



Reaching Critical Mass in Nigeria's Telephone Industry

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Abstract

The sudden and rapid growth in access to telephones in Nigeria has certainly raised major questions for telecommunications scholars. Access to telephones in Nigeria had been marginal by the end of the twentieth century with the teledensity rate well below 1:100 for a country of estimated 130 million persons (Ajayi, Salawu and Raji 1999). Today, over 10 million Nigerians have access, improving the teledensity to 13:100 in barely five years! Growth rates are currently over 100 percent per year. What happened? How was the industry turned around? Has critical mass been reached? Has the rate of growth become self-sustaining? This paper explores all the above questions using the theory of critical mass as the framework for analysis. It concludes that a critical mass of users has been built in the urban centers and that access is rapidly approaching the saturation point. In addition, it argues that much more needs to be done in order to achieve similar growth rates in the rural areas.

Key Terms: Telephone, telecommunication, teledensity, critical mass, Nigeria

Résumé

La brusque et rapide croissance au niveau de l'accès téléphonique au Nigeria soulève des questions cruciales à l'endroit des universitaires des télécommunications. L'accès aux téléphones dans ce pays est demeuré plutôt marginal vers la fin du vingtième siècle, avec un taux de télé densité bien en deçà des 1 : 100 pour un pays d'environ 130 millions d'habitants (Ajayi, Salawu et Raji 1999). Aujourd'hui, environ 10 millions de Nigériens ont accès au téléphone, augmentant ainsi la télé densité à 13:100 en à peine cinq ans ! Les taux de croissance dépassent actuellement les 100 pour cent par an. Que s'est-il donc passé ? Comment expliquer ce revirement dans l'industrie du téléphone ? Est-ce qu'une

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masse critique a pu être atteinte ? Le taux de croissance peut-il se maintenir ? Cet article analyse toutes ces questions en se servant de la théorie de la masse critique comme cadre d'analyse. L'auteur conclut qu'une masse critique d'utilisateurs a été constituée dans les centres urbains et que l'accès serait même proche du point de saturation. En outre, l'article révèle que beaucoup d'efforts restent à faire, afin de réaliser le même taux de croissance dans les zones rurales.

Mots clés: Télécommunications, téléphone, accès aux réseaux de télécommunications, Nigéria

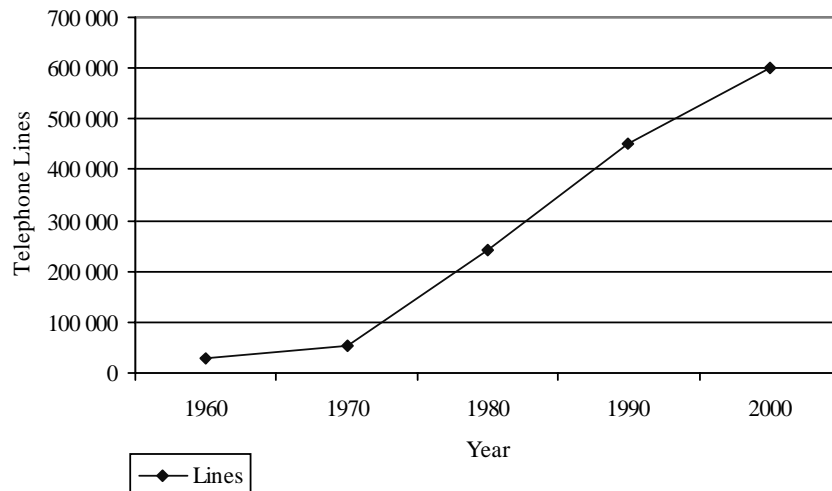
Introduction

The sudden and rapid growth in access to telephones in Nigeria has certainly raised major questions for telecommunications scholars. Access to telephones in Nigeria had been marginal by the end of the last century with the teledensity rate well below 1:100 for a country of estimated 130 million persons (Ajayi, Salawu and Raji 1999). At the time, mobile telephony was largely non-existent and the population growth was quickly outstripping the growth of new fixed lines. There were serious concerns that access to telephony would not come easy and achieving a critical mass of users was therefore considered difficult. Reasons presented for this challenge included the fact that the average income in the country was below poverty level, the cost of service was expensive, and the national provider was barely surviving. Today, over 10 million Nigerians have access, a number that has raised the teledensity level to 13:100 in barely five years! Growth rates are currently over 100 percent per year.

