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Mobile Technologies

A Case Study of the Global System of Mobile Communication (GSM) in Nigeria

Adeyinka Tella, 'Niran Adetoro, and Paul Adesola Adekunle

This paper presents a case study of the implementation of the Global System of Mobile Communication (GSM) in Nigeria, that started in 2001. The paper includes a discussion on the nature of this system, a brief history of GSM in Nigeria as a success story, demographics of users, benefits, problems/challenges and recommendations for future development and improvement of GSM services in the country. It also provides some insights into the problems developing countries face in this industry compared to those of the developed world.

Keywords: Africa, Case Study, Communications, GSM, ICT, Information and Communication Technologies, Nigeria.

1 Introduction

There is no doubt that communications are a major driver for any economy. Emerging trends in socio-economic growth show a high premium being placed on Information and Communication Technologies (ICT) by homes, organisations, and nations. Improved Information Technologies (IT), especially as far as digital computer systems are concerned, are becoming more affordable and accessible to an increasing number of people. Communication technologies, coupled with the advances in information technologies, are innovations which allow voice and data to be communicated anywhere in the world at affordable cost thus enabling a significant number of people, rather than limiting its accessibility to small minority of people. ICT have also permitted a range of technological and institutional developments. These developments represent a major break with the past that is

Authors

Adeyinka Tella is a graduating commonwealth doctoral student and Teaching Assistant in the Department of Library and Information Studies, Faculty of Humanities, University of Botswana. He has wider research areas of interest. These include information system and management, e-learning system, psychology of information, digital divide, and information communication technology and education, etc. <tellayinkaedu@yahoo.com>

'Niran Adetoro received the Ph.D. degree in Library and Information Studies from The University of Ibadan, Nigeria, in 2008. He was formerly a librarian at the Tai-Solarin University of Education Ijebu-Ode, Ogun State, Nigeria and currently a lecturer in the Department of Library and Information Studies at the same university. His research interest is in the area of information technology. <niranadetoro@yahoo.com>

Paul Adesola Adelunke is a PhD student at the Abadina Resource Center, University of Ibadan, Nigeria, and a Librarian at the Bowen University, Iwo, Osun State, Nigeria. <adekunlesola1@yahoo.com>

producing significant qualitative changes in what is being produced, where, how and by whom. The changes are cumulative and incremental. There are already signs that ICT are beginning to transform systems of production and the relationships between firms and States in the international economy. These changes are accelerating because technological advances continue to bring about reductions in the costs of ICT. As cost reduces, the range of possible applications expands into new areas. One of the new areas or innovations brought about by ICT is the Global System for Mobile communication (GSM).

2 The Nature of GSM in Nigeria
The world is fast becoming a glo-

bal village and a necessary tool for this process is communication of which telecommunication is a key player. The quantum development in the telecommunications industry all over the world is very rapid as one innovation replaces another in a matter of weeks. A major breakthrough is the wireless telephone system which comes in either fixed wireless telephone lines or the Global System of Mobile Communications (GSM). GSM is a technology widely appreciated and accepted by Nigerians as it has helped in various aspects of the economy.

Mobile phones are more than just a fixed-line alternative; however they are now recognised that they are also 'mobile'. This 'communications on the move' means people can engage in development activities that previously would not have been possible. For example, mobile phones enable State surveillance and also allow citizens to monitor the State.

GSM is multi-functional with many opportunities, by means of which many of the world's poor communities have access not just to a phone but to a camera, calculator, audio player, video player, timepiece and good enough a platform for email and Web use. GSM is also cross-functional by bringing together services that cut across existing boundaries and present governments with new platforms for taking decisions.

GSM technology is one of the leading digital cellular systems. GSM uses narrowband TDMA (Time Division Multiple Access), which allows eight simultaneous calls on the same radio frequency. It is considered as the most advanced digital cellular technology. GSM networks are leaders in many typical digital services including the Short Message Service (SMS), Over The Air (OTA) configuration and GSM positioning. The SIM card (Subscriber Identification Module) is also a unique and essential component of GSM phones. Technically, GSM was built based on the TDMA protocol.

3 Brief History of GSM in Nigeria

In July 1999, the reigning President of the country announced plans to privatise Nigeria Telecommunication Limited (NITEL, as it is known), which previously monopolised telecommunication operation in Nigeria. Since then a number of operators have entered the market, including Em international (EMIS), Prest Cable, Motophone Nigeria and Wireless Systems Nigeria. So far these companies have concentrated their services on urban. Nigeria has had a very limited telephone network for many years and the waiting list is estimated to be over 10 million prospective subscribers who have applied to the operators for their services. About 6 cities have IDD (International Direct Dialing).

