] Pyramid Research defines **mobile data** as:

- **Messaging services**, which include SMS, MMS, email and other messaging services.
- **Mobile applications**, which include ringtones, graphics/images, games, browsing/WAP, music and video.
- **Mobile broadband**, which includes Internet access from computers using data cards or embedded modems.

markets where 3G+ networks have been deployed, content streaming is gaining ground as the preferred method for enjoying video and audio entertainment. Initiatives across emerging markets are being promoted by global technology players such as Google and Apple as well as regional mobile players such as America Movil in Latin America.

**Exhibit 128: Examples of mobile entertainment initiatives**

| Application provider | Delivery mode | Specifics | User experience |
|---|---|---|---|
| Google mobile<br>**Google** in Uganda (third party) | SMS-based trading: Google Trader | Google Trader is a new SMS-based mobile initiative in Uganda | MTN users can:<br>• Post ads<br>• Find ads<br>on Google Trader by sending a free (during trial period) SMS to a short code. |
| Claro<br>**Claro** in Argentina (mobile operator) | Preloaded content: The Fergie Phone | Claro offered a Fergie-themed Motorola device | Pack includes:<br>• Four songs by Fergie<br>• One complete video and 30-sec overview of other videos<br>• One wallpaper |
| mxit JOIN THE EVOLUTION<br>**MXit** in South Africa (third party) | WAP-based instant messaging and social networking platform | MXit application can be downloaded to any GPRS/ EDGE phone and used on any operator network | MXit users can:<br>• Chat with other Mxit, AIM, Yahoo Messenger, Google Talk, ICQ and MSN users for much cheaper prices per message.<br>• Upload and vote for picture, music and videos<br>• Buy Skinz |
|  <br>**Apple** iPhone in multiple markets (handset vendor) | Content streaming: YouTube | YouTube application comes pre-installed on the iPhone | Users on 2.5 and 3G networks can:<br>• Search<br>• Watch<br>• Add to Favorites<br>• Add to Playlist<br>• Share video clips uploaded by other users. |

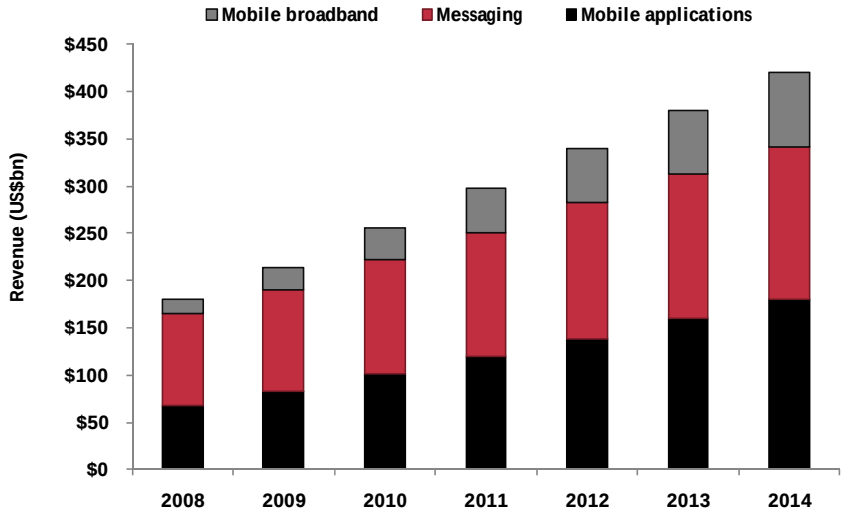
*Source: Service providers; Pyramid Research, 2009*

Mobile operators are also looking at broadcasting as a means of content delivery. Broadcasting offers the ability to distribute content to multiple subscribers at the same time — one to many. The most successful of these initiatives are mobile TV offerings driven by cooperation between operators (which have a wide subscriber base, distribution channels and extensive infrastructure) and content providers (which provide premium content).