What happened? How was the industry turned around? Has critical mass been reached? Has the rate of growth become self-sustaining? This paper explores all the above questions using the theory of critical mass as the framework for analysis. The sections of this paper are designed as follows: first, a brief recap of the industry status prior to the licensing of mobile telephone providers in 2001; second, introducing the theory of critical mass; third, discussing the problems posed by the pre-2001 industry status; fourth, using the theory to shed light into the post-2001 industry status; and finally, asking and attempting to address the question, 'What's next?'

Pre-2001 industry status

The Nigerian telephone industry was largely stagnant prior to 2001. There were two clear phases that defined industry activity during this period. The periods were (a) pre-liberalization period and (b) early liberalization (i.e., liberalization between 1992 and 2001). Figure 1 below provides data of industry growth pre-2001.

Figure 1: Pre-2001 Industry Growth Rate***Pre-liberalization***

Nigeria's telephone industry was monopolized by the government during the pre-liberalization period as it was thought that only the government had the funds to develop the nation's telephone infrastructure. The government department that was charged with this task was the Ministry of Communications, and the Ministry carried out the task through its parastatal, the Nigerian Telecommunications Limited (NITEL).¹

Prior to Nigeria's independence in 1960, telephone access in Nigeria was first developed in 1886 to provide a telecommunications link between British colonial administrators in Nigeria and their home country, Britain (Ajayi, Salawu and Raji 1999). Thus, telephone access was severely limited to these few administrators. At independence, the policy changed to providing telephones to government offices and there were few telephones available in residential homes. The outbreak of a civil war, barely seven years after independence, did not help matters. Nigeria turned its attention to war matters and the growth of telephone access suffered sharply during the war years from 1967 to 1970.

To worsen the matter, budgets for the expansion of telephone lines began to experience frequent shortfalls between the amount budgeted and the funds that were actually released for implementation. This problem created a crises situation where the population growth began to outstrip the introduction of new lines. Furthermore, several of the existing

lines had fallen into disrepair and funds were not being used to resuscitate these lines. Thus, at one time the number of effective lines had fallen from 600,000 to 400,000.

Early liberalization

The problems in the industry had become a crisis, and the government was being pressured by both internal and external groups to liberalize the industry as a viable solution. Of course, much of the pressure was also due to interest in taking advantage of the business opportunities that follow industry liberalization. Eventually, the military government acceded to the pressures by liberalizing the industry in 1992 and establishing the Nigerian Communications Commission (NCC). However, this early bid for liberalization was fraught with its own problems.

The biggest problem was that the regulator (i.e., NCC) was headed by administrators who were more willing to capitulate to governmental and elite pressures instead of maintaining a firm regime that focused on the larger public interest and the development of the industry. The result was chaos. Within a few years of NCC's existence, scores of licenses were awarded to all sorts of interests. Several licensees were related to or were acquaintances of government officials (Adekanmbi 1999). Some of the licensees never provided any service and instead resold the licenses for profit. Kubeyinje (1998) reported that the then Chief Executive of NCC, Mr. Ogbonna Iromantu, complained that 'of 150 telecommunications companies licensed so far nationwide, fewer than 20 had provided services to their clients'. In such an environment, very little development took place. The little development that took place was painfully slow as a few of the providers struggled to improve access for Nigerians.

Building critical mass and the pre-2001 problems

Obviously, the problems of the pre-2001 industry status raised the question of whether it was possible to create a critical mass of telephone users in Nigeria. Rogers (1991) has indicated that critical mass in an interactive system, such as a telephone network, refers to the point at which the number of adopters of the system is large enough for the growth of the network to become self-sustaining.

It was Lynne Markus who provided the framework for the theory of critical mass of interactive media in 1990. Before then, there were numerous publications on the concept of critical mass (Granovetter 1978; Hardin 1982; Oliver and Marwell 1988; Oliver, Marwell and Teixeira 1985; Olson 1965). Most of those publications, however, focused on collective actions in the social arena for the public good. Markus (1987, 1990) relies on two

key principles in the explanation for the building of a critical mass: resource contributions and heterogeneity. For resource contributions, Markus refers to users' knowledge of the system, the effort required in the usage of the system, the level of commitment and discipline required of the users of the systems and the cost of the system particularly for the early adopters. Heterogeneity refers to factors such as diversity in users' interests, task interdependence and the geographic dispersion of the users.

Onwumechili (2001) discussed critical mass in telephone access in Nigeria by using the theory to forecast the likelihood of universal access. At that time, he pointed to several obstacles to the building of critical mass of telephone users in Nigeria. Those obstacles were the cost of obtaining the service which then ranged from \$210 to \$526 and was higher than costs for obtaining a similar service in the Western countries, the low per capita income in Nigeria, and the lack of telephone resources in the rural areas. Onwumechili (2001) did acknowledge that the discipline and effort required for building critical mass and the required geographical dispersion of users were already present in Nigeria.

