
**THE EFFECT OF DISRUPTIVE TECHNOLOGY ON NATIONAL
INFORMATION TECHNOLOGY DEVELOPMENT LEVY OF THE
SELECTED TELECOMMUNICATION NETWORK PROVIDERS IN
NIGERIA**

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Abstract

Technology has led to dramatic changes not only in the ways we manufacture and process goods, the ways we trade and access markets, and the ways we communicate. This study examines disruptive technologies with regard to finance which is critical to achieving the Sustainable Development Goals, many of which can be advanced and accelerated in Nigeria through technological innovations. The disruptive technologies focused on in this study are Mobile Number Portability, Horizontal Integration, Over the Top-Lawyer, Customer Experience Management and Soft-SIM. Ex-post facto research design was used for the study using published secondary data of selected listed Telecommunication companies (MTN, Globacom, Airtel and 9-mobile). Time series secondary data published by The FIRS and Ministry of Budget Planning were collected for both tax revenue and disruptive technology for the period of 2001 to 2019 and analyzed using regression analysis. It was discovered that Customer Experience Management had the highest relative effect on Information Technology Development Levy of the selected telecommunication network providers in Nigeria ($R^2 = 0.29$, $t = 8.81$, $p < 0.05$), followed by Horizontal Integration ($R^2 = 0.26$, $t = 7.651$, $p < 0.05$). Over the Top-Lawyer was next in line ($R^2 = 0.13$, $t = 3.71$, $p < 0.05$), followed by Mobile Number Portability ($R^2 = 0.12$, $t = 3.27$, $p < 0.05$), while Soft-SIM had the least relative effect ($R^2 = 0.1$, $t = 3.58$, $p < 0.05$). Given these results, the study therefore concluded that disruptive technology dimensions significantly affect Information Technology Development Levy of the selected telecommunication network providers in Nigeria. Based on the result, it was recommended that the regime of taxes and levies ought to be ascertainable in order to assist planning and forecasting for business endeavors and the economy. While it is accepted and common practice that taxes and levies form a veritable source of revenue for government, it is imperative that citizens should be able to determine or know in advance what taxes they are liable to pay. The computation of taxes and levies should therefore be predicated on clearly defined criteria.

Keywords: Disruptive Technology, National Information Technology Development Levy, Mobile Number Portability, Horizontal Integration, Over the Top-Lawyer, Customer Experience Management and Soft-SIM.

1.0 Introduction

International Monetary Fund (2011) admonishes developing countries to mobilize resources internally in order to ensure sustainable development which can flow from more stable, predictable and sustainable revenue source such as non-resource tax compared to the increasingly unpredictable oil-based revenue source operating in Nigeria. A case in point is the recent unavoidable budget cut in Nigeria necessitated by the dwindling oil revenue. Similarly, the United Nations (2018) also prescribed that at least 15% tax/GDP ratio must be allocated to pillar sectors like education, health amongst others be able to achieve a sustained economy in Africa. However, most African countries, including Nigeria, have not been able to meet this threshold till date and the current figures achieved differ across countries. Specifically, Nigeria’s tax/GDP ratio has been hovering around 6% mark for quite a while (see figure 1.1).