The replacement of Nigeria's outdated telecommunications infrastructure through both multilateral and Nigerian funding still constitutes a priority program of the Nigerian government. NITEL has approved eight private firms to be connected to its switching system in order to provide services to different Nigerian zones. Seven of these firms, VGC Communications, Mobitel, Multilinks, Intercellular, EMTelecommunications, Spar Communications and GSM Celia commenced operation in Lagos area [12].

In August 2001 the first Global System for Mobile (GSM) communications call was made under a democratic government. This event heralded the dawn of a new era, "the era of GSM technology", which has completely changed the way of doing business in Nigeria. Prior to 2001, the number of connected phone lines in the country were a mere 450,000 for an estimated population of 120 million at the time and the level of investment in the telecommunications sector was just about US$50 million only [4]. Six years after, the growth in telecommunications sector is unmatched by any other sector and it has recorded a phenomenal growth both in terms of subscribers' base and infrastructural development in the country. In January 2001, the commission conducted an auction for digital mobile licenses. This auction was acclaimed locally and internationally as one of the best in the world due to its high level of transparency. The auction brought about the emergence of three mobile Operators: ECONET Wireless now (Zain), MTN and MTEL, an offshoot of the incumbent operator NITEL. In 2002 a fourth Digital Mobile License (DML) was issued to Globacom (Glomobile) through another transparent auction process. To further increase competition, a fifth mobile license (with GSM spectrum) was awarded to Emerging Market Telecommunications Services Limited, otherwise known as Starcoms, in 2005.

However, four years after the first GSM trail was blazed, the GSM industry in Nigeria has changed tremendously. Competition for subscribers is getting fierce. Operators have resorted to "price wars" in order to win subscribers. Subscribers, on the other hand, have more choices than ever regarding which GSM operator to use. To attract, maintain and move subscribers to high-value services such as voice, data and multimedia applications, network operators must provide high quality services. Providing quality services will require monitoring and quality assurance with a view to optimize the network. The ever increasing number of GSM operators with its lower tariffs on calls has led to continuously increasing number of subscribers, which has made Nigeria the largest GSM market in Africa overtaking and beating South Africa.

4 Demographics of GSM Users in Nigeria

In Nigeria there were about 450,000 connected lines in May 1999 which had increased to over 38 million lines by July 2007, boosting teledensity growth from 0.4% to 24% [10]. As mentioned before, early in 2008 Nigeria overtook South Africa to become the continent's largest mobile market with over 44 million subscribers. New customers are currently signing up at a rate of almost one per second [5]. The capacity for growth in the number of phone lines in the country over the next decade remains quite high, as some parts of the country are yet to be covered.

5 Benefits of Mobile Telephony in Nigeria

Nigerians have benefited immensely from the advent and maturity of a mobile telephone system. Many Nigerians now have easy and quick access to the phone, whereas compared to when mobile telephones were introduced in 2001, only rare and wealthy Nigerians could afford telephone lines

[12]. Different categories of the population can now afford to own a mobile line. According to [9] it is instructive to note that while connected lines only grew at an average of 10,000 lines per annum in the four decades between independence in 1960 and the end of 2000, between 2001 and 2003, an average growth rate of over 1 million lines per annum was attained; as of September 2003, Nigeria had attained over 3 million lines (2.3 million of which were digital mobile lines). Total teledensity, which had been 0.4 lines per 100 inhabitants in 1999, stood at 2.6 per 100 inhabitants by September, 2003. Ndukwe goes on to explain that this progress is largely due to the liberalisation of the Nigerian telecom market.

Essentially the advent of GSM in Nigeria in 2001 has generated a huge number of employment opportunities for all categories of the Nigerian population. Uko asserts that the advent of GSM sub-sector has added fillip to the Federal Government's wary battle against unemployment [17]. Since 2001 when the three GSM companies became operational, some 3,000 people have been directly employed by MTN, Econet and M-Tel, while Globacom's entry into the market added a couple of hundreds to the class of people who have been employed. However, the number employed indirectly by the GSM sub-sector is immeasurable because scores of new businesses have come about courtesy of the sub-sector. The list is endless, from various levels of dealerships, to the cellphone vendors, and suppliers of accessories, repair shops, the static and the itinerant call shops and street recharge card hawkers. This technology has to some extent alleviated the problem of unemployment in the country.