In any case, the telephone industry in Nigeria has undergone dramatic changes since 2001. Some of the key problems that were cited as hindrances to the building of critical mass and the wide extension of telephone services have been largely overcome. For instance, costs have dipped dramatically (see Figures 2a and 2b). The lower costs have come largely from intense market competition.

Figure 2a: Decline in SIM Card Price Provider

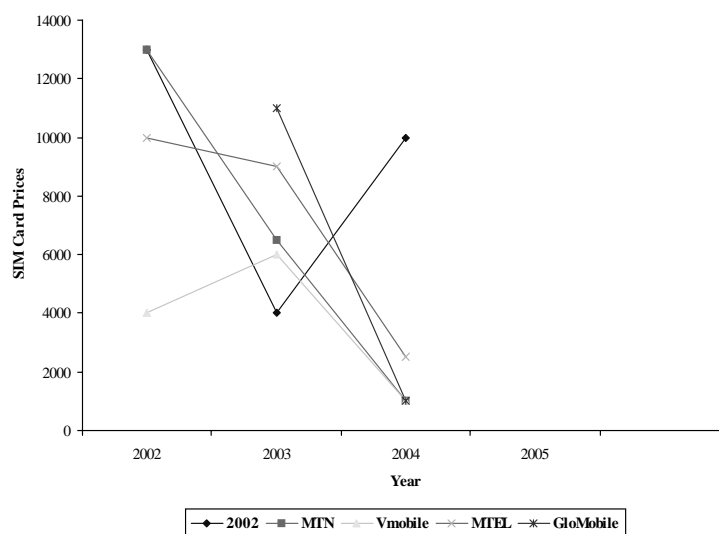
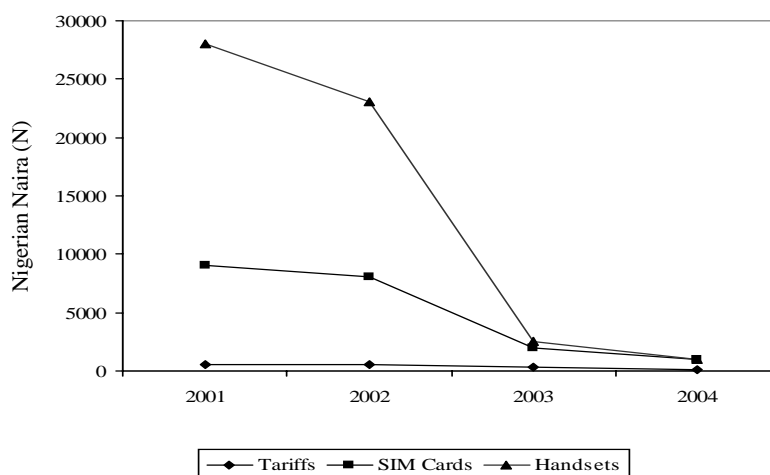


Figure 2b: Decline in Prices*

* Data representing tariffs are miniscule. However, the data shows a steady decline in tariff from 40 kobo in 2002, 22 kobo in 2003, to 20 kobo per minute in 2004. The exchange rate at the time of writing is \$1 = 13,900 kobo.

The declining cost of access has also impacted the percentage of income required for access. By the 1990s, costs associated with telephone access were so high that Nwankpa (1999) and Wogu (1999) pointed out that the percentage of income that Nigerians used to acquire telephone access was by far higher than the 1.5 to 3 percent obtainable world wide at the time. Thus, the growth in access to telephone, at the time, was logically considered a problem with high cost of access and its effect on incomes. However, that dramatic change with the declining cost has meant that the percentage of income required for access has also declined, thus, increasing the probability of access.

