

## Untapped Capabilities of 2g in Nigeria Telecom Space

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### Abstract

The advent of 3G wireless technologies is obviously relegating the 2G network, gradually pushing them into oblivion. The shortcomings of 2G are the platform that brought about the development of 3G but this does not justify it to be scrapped. This paper will analyze these shortcomings and try to bring out the potentials of the 2G system which can still be garnered. This analysis will be based on the technology used by the system, marketing and the consumers.

### Keywords

Second generation for mobile communications, Third generation for mobile communications, General packet radio service, Global systems for mobile communication, Universal mobile telecommunication system, Wideband code division multiple access

## **Introduction**

2G technology has being said to have reached its capacity limit because of the lack of available channels i.e. the channels are totally used up (congestion). This is especially said in the urban areas which are traffic hotspots, due to the population of people subscribed to the service. During peak hours the operators may soon be unable to provide service for everybody in these traffic hot spots. But the lack of capacity in 2G systems alone does not make the building of 3G systems necessary.

Current phone usage is still mostly voice, and this traffic could be handled quite easily by just adding extra frequency allocations to 2G networks (e.g. from the UMTS spectrum[5Mhz]). Breaking it down, one GSM frequency carrier takes 200-kHz bandwidth and can accommodate eight traffic channels. Thus, one WCDMA 5-MHz frequency carrier could accommodate 25 GSM frequency carriers, translating into 200 GSM traffic channels. In practice, the number of traffic channels is lower, as control channels use part of the capacity, and also in TDMA systems, the same frequency cannot be reused in nearby base stations. Therefore, a 5-MHz frequency slice would offer lots of new capacity for a GSM system.

Apparently, the character of mobile communications will evolve considerably in the coming years, and data in their many forms will become more and more important. Voice will remain an important component in telecommunications, but quite often it will be combined with other types of information to form multimedia applications. The current 2G networks were designed to transfer voice traffic only; real-time multimedia can be transferred via the GSM phase2+ air interface only with great difficulty. GSM was designed at the end of the 1980s. The needs and expectations of the telecommunication world then were totally different from those of today.

Furthermore, the GSM system has evolved over the years very successfully to meet the new incremental demands, it has some problems that make it difficult to use for the emerging 3G applications. The biggest problem is the relatively inflexible air interface. An application that generates bursty traffic with several multimedia components cannot be effectively handled in GSM. The GSM interface cannot handle highly variable bit rates. The same connection cannot transfer services with different quality requirements. Speech, video, and other forms of data are multiplexed into multimedia services. The offered bandwidth is rigid and cannot be dynamically allocated as needed. This makes the spectrum use inefficient.

However, GSM technology is surely not at the end of its life. The enhancements to GSM, such as HSCSD, GRPS, and EDGE, has improved its capabilities considerably, and the result, 2.5G, is quite capable of handling many of the same applications that 3G is designed to handle.

However, GSM operators could also integrate some other radio access technologies into their networks to boost data rates; for example, WLAN systems can provide bit rates up to several tens of Mbps (100Mbps) in hot spots, which is much more than the standard UMTS can provide.

### *Mobile telecommunication consumers*

The mobile communication consumer market in Nigeria can be divided into three segments: high-end, middle-level, and low-end [2]. The high-end market includes businessmen, high ranking managers, field service engineers, and journalists who have the ability to pay and are frequently on the move and in great need of high-quality communication. It also includes early adopters of new mobile services such as young IT professionals and university students and researchers. All of the high-end users already have mobile phones and use them heavily.

The middle level market includes salaried or retired people and other students. These are people in moderate need of communications with local mobility. This group of people does not have high purchasing power. Their spending on communication is less than ₦ 1500 (US \$13) per month. Although most middle level users have mobile phones, they use them only when it is necessary. The low-end market includes farmers, low income workers and those who usually stay locally. Their spending on communications is less than ₦ 580 (US \$5) per month. The vast majority of them do not even have regular fixed-line phones.

3G as a more advanced technology than 2G/2.5G, the initial target market of 3G will be the high-end market who contributed a little less than 1% of Nigeria population(as at December 2007, Nigeria Communication Commission gave a position statement that only 40 millions of Nigeria population have access to telephone line either live or dead). 3G will be attractive to those who need additional high-quality mobile communication services, over and above what 2G/2.5G can provide and are willing to pay the premium.