Corroborating the point above Omeruo remarks that some of the blessings of mobile communication in Nigeria have been directly or indirectly on the common people, the corporate and business worlds, and the society at large [14]. Job creation and employment are some of the good things that GSM brought to us, the sector been the highest employer of both skilled and unskilled manpower in recent times. A great number of people, especially young graduates, have been given employment in the GSM companies where they make a living and are useful to their families. This somehow has reduced crime rate.

Omeruo goes further to say that, apart from this direct employment, jobs have been created where many people are self reliant doing their own GSM businesses, one of such business is making calls and the sale of recharge cards to GSM users. This business is popularly known as business centers or call centers. Looking around the cities, towns and even villages one will hardly walk about two poles without seeing a business center mainly characterized by the use of umbrellas, kiosks and even shops painted with the colors of the mobile service providers. It is easy to start because it requires little initial capital, in fact all you need is your umbrella as a shade, a stool, a table and your handset loaded with calling credit of any amount starting with as little as 100 nairas (Nigerias' currency, approx. 0.50 euros). This has provided a means of livelihood for many people who would have been unemployed otherwise. Some have also learnt the technical aspect of the business of repairing and fixing of mobile phones in their repair shops-mobile or stationary as the case may be.

On the social benefits of GSM to the Nigerians, Omeruo points out that Nigerians have benefited from the corporate social responsibility of service providers and phone companies [14]. Some have provided educational facilities, AIDS campaign awareness and amelioration, state-of-the-art ICT labs to educational institutions, scholarship awards to indigent and deserving students, financial and equipment donations to hospitals and sponsorship of several events. One of such events is the Globacom Premier Football League in Nigeria and the African continent with the Confederation of African Football (CAF) been the beneficiary. This usually involves setting aside huge amount of money for sport and football development in Nigeria, the host community, in particular and African Continent in general. Many individuals have also benefited from these companies by being their ambassadors.

Nigerian social life has also being impacted on. Relationships with friends, relatives and loved ones are kept alive through phones calls. In this sense Omeruo says: "I have personally benefited from the mid night free calls being offered by MTN, I have good time to talk to my friends and loved ones" [14, p. 4].

Other by-products include the fact that GSM has greatly reduced the need and frequency of travelling for those who possess mobile phone and have access to it. Instead of travelling to deliver some messages, people just make the call and thus reduce the incidence of road accidents in the country.

Olatokun and Bodunwa, in a study on GSM usage conducted at the University of Ibadan, Nigeria, remarked that GSM helps in proper management of Nigerians' time [13]. That is, it has allowed for efficient use of their time. Students can call to find out when a class or examination will hold, lecturers can be called to know if a class would hold or not. Of the respondents, 274 (68.2 percent) agreed that GSM is better than landline telephony. This can be viewed from the point that GSM phones can easily be carried about, small and compact, convenient to use and have various subscriber services compared to landline phones.

Moreover, Ndukwe points to another benefit of GSM to Nigeria by emphasizing that business transactions are far more productive and yet cheaper and more convenient than they used to be [9]. Citing the example of a journalist, sourcing for news, conducting interviews, reverting to bosses or subordinates as the case may be, has become far more seamless and productive than it used to be. The mobile phone is empowering every social class upper, middle and lower. Ndukwe concludes that if there is a list of outstanding dividends of Nigeria's transition to democracy in 1999, GSM must rank very high on that list if not top it altogether.

On his own Aihe emphasized that another gift of GSM to Nigeria is that it exemplifies the strength and beauty of industrial regulation [2]. While the uninformed may not fully appreciate the complexity of telecom regulation especially in a developing country like Nigeria, the truth is that the Nigerian Communications Commission (NCC)

in the last 7 or 8 years has shown the country and the continent at large how telecom regulation ought to be carried out in order to preserve the delicate balance of interests between investors/financiers, government and telecom subscribers respectively. It has demonstrated that there are times when moral suasion should be applied and times when force should be applied and yet other times when market forces should be allowed to play their role.

6 The Success Story of GSM in Nigeria

Nigeria is often identified as the fastest moving economy and one of the most advanced ICT market sectors in the Africa. It has the largest population in Africa and Nigerian market's high level of sophistication makes it an exciting and attractive market. In just a few years, Nigeria has become the Telecom hotspot in Africa for both telecom operators and equipment suppliers.