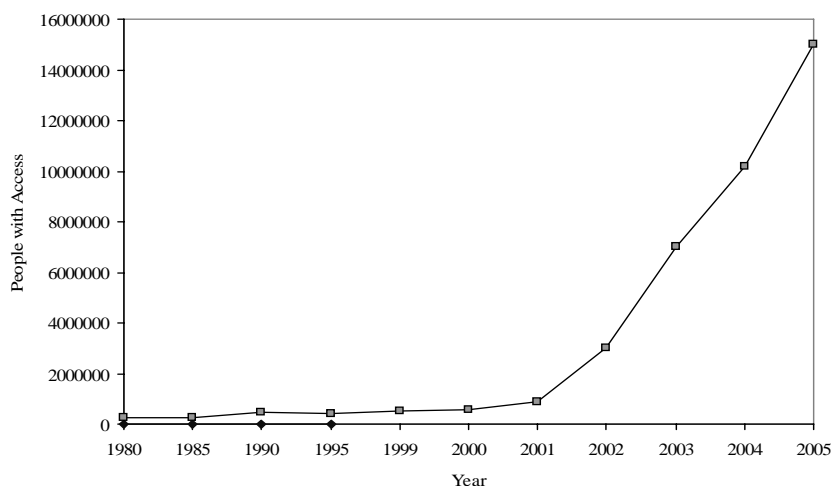
The telephone regulatory system in Nigeria focuses on providing access to urban residents and not to rural residents. Thus, telephone resources are severely limited in the rural areas. Therefore, a calculation of critical mass should focus on the urban centers.

There are other factors that impact the building of critical mass, apart from the downward pressure on costs. As stated earlier, Olson (1965) had noted that a few committed leaders are quite capable of generating collective action of a very large group. In Nigeria's case, the earlier adopters of telephone service were elites because of the high costs. However, as the costs began to decline, a diversity of opinion leaders from other eco-

conomic classes also adopted the medium. For instance, students and low level workers (e.g. auto mechanics, petty traders, among others) were quick to join the early adopters. This meant that the heterogeneity or user diversity predicted by Markus became present in the Nigerian case. Presently, service users include more than opinion leaders or early adopters. The service is now being diffused to their followers or early majority using Rogers' diffusion of innovation model for analysis. Figure 3 shows the beginning of an S-shaped curve as predicted by Rogers (1991). The curve is yet to be fully shaped because the growth has not begun to level off.

So, do the above discussions entail a success in building critical mass? Essentially, yes. It is important to note that we need to categorize Nigeria into two geographical areas of urban and rural in order for us to effectively discuss the building of a critical mass in Nigeria. Critical mass has been reached in the urban centers where the telephone service providers have largely focused their services and marketing. There is a huge potential in the rural areas but the providers are yet to focus their attention on those areas.

Figure 3: Diffusion Growth of Telephone

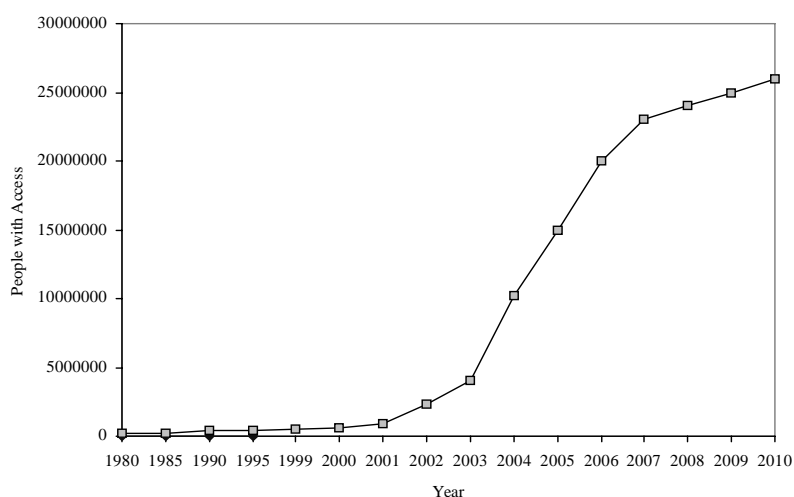


The existence of this critical mass of users, particularly in the urban centers, can be explained by the following: (a) that virtually all calls from existing telephones originate from the urban centers, (b) that the 10 million Nigerians who have access to these telephones represent half of the 23 million adults residing in the urban centers,² (c) that the above access constitutes a large reach of households in Nigerian urban centers, and (d) that the

above constitutes a realization of telephone's interactive full benefits or at the very least, its possibility of reaching that full potential within Nigerian urban centers. The interactive benefits are derived through the ubiquity of a large number of friends who belong to a network and their increased ability to comfortably conduct relationships and business over the telephone. This increases the medium's chance of sustainability and encourages the few friends who have not acquired access to do so as later adopters of the medium.

The lowering of costs and the presence of other factors have all helped to build a critical mass of users. As noted earlier, the story is not completely told by lower costs. Instead, the following factors have all been instrumental to the changes with some of them also explaining the lower costs: regulation, competition and aggressive marketing, latent demand, economic/commerce boost and a boisterous informal economy. They have all combined to dramatically increase access to telephone services in Nigeria and, thus, have helped develop a critical mass of users. Rogers (1991) argues that a critical mass of users develops as the number of users reaches a point that is considered large enough to self-sustain the growth of the use of the product. This often can be graphed in an S-shaped curve. The curve in Figure 4 represents the predicted rate of growth by 2010. The factors that have helped to produce a critical mass of users in the Nigerian case have been identified above, and we will proceed to further describe each of them.