Advances in 3G+ network deployments, increasing demand for mobile broadband and cheaper handsets with advanced media capabilities will lead to higher uptake of music and video services in both developed and emerging markets. Pyramid Research forecasts that in the 2009-2014 period the fastest growing revenue stream will be mobile broadband (defined as Internet access via data cards/modems), with a CAGR of 25%; it will be closely followed by video (24%), other messaging (23%) and mobile music (22%). The growth of mobile entertainment [21] revenue is piggy-backing on mobile broadband growth.

In most of the Africa and Middle East region (AME), end-user spending on services other than voice is still at an early stage, contributing only 15% of total mobile service revenue generated by operators in 2009 compared with a global average of 25%. This slow uptake is the result of multiple factors, most prominent of them low disposable income. Late deployment of 3G networks in sub-Saharan Africa is also a major factor behind the sluggish uptake. In the absence of these networks, slow download speeds for content discourages even those who have the means and interest in such content. Of the 15% of total mobile service revenue generated by mobile data in AME in 2009, messaging contributed 69% compared with 50% globally, while mobile applications (excluding mobile broadband) contributed 18% compared with 39% globally for the same year.

**Exhibit 129: Breakdown of global mobile data revenue, 2008-2014**




*Source: Pyramid Research Mobile Data Forecast, 2010*

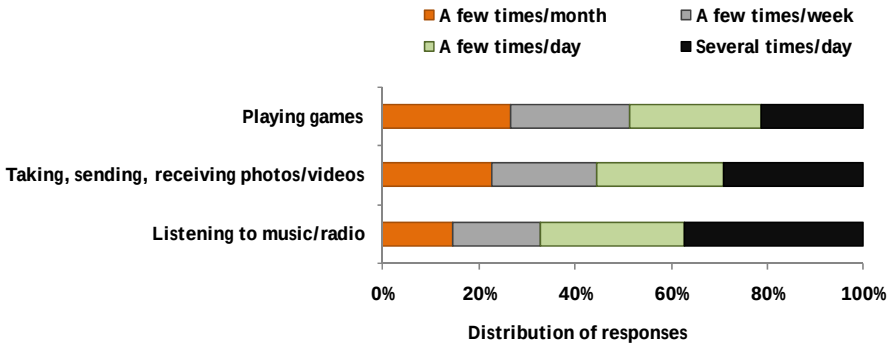
### 4.7.1 Mobile services and the entertainment sector in Nigeria

In Nigeria, uptake of paid-for mobile entertainment services is still low, with mobile data contributing an estimated 7.9% of total mobile revenue generated by mobile operators in 2009.

Pyramid Research's survey of Nigerian mobile users suggests Nigerians do use their mobile phones on a regular basis for entertainment purposes, mainly offline. Of all interviewees, 90% claim to use their mobile phones for entertainment purposes, compared with about 50% for work-related and 30% for education-related matters. Survey data also shows that 50% of Nigerians who have a phone use their handsets to listen to music, 46% to play games and 36% to take, send and received pictures and videos.

[21] Defined as graphic, ringtones, games, browsing/WAP and music

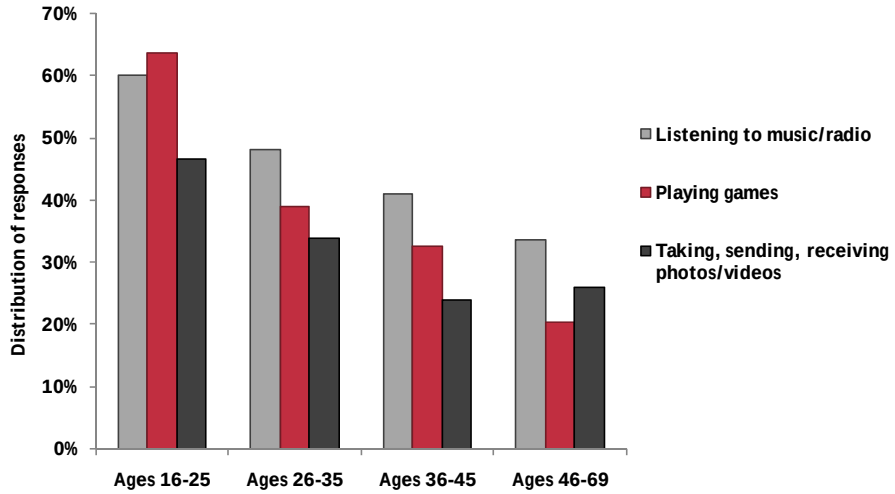
**Exhibit 130: Frequency of use of mobile entertainment among Nigeria's mobile service users, 2009**