In 2004, Nigeria now has about five million mobile lines and about one million fixed wireless lines, compared to just about 450,000 NITEL working lines three years before. Since the GSM launch, mobile telephony has rapidly become the most popular method of voice communication in Nigeria. Growth has been so rapid that Nigeria has been rightly described by various commentators as "one of the fastest growing GSM markets in the world".

The number of connected mobile phones in the country rose from 266,461 in 2001 to 32,322,202 units in 2006, indicating a monumental increase of 12,030.18 percent. According to the NCC, the total number of mobile subscribers in the country stood at 18.6 million at the end of 2005, a penetration rate of around 16% and close to the regulator's predicted end-year figure of 20 million. The NCC said it hopes to see the total number of subscribers grow to 50 million by 2010. At the end of 2005, there were 1.22 million fixed wireless line customers in the country.

In 2007 Online Nigeria.com stated that the mobile phone sector has been a booming industry [15]. At that time there were approximately 1.25m landlines in Nigeria, whereas there were more than 30m mobile phone subscribers. Analysts believed that this growth would continue, with Nigeria overtaking South Africa to become Africa's largest market by the end of 2007.

In the first nine months of 2007, the country's four mobile operators – MTN, Globacom, Celtel (presently Zain) and M-Tel – added over 7mn net additions to take the market total to almost 37mn subscribers. Given this robust growth, the mobile sector comfortably met the year-end target of 39.4mn, taking mobile penetration to almost 30%. A number of major contract announcements prove that operators are still in full expansion mood, with MTN securing a US$2bn loan to fund its network expansion over the next five years. Meanwhile, in December 2007 Globacom became the first operator to launch commercial 3G services in Nigeria. The service was initially available only in the cities of Lagos, Abuja and Port Harcourt, although Globacom said that they will be extended to other major urban areas in due course [6].

In 2008 AfricanLoft.com revealed [1] that Nigerians woke up to read about the sustained growth of the positive surprise that is now synonymous with the nation's telecommunication sector – telephone subscribers were 46.2 million! Having about 10% of the population as mobile phone subscribers is indeed a landmark for the Nigeria Telecoms sector –an industry that commenced within the last decade. However, it's ironic that the new subscriber figures were released about the time it was almost impossible to have a five minutes mobile phone conversation without losing signal.

The advent of GSM has brought about new opportunities and challenges particularly to the millions of its users across Nigeria.

Many Nigerians believe that the GSM revolution in Nigeria is the second independence for Nigeria, considering the ample opportunities it offers and the ability it provides for stress-free communication. There is no doubt about the fact that Nigeria GSM market is growing at an astronomical rate. Going by the current statistics, Nigeria – that currently account for 14 percent of Africa's total mobile users – is expected to increase the number of users by 5 percent before the year ends. In addition, the country is expected to add 13 million subscriptions above the year 2006, which increases the subscriptions to 44 percent.

Based on the information above and available statistics of GSM subscription and utilisation from the time it was introduced in Nigeria in 1999 till date compared to other African countries, one can emphatically and unequivocally conclude that GSM has been a success in Nigeria.

7 Problems of GSM in Nigeria

Every good invention comes with its attendant shortcomings. The same is true for GSM. Due to daily expansion of the GSM technology, the networks continues to experience problems such as difficulties in interconnectivity, network congestion, loading of recharge cards and occasional and abnormal billing practices engendered by infrastructural breakdown. These problems associated with GSM since its introduction in Nigeria will be discussed in this section. Both the technical and social problems of GSM in Nigeria will be considered and possibly offer solution and the way forward to overcome the problems.

There are several challenges facing the GSM sub-sector in Nigeria. One of these is the need to extend mobile coverage to every nook and cranny of Nigeria. At present, mobile coverage is yet to be extended to 40 percent of Nigeria geographical spread. This means that people in those areas cannot benefit from the effects of mobile telephony. It should be noted that most of the uncovered areas are the rural parts of the country where about 70 percent of the inhabitants dwell.

Another challenge is the need to increase the number of mobile phone subscribers. Nigeria is a vast country with a population of approximately 140 million inhabitants. Thus, most of the inhabitants are not telephone subscribers. Though the number of subscribers keeps increasing since the advent of GSM in Nigeria, more efforts need to be made by the operators to ensure that most Nigerians own and use mobile phones. Some steps can be taken by the operators to achieve this.