### ***Cost Implication***

Deploying 3G is obviously a very costly venture and the aim of an operator is to satisfy customers and therefore make profit. The biggest operator investment will clearly be building out the radio access network part which is and does not include huge cost of license. This huge investment therefore requires a breakeven plan by the operator makes to bear on the consumers. A similar history of this can be seen in consumer reaction to the entry of GPRS service into the Nigeria Telecoms industry; it required enormous advertisement and promotions before a percentage of the consumer subscribed to its use. The High-end users, which were stated above sparsely utilized the service for some data and multimedia applications like music downloads, news alerts and internet access. Due to his high cost, the patronage of the service dropped.

Having said this, it is becoming increasingly clear that the deployment of 3G technology in Nigeria telecoms space may suffer defeat in term of patronage (at least at the entry stage). This may due largely to envisaged low market share or penetration of say, 1% of 40 millions of the Nigerian subscriber that have access to GSM (courtesy of NCC, December 2007), high tariff (N1/sec for video calling and 35k/kbytes of data), poor operator goodwill and actual necessity for such application where middle and low-level market constitute over 97% of the population. Except for the mentality of an average Nigeria who associates status for value may be a major reason to prove otherwise. Also, early adopters of new mobile services such as young IT professionals and university students & researchers may drive the market initially [2]. Therefore, the high cost of accessing 3G makes relegating 2G a difficult task.

### **Application types**

#### ***Multimedia***

A multimedia service consists of several media components such as speech, video, still images, and music, which are already available in use as single-media application in 2G. For example, news may be delivered to terminals as SMS messages in 2G, but in 3G, the same news service may include voice news accompanied with video clips or still images from the most interesting pieces of news. The market requirement shows that a larger chunk of this

application is required by middle level consumers which can remain on the 2G platform of the network. Therefore, 2G systems are still very much relevant in delivering multimedia to customers.

### ***Voice***

The ability of 2G systems delivering voice which is its primary intent cannot be swept aside, voice being an integral part of 3G would try in this aspect to overshadow it due to its abundant channel, but a proper channel management and increased bandwidth would bolster the relevance of 2G. The requirement is just the increased number of channels.

### ***Internet access***

Internet access is an application required in almost every sphere of communication. This application is relatively easy to implement in 3G terminals. 2G is basically circuit-switched, but upgrades of EDGE and GPRS bring packet switching into 2G making it an IP network, this allows internet access though at a level not comparable with 3G.

### ***Location based applications***

They include cell broadcast, for example, alert on an impending weather condition in an area, trade alert, advertisement and campaigns. It also used for tracking, like managing a fleet of vehicles and monitoring their location.

### **Conclusion**

In conclusion, this paper analyzed 2G and 3G from a view in terms of technologies, market structure/consumers. Although 2G is being taken as an inferior technology and 3G is perceived as an advanced technology, they each retain their own advantages and disadvantages. In general, 2G and 3G can be viewed as a progression rather than competitive technologies as they can be used to serve different target markets. 2G will serve the low and middle end markets, while 3G will serve the high end market. As a result, 2G and 3G providers will have different business models.

The analysis of 2G and 3G in this paper implies that the success of a technology is not only dependent on the performance of the technology itself but on many other factors,

including market demands, business models and government policy. Experiences in other countries help to demonstrate this point [7].

In terms of technology, improvements to the quality of service are the key to the survival of 2G and technology maturity is the major challenge of 3G. Government should ensure that operators with existing facilities should not relent on improving their 2G's quality of service. Since the functions of 3G phones and 2G phones are very similar, a unified user interface could be established and users should be able to use such a unified user interface to access a variety of value added services. For instance, when a user is carrying out mobile banking, he/she should be able to operate in areas where 3G services is not available by the use of GPRS. When a person is traveling, and roaming is needed, it can switch to 2G mode. For multimedia and fast Internet access, 3G mode may be needed. This approach can be enhanced by subsidy on a dual mode handset

### **Acknowledgement**

The author wishes to register his thanks to Celtel Nigeria for their kindness in making relevant information accessible.

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