Note: Multiple answers were accepted; n=1,983.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

A further breakdown of survey results shows that younger Nigerians (aged 16-25 years old) are the most inclined to use handsets for entertainment purposes. Among interviewees in this age bracket, 64% use their phones to play games, 60% to listen to music and radio, and 46% for picture- and video-related activities.

**Exhibit 131: Adoption of mobile entertainment services among Nigeria's mobile users by age group, 2009**




Note: Multiple answers were accepted; n=1,983.
*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Mobile operators' efforts to promote mobile entertainment in Nigeria have witnessed a strong uptick in the past year. All GSM operators have beefed up their mobile entertainment and application content offering. Most commonly known of these services is the ringback tone application. New initiatives such as MTN's Google SMS Search, Zain's Chat (instant messaging) and Etisalat's SMS to Facebook also look promising, with encouraging initial feedback.

**Exhibit 132: Mobile value-added services by the top three mobile operators in Nigeria**

| Service | MTN | zain | glo | etisalat |
|---|---|---|---|---|
| Ringback tones (RBT) | ✓ | ✓ (limited rollout) | ✓ | ✓ |
| Ringtones | ✓ | ✓ | | |
| Songs | ✓ | | | |
| Clips | ✓ | | | |
| SMS to Facebook | | | | ✓ |
| Chat | | ✓ | | |
| Google SMS | ✓ | | | |
| Wallpapers | ✓ | ✓ | ✓ | |
| Information: football, news and other entertainment | ✓ | ✓ | ✓ | |
| Mobile TV | ✓ | | | |
| Games | ✓ | ✓ | ✓ | |

*Source: Operators; Pyramid Research, 2009*

One of the most innovative mobile entertainment offerings in Nigeria is a mobile TV service that combines DStv's premium content and MTN's mobile platform. The pay-TV market is fiercely competitive, driven by a group of direct-to-home (DTH) satellite service providers, led by DStv, HiTV and the most recent market entrant, DAARSAT. We estimate that Nigeria had about 2.5m fixed-line TV subscribers at the end of June 2009, that 98% of them received some form of DTH service, and that about 25% of them were paying subscribers.

Since its entry in 1994, DStv, a subsidiary of MultiChoice South Africa, led the Nigerian pay-TV market with a mix of local and international content and a focus on sports. The entry of HiTV in 2007 brought in competitive prices and stronger local content, and DAARSAT's entry in 2008 also generated a considerable response due to its prepaid business model and attractive hardware and service packages.

DStv faces an increasingly competitive environment across a footprint of 48 markets in Africa, including in Nigeria. The challenges are caused by its low-cost business models and a focus on local content. However, given its wide footprint and scale, DStv enjoys substantial economies of scale, which it leverages to secure premium content, including broadcasting rights for much-prized international football (soccer) games.