Ndukwe has identified some challenges faced by the Nigerian telecom

sector [9]. He notes that for starters, telecommunication is a highly capital intensive business, requiring massive importation of equipment from abroad and therefore massive funding. Telecom operators in Nigeria had suffered from the timidity of major local financial institutions in and the lack of access to long-term capital. The industry is also held back by the lack of reliable transmission infrastructure in the country, which has forced the major mobile operators to divert network access resources to build their own infrastructure and has led them to review their financial and business plans. Furthermore, lack of sufficient interconnectivity resources and facilities within both NITEL and M-Tel networks continue to hinder seamless interconnection. However measures are being pursued by the new management of NITEL and M-Tel which hopefully will result in full interconnection soon.

Operators also contend with inadequate and erratic electricity supply, poor security and vandalisation. Ndukwe highlights additional problems to include;

■ overcoming shortage of trained and qualified manpower;

■ financing and implementing expansion of telecommunication facilities which must go side by side with the development of the human resources capacity that will support the industry;

■ the telecoms sector must develop personnel knowledge, skill and competencies to understand the complex linkages of wireless networks, optic fiber, satellite systems, computer-to-computer networks, Internet, webs and a host of other telecommunications technologies;

■ this new sector also needs well-trained personnel in other specialist areas such as finance, planning, law, accountancy, consultancy services, business management; computer science, personnel management and so on [9].

These challenges must be addressed if GSM is to attain advanced stage in the country and if the inhabitants are to derive optimal benefits from mobile telephone services.

The main barriers to mobile phone growth amongst non-users have been identified as insufficient income (41%) and high price of handsets (27%) [9]. This is in line with research by the global GSM association that pinpointed the cost of handsets as the single biggest obstacle to affordability in emerging markets. It becomes imperative to work with mobile handset vendors to target cheap and affordable phones. Handset manufacturers (particularly Motorola) have pioneered an initial US$50 handset that over time as demand increases will fall to US$40 [9]. This sounds promising, but it would remain a challenge since nearly 80% of distribution in Nigeria is in the so-called "grey market" where dealers seek to maximize price reductions. Estimates show that for every appointed dealer there are about 30 grey market dealers. Though such a disordered market structure often makes it frustrating for manufacturers in this field to increase sales, it does ensure that competition brings down prices. Doubtless many of the phones sold are either secondhand or refurbished and their sellers have mostly avoided paying import tariffs.

7 Recommendations for Future Development of GSM

The statistics that over 16 million handsets have been sold so far, there are 32.2 million mobile lines in Nigeria in 2007, with the number of mobile lines increasing to 43 million within the first part of the year 2008 and a projection of about 76 million mobile lines come 2011, are indicators of how the market is and where it is going. Many people have actually tapped into this boom. There is no doubt about the fact that there the number of subscribers and GSM service providers will keep increasing. In this light, the following recommendations will be helpful for future development of GSM in Nigeria.

GSM providers should consider extending their services to the uncovered areas. Cost of obtaining a line and buying recharge cards should be reduced in order to meet this challenge. Contributions to home safety and emergency networks, improved interpersonal communications and more business efficiency are some of the key objectives. GSM operators should help create the conditions that will help to generate public empathy more easily. A more disciplined approach to cus-

tomer acquisition and better customer care would definitely top the list of these conditions.

Governments in these countries should open up their economy to full participation by local and international private companies; eliminate monopolies and the abuse of market dominance; ensure a minimal, but transparent, regulatory intervention; locate and satisfy people's demand for services; encourage the use of open standards, protocols and technologies; protect the consumer from ill-treatment by operators; reduce rural-urban migration by encouraging geographical spread of services; and remove bureaucratic bottlenecks relating to trade and imports.

There should be a policy in which a certain percentage of the profits made by the GSM operators is invested back in the economy. There is still a lot to be done in the Internet and fax capabilities of GSM mobile phones in the country. The low/slow data-carrying capabilities of GSM telephones mean that businesses, government agencies, educational institutions, individuals, etc are still not fully reaping the benefits of telecommunications [13]. An upgrade in the communication standard is therefore recommended. Though an increasing number of Nigeria dwellers are hooked to the networks, the operators still need to ensure that problems of interconnectivity, limited mobile coverage, high cost of services, shortage of trained and qualified manpower, low financial capital etc. are tackled so that Nigerians can take full advantage of mobile telephony.

When all these are put in place, it is believed that Nigeria, and indeed developing countries the world over, can exploit the full opportunities offered by GSM. It means essentially that increasing GSM use will certainly positively enhance subscribers' professional and personal lives.

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