Figure 4: Predicted Curve of Telephone Diffusion in Nigeria



Regulation

Industry regulation improved dramatically under the democratic government which was elected in 1999. The government immediately found a solution to the chaotic telephone regulation that existed under the NCC of that time. It revoked several of the licenses and appointed a more capable NCC administration.

The changes turned out to be astute. The new NCC under Ernest Ndukwe has been central to the rapid growth in the industry. Among its key successes have been in the areas of creating trust among the public, providers and investors; attracting heavily-capitalized investors; developing the capability of investigating the technical ability of market participants; and, general oversight that is designed to protect the public good in the area of interconnection prices and consumer protection. All those measures have contributed to the building of critical mass.

The new NCC built trust very quickly through its transparent auction of GSM frequencies in 2001 (Onwumechili 2003). It followed its policy to the letter and put down its feet in denying a license to Communications Investments Limited (CIL) after the latter failed to pay the required fees on a preset deadline. NCC failed to budge under political pressures from some legislators and government officials that were sympathetic to CIL. That singular act by NCC immediately bestowed it with the much needed trust from a watching public, providers and both internal and external investors.

Furthermore, the NCC strengthened the requirements for license applicants in order to ensure that companies that are bidding for licenses have substantial financial backing to build the needed infrastructure and to survive initial losses while building up the market. This was not always the case, particularly during the period pre-2001. The new requirements, for instance, led to substantial investment of close to \$300 million in license fees alone paid by each of the licensed GSM providers. The result was that credible providers were immediately made market participants. Today, several banks (local and foreign), Nigerian state governments, foreign investors, international agencies and multilateral institutions provide major capital backing for several of the telephone market participants. For instance, in 2004 Guaranty Trust Bank (GTB) led a consortium of banks to finance MTN's infrastructure project valued at \$250 million, in the same year two private equities invested \$43.2 million into Starcomms, and the International Finance Corporation (IFC) contributed \$100 million to a syndicated \$395 million loan to MTN (NCC 2005).

It was not just the financial muscle that mattered to the NCC. In addition, it hired very knowledgeable personnel to analyze the capabilities of the market participants in order to ensure that these participants were capable of providing telephone service. Again, this was remarkably different from the past when licenses were merely awarded to friends of high-ranking government personnel.

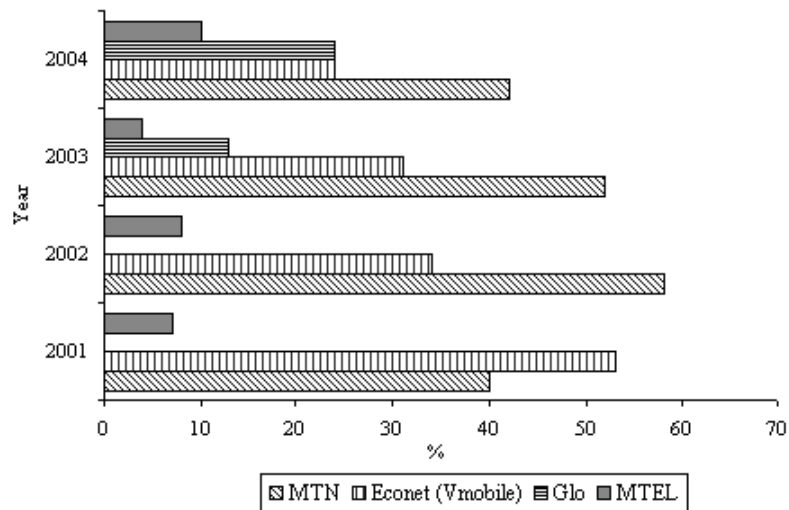
The NCC also provided a myriad of regulations to protect the consumer and assure continued consumer confidence in the industry. For instance, the NCC enforced its right to set interconnection rates in spite of legal challenges by major market participants. The courts ruled in favor of NCC. In another act, the NCC established a consumer parliament where consumers could confront providers on the quality of services. The establishment of the Consumer Parliament was fortuitous in September 2003. It followed a September 19, 2003 nationwide boycott of GSM services called by the National Association of Telecommunications Subscribers (NATCOMS) that was estimated to have cost the providers more than N1 billion in lost revenue. The NCC then established the parliament, bringing consumers face to face with providers. Since then, the parliament has been cited as helpful in creating consumer awareness and resolving several critical issues in the industry including network congestion and the migration to per second billing (NCC 2005).