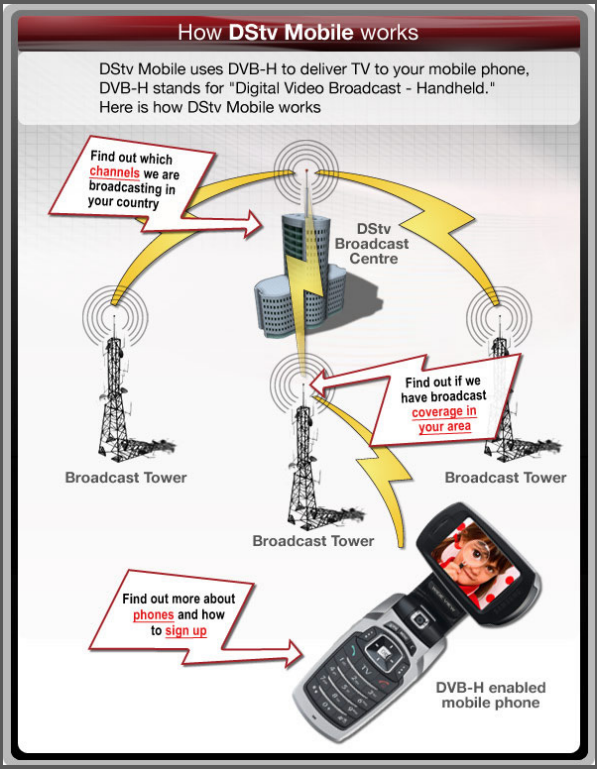
A mix of intensifying competition, the need to stay at the forefront of the market and an attempt to expand its distribution footprint prompted the company to look toward mobile technology and to implement a multiscreen strategy: at home and on the move. Other initiatives to reach out to consumers and facilitate interaction with them include a partnership that DStv struck with Nigerian banks FinBank and FCMB and mobile operators to facilitate online, mobile and ATM bill payments.

# CASE STUDY: DStv and MTN partner for mobile TV service in Nigeria

DStv, in partnership with MTN, launched DStv Mobile in Nigeria on a trial basis in April 2008.

- DStv provides DTH pay-TV service in 48 countries across Africa and is the leading pay-TV provider in Nigeria.
- MTN is a pan-regional mobile operator in Africa and the Middle East, and the leading mobile operator in Nigeria.
- The DStv Mobile service is based on DVB-H technology, which broadcasts live TV to eligible handsets.
- The TV signal originates from the DStv Broadcast Center and is relayed by broadcast towers to handsets.

**Exhibit 133: DStv mobile broadcast**




*Source: DStv, 2009*

- The original launch covers areas in Lagos, Abuja and Ibadan, with plans to expand to other areas.
- The subscription costs N1,500 (about $10) per month and is positioned as an entertainment on the go targeting daily commuters.
- Subscribers were offered a free three-month subscription, but the subscribers needed to purchase a new phone, the DVB-H-capable ZTE F912, from an MTN service center for N45,000 (about $300).

- DStv Mobile offers 10 channels, covering the areas of entertainment (Africa Magic, Cartoon Network, Magic World and NTA2), lifestyle (Channel O and TBN), News (CNNi) and sports (Super Sport 3, Super Sport 9 and Super Sport Update) (see Exhibit).

**Exhibit 134: DStv mobile channel offering**


*Source: MTN Nigeria, 2009*

In June 2009, DStv announced a new agreement with Nokia Siemens Networks to expand its DStv Mobile network in four African countries: Ghana, Kenya, Namibia and Nigeria. The expansion will also bring a shift in the standard used to support the service, from the outdated IPDC standard to the OMA BCAST standard.

The network expansion will be accompanied by adjustments to the business model. DStv brought on board Nokia, which will be offering a free 12-month DStv Mobile subscription with the purchase of a DVB-H-capable handset. Nokia's range of capable devices (built-in or with the addition of a Nokia mobile TV receiver) currently includes the N79, N85, N86, N79, E75 and Nokia 5800 XpressMusic models. These devices offer consumers a wide choice of handsets with different functionalities and price points. Nokia Nigeria's general manager, Philip de la Vega, announced that the range of devices will be expanded in the run-up to the 2010 World Cup.

DStv also plans to expand its package offers and the length of subscriptions, providing three different packages, the ability to purchase content on demand and different pricing schemes for different subscription periods. These changes will enable players to attract new segments of the Nigerian mobile market.

## Annex: Methodology of end-user survey for this study

With the goal of analyzing the impact of mobile telephony on Nigerian society and understanding the value of mobile technology in the general population's day-to-day activities, Pyramid Research carried out a survey of over 1,500 Nigerian mobile phone users.

In order to secure participation and ensure the quality and consistency of consumer feedback, Pyramid Research developed a questionnaire comprising mostly closed-end questions. The main topics covered in our interviews were as follows:

- Determinants of mobile ownership
- Drivers of usage
- Purpose and pattern of mobile phone usage, including:
  - Work-related activities
  - Entertainment and access to information
  - Access to health, education, financial and logistics/transportation information and services
- Perceived changes in patterns and benefits of economic activity among mobile phone users
- Perceived changes in work practices and networks of social contacts among mobile phone users

Data was collected via a combination of phone-based and face-to-face interviews in households and high-traffic pedestrian areas.

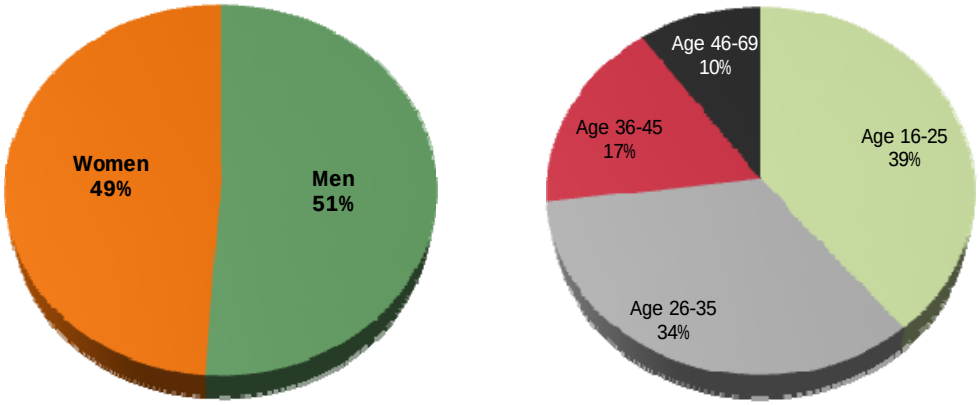
**Exhibit 135: End-user survey execution in the interviewee's house, 2009**

*Source: Pyramid Research, 2009*

The sample group of our survey is representative of Nigerian society, including a combination of female and male participants. The research was designed to include mobile users living in different parts of the country, with 70% of interviewees living in urban areas and 30% living in rural areas in the following regions and cities: Lagos, Abuja, Kano, Akure, Kaduna, Ibadan, Jos, Aba and Enugu. In terms of age groups, we focused the study on the 16-69-year-old population, assuming that these users not only represent the overwhelming majority of overall mobile subscriptions in the

country but also that — given their active role in the economy — people in this age bracket use their mobile phones across a wider variety of activities.

**Exhibit 136: End-user survey interviewee profile by gender and age group, 2009**




Note: n=1,500.

*Source: Pyramid Research survey of 1,500 mobile service users in Nigeria, 2009*

Among our interviewees, the overwhelming majority (99.3%) own a personal mobile subscription, with only a few sharing a mobile subscription with another family member at no cost. Among those who claim to have their own subscription, we looked at multiple SIM ownership: 71% have one mobile subscription (one SIM card) in operation, while 22% have two mobile numbers and 6% have three mobile subscriptions in service. These proportions vary between rural and urban areas, with rural respondents having a higher rate of one-phone subscriptions, 79%, compared with 68% in urban areas.

**Exhibit 137: End-user survey interviewee profile by urbanization and location, 2009**

| Location | Number of urban interviewees |
|---|---|
| Lagos | 150 |
| Ibadan | 201 |
| Akure | 135 |
| Kano | 222 |
| Kaduna | 147 |
| Abuja | 154 |
| Jos | 155 |
| Aba | 201 |
| Enugu | 135 |
| **TOTAL** | **1,049** |
| **PERCENTAGE** | **70%** |

| Location | Number of rural interviewees |
|---|---|
| Ikorodu | 45 |
| Maniya | 60 |
| Ikere | 40 |
| Osisioma | 67 |
| Emene | 44 |
| Jogana | 47 |
| Rido | 48 |
| Bukuru | 60 |
| Lugbe | 40 |
| **TOTAL** | **451** |
| **PERCENTAGE** | **30%** |

*Source: Pyramid Research, 2009*

**Notes:**

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