Competition and aggressive marketing

It was NCC that also produced the competition that has transformed the telephone industry in the country. However, the market behavior of the competing providers has gone a long way in contributing to the rapid growth in the industry and, thus, building up the needed critical mass. The competition has been fierce among the new entrants and most of the benefits of this competition have accrued to the consumers. Of course, the competitors have also been very profitable in the process. VMobile reportedly earned N22 billion³ in six months in 2004 (Ojo 2005), and in 2005 MTN declared N119 billion gross earning for a six month period (Ajakaye 2005). It appears that only the erstwhile monopoly NITEL, which is still owned by the government, has failed to keep pace with the fierce competition. See Figure 5 for a breakdown of competing companies in the GSM telephone industry and their market share.

Service in the wireless telephone market has been based on prepaid SIM cards which are heavily discounted with the initial purchase under the marketing plan that is designed to make profits from re-sold call cards. This use of prepaid cards has been very successful as customers buy as much airtime as they are able to afford. Incoming calls are free.

Figure 5: Market Shares of Major GSM Competitors



Notably, the entrance of the second national operator (SNO), Globacom, increased market competition (NCC 2005; Ojo 2005). Globacom was very aggressive. It became the first to introduce per second billing in a market dominated by per minute billing methods. Much more dramatic was Globacom's Glo Mobile starter packs which went for N1 for basic prepaid in 2004. This was a major development as previous starter packs were sold at N20,000. This forced the competitors to discount their packs as the Glo Mobile service siphoned customers. Ultimately, the beneficiaries became the consumers who paid a little less for their calls, and the lower bills encouraged new consumer adopters to gain access to the market.

Latent demand

The demand for telephone access in Nigeria was at 10.12 million people in 1998 (Aragba-Akpore 1999; Onwumechili 2001). At that time, only 600,000 Nigerians had access, and service growth was slower than the population growth. Moreover, the growth in service demand was increasing rapidly and at a rate that many considered to be geometric. The 10.12 million figure was actually considered conservative because it only counted those who made the effort to put their names on a waiting list for service. This takes into consideration that some persons whose names are on the waiting list may well not have been able to afford the service at the time and have merely listed their names in order to reduce installation time when they become ready to afford the service. A much more realistic figure,

however, is the 15–20 million people identified by BMI-TechKnowledge (2001) as working class Nigerians who had the funds to afford telephone service during that period. However, even the BMI-TechKnowledge's figure may be conservative as the NCC has publicized the addressable market for telephone subscription as 25–30 million (NCC 2005).

In essence, the road to building a critical mass had been stunted prior to 2001 because of the scarcity of telephone service. It appears that a potential critical mass had existed and laid dormant because of the lack of telephone supply. An explosive growth in access became inevitable as telephone supply rose. Thus, critical mass had not been delayed by a lack of demand because there were millions of Nigerians who eagerly sought telephone service. Millions of those Nigerians were then able to quickly purchase the service when MTN, Econet (now VMobile), and later Glo Mobile began to offer GSM wireless telephone service after the award of licenses in 2001. It is, therefore, conceivable that the 10.12 million people on the waiting list in 1998 form a significant bulk of the 10 million people who now have access to telephone service in Nigeria.

Economic and commerce boost

The relationship between the building of critical mass and the rise in economic and commerce activities is similar to the 'chicken and egg' question. While it is difficult to determine which one significantly led to the other, it is clear that they each have an effect on the other. The development of Nigeria's private sector has been very important to the building of critical mass, because the growth in the sector also meant the increase in the pool of individuals with the financial strength to gain and sustain telephone access. However, that access by the early adopters, among the private sector, also persuaded their business and social associates to gain access in order to maintain or sustain the viability of their relationship network.

It is important to note that the telephone industry has been credited as 'directly (employing) about 5,500 professionals and is responsible for another 450,000 jobs indirectly' (NCC 2005). These indirect jobs include roadside airtime resellers, handset distributors, third party site engineers and security personnel. These workers have in turn been able to earn the wages necessary to afford the purchase of telephone services and, thus, become adopters of the service.

Informal economy

Nigeria, like several other African countries, has a burgeoning informal economy. This economy is propped by the income made by Nigerians which goes unreported. There are various sources for this income including money obtained through tips, funds wired from relatives that are resident overseas and a wide range of other payments that are exclusive of the formally reported wages. The significant existence of this economy has made planning difficult as such planning often underestimates the elasticity of income that is available to Nigerians for expenditure.

More importantly, the existence of this economy provides the expendable income that is required for access to telephone service. The formal income provides the basis for the 15–20 million figures put forward by BMI-Knowledge as the maximum number of Nigerians able to purchase telephone service. The informal economy, however, is more likely to make those figures conservative.

The diversity in the formal incomes of current telephone subscribers explains the further effect of the informal economy. Those with access are as diverse as the wealthy, the roadside hawkers, students and micro-business owners. Ordinarily, the formal income that is reported by groups such as roadside hawkers and students will lead one to conclude an inability to sustain access to telephone service. However, these groups are all involved in the substantial practice of informal income earnings and, thus, their access can be confidently attributed to the impact of such income.

What's next?

Of course, having made the case for critical mass, the question is invariably, 'What's next?' The NCC's Ernest Ndukwe (2004) has forecast the connection of an additional 10 million people by the end of 2005, making a total 20 million people with access to telephones within a year. These 10 million additional people are residents of the urban centers and, as we know, the total of 20 million people is close to the saturation level for urban centers in Nigeria. There are 39 million people in the urban centers of which 23 million are estimated to be adults, 10 million of whom already have access. In essence, our discussion will have to focus on the possibilities of reaching saturation level in the urban centers. In addition, we will discuss the possibilities for substantive access in the rural areas.

An urban saturation

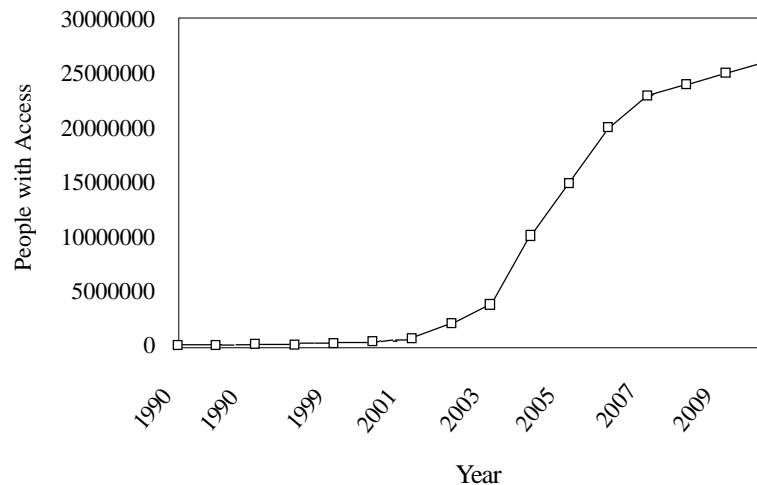
We have mentioned earlier that the adult population in the urban centers is an estimated 23 million Nigerians. If one assumes that 80 percent of this

figure will eventually have direct access to the telephone, we are essentially stating that 18.4 million urban-resident Nigerians will have access. This figure is an approximation of the 20 million cited by NCC's Ndukwe. In any case, the 18.4 million represents the reasonable saturation level for telephone access in Nigerian urban centers. If we use this figure, then the potential number of subscribers yet to be reached is easily calculated with the simple formula:

$$\text{Saturation level} - N \text{ of existing subscribers} = \text{potential subscribers}$$

One would argue that the inflection point for growth is very close to the saturation level. We believe that the downward pressure on access costs is bound to continue for a while as the market itself is yet to stabilize and some of the main providers are new entrants to the market. These new providers will strive to establish a market foothold. Glo Mobile, for example, is relatively new and its market behavior, designed around lower pricing and innovation, has had a tremendous downward pressure on the market prices. Glo Mobile has dramatically cut access cost and introduced per second billing upon its entrance into the market. Glo Mobile is unlikely to revise this behavior until it secures market leadership to suit its position as a second national operator (SNO), which gives it more multi-service options than its main GSM competitors—MTN and VMobile. Furthermore, NITEL which offers an international gateway and GSM wireless service have been losing market share because of relative inactivity. This is likely to change as soon as NITEL is sold to aggressive investors. NITEL has been offered for sale for several years now and was briefly under a management company. Under an aggressive investor, NITEL is likely to dramatically change its market behavior and compete aggressively for customers. It is because of these variables that one foresees aggressive competition putting a further downward pressure on prices and, thus, fueling a continued and rapid growth in market access.

While the relationship between declining prices and potential customers will accelerate the growth in telephone access, such a growth may not reach the dizzying heights of 2001 to 2005 years. This is simply because of the fact that the number of potential subscribers is also declining. Thus, the growth will taper off gradually. However, the inflection point (i.e., the point at which the growth significantly levels off and then declines) is unlikely to be reached until close to the saturation point because of the continued significant demand for telephone access correlated with the downward pressure on prices. See Figure 6 for the predicted relationship between the inflection point and the saturation point.

Figure 6: Relationship between Inflection & Saturation Points

It is important to note that the saturation point that we have mentioned and that is shown in Figure 6 is not static. It is dynamic because it is affected by population growth as well as other relevant indices that may affect access to telephones such as the sudden jump in prices.

Access in rural areas

Our discussion in this paper has focused almost exclusively on telephone service and access in the urban centers. As mentioned previously, that is a focus essentially on 39 of 130 million Nigerians. However, it also means that we have yet to discuss service and access to 91 million Nigerians who reside in the rural areas. The rationale has been that the providers have almost exclusively focused their services on the urban centers and, thus, an effective discussion of the building of critical mass had to focus squarely on service and access in the urban centers.

However, the goal of telephone service and access in Nigeria goes beyond the urban centers and, thus, the need for us to provide a brief discussion of service and access in the rural areas in this section of the paper.

Presently, there is minimal access in the rural areas. By this we do not mean that the wireless telephones do not operate in some of the rural areas. The telephones work in almost all areas in the country because the infrastructure is largely spread out. What we mean, therefore, is to ask who does and who does not have access? The answer is that while most

of the urban residents have access, it is exactly the opposite in the rural areas where very few people have access to telephones. There are numerous reasons for this, including the cost of service and providers' marketing focus, which we will discuss in the subsequent paragraphs.

Costs matter as we have noticed in our discussion of critical mass in the urban centers. In considering issues of heterogeneity and effort, building critical mass in the rural areas will be a much simpler matter because of some existing relationships between rural residents and urban residents. The key element will be cost. Rural residents have far less income than residents in the urban centers, which also means that access to disposable income is also relatively less for rural dwellers. Thus, it will require a much more inexpensive access to telephones to generate a rapid growth in telephone access in the rural areas. The NCC's Ernest Ndukwe (2004) has indicated a realization of this need to reduce costs by arguing that further reduction of duty rates, reduction of charges on satellite bandwidth and improvement in electricity supply are critical in expanding access. The early adopters or those likely to gain access early in the rural areas would be the rural elite (just as the case in the urban centers) such as the clergy, local government workers, micro-business owners, civil servants and other opinion leaders.

Another critical aspect in expanding access to the rural areas would be the providers' marketing focus. Presently, the major providers have all focused their attention on the lucrative urban centers. This will not change unless (1) the urban centers become saturated, or (2) significant incentives are provided for service to rural residents. It is already clear that the saturation level for urban centers is rapidly being approached. However, the government is yet to provide market incentives for service providers to market to the rural areas. Instead, the government has opted to develop half a million lines by early 2006 with a N28 billion loan from the Chinese government (NCC 2005). This project, however, may fail to be sustainable particularly if the government will be depended upon to maintain the lines. In the past, the government's culture of maintenance has been very poor. It seems that the NCC's alternative through the licensing of Broadband Technology Limited may have a longer-term viability. Broadband Technology Ltd. is expected to use VSAT technology to provide prepaid access to rural residents. If the service is offered at a low cost, the prepaid format will provide the revenue needed to sustain the network. Invariably, it is clear that the approach to rural access is unclear and at an infant stage. The growth of access in these areas will be much slower without more amenable access strategies.

Conclusion

This paper has focused on providing an understanding of how critical mass was built for access to telephone service in Nigeria. It began by noting the very poor access rate to the service prior to 2001 in spite of the industry liberalization that was nearly a decade old at the time. The year 2001 marked a major transformation of the industry when a new regulatory administration provided the framework which rapidly built a critical mass of users by introducing an environment that led to access price reduction and intense competition, among other essential elements. The paper went on to analyze what lies ahead beyond the building of critical mass. The answers lie in the growth towards saturation of the urban market and the expansion of access to the rural areas. While the paper argues that saturation will be approached rapidly, it also points out that the lack of effective and coordinated rural access strategies could slow growth in the rural areas.

Notes

1. NITEL was initially known by the name Post & Telegraphs (P & T) Company.
2. There are 39 million of 130 million estimated Nigerians residing in the urban centers. This is based on the estimation that 30 percent of Nigerians reside in the urban centers. Please consult statistics from *The World FactBook* (2005) and the *World Development Indicators* (2005). Note that these statistics also estimate that 58 percent of Nigerians are 15 years old or older.
3. The current exchange rate is \$1 = N140 as of 2005.

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