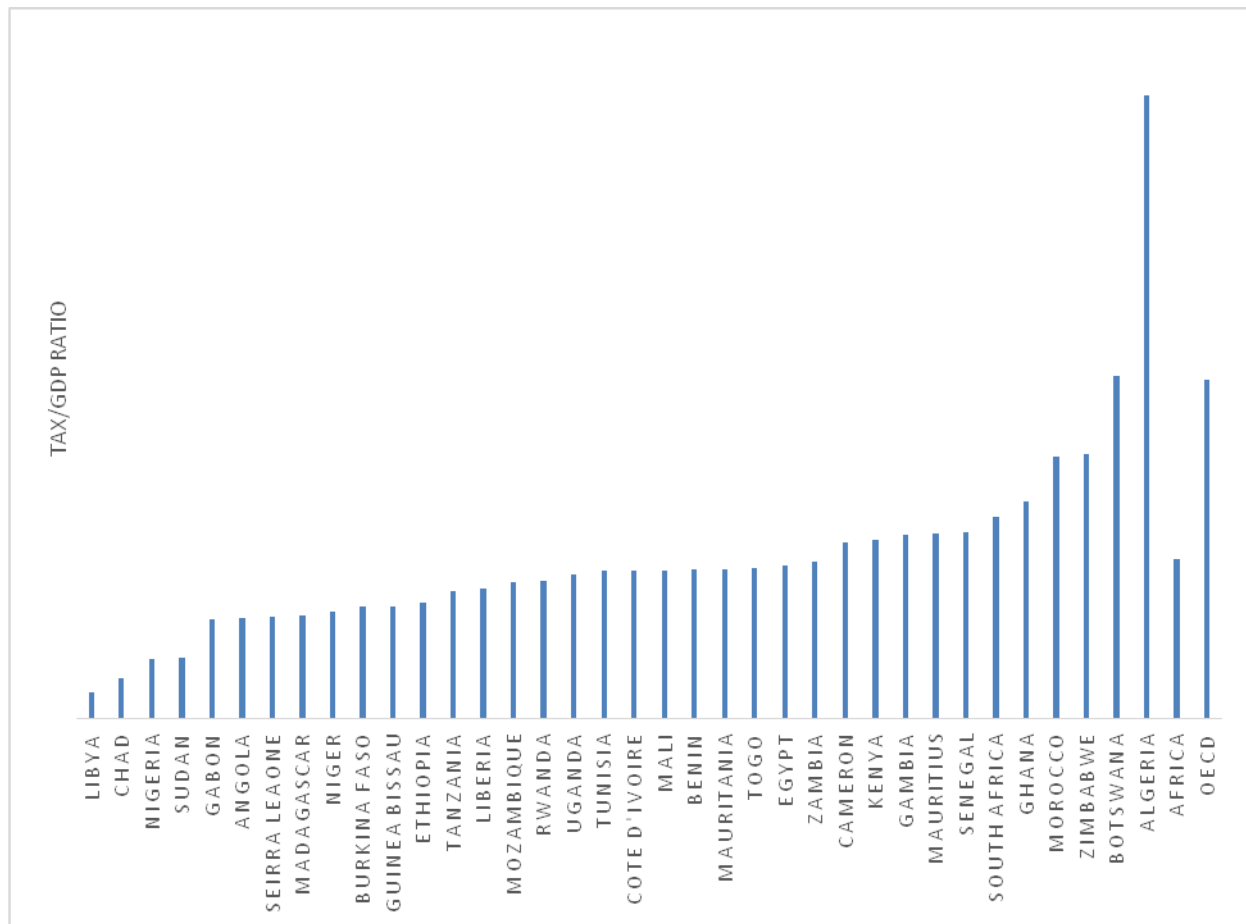


Figure1: Tax/Gdp (%) in Selected Countries in Africa (2017).

Source: OECD database (2018).

In Nigeria, various attempts ranging from new tax laws and reforms to overhaul the existing tax system in order to achieve the set fiscal goals have been in place. For instance, VAT has been reviewed by the central bank, introduction of stamp duties on deposit to mention but a few.

The relationship between penetration and tax percentage is clearly a complex one, involving many other variables as well, including particularly prices, income levels, ICT regulation and the dynamics of competition. This circumstance makes it difficult to say anything definite on the basis of these data about the effect of tax rates on diffusion. The government levies a tax on telecommunications. As a result, the roll-out of services is delayed. This has a direct effect on national income, which includes telecommunication/ICT output. However, there is also a spill-over effect. This arises because telecommunication/ICT services are used in many other sectors, and can increase productivity there. Accordingly, the tax has a broader effect on the growth of national income, and hence on future tax revenues from other sectors (GSMA/Deloitte Global Mobile Tax Review, 2011).

There is quite a wide variation in the level of telecommunication taxation across the world. A study by GSMA/Deloitte has calculated taxes as a proportion of the total cost of mobile ownership (TCMO) of a mobile telephone to end users, defined as the monetary sum required to be connected to telecom services, taking into consideration the price of the handset, services (calls and SMS) and taxes. Using 2011 data from a sample of 111 countries in Europe, Central and Eastern Europe, Africa, Latin America and Asia for pre-pay and post-pay mobile users, it was observed that Africa records the highest tax as a proportion of handset cost on average 29 per cent closely followed by Latin America with 27 per cent. Asia Pacific records the lowest figure for tax as a proportion of TCMO (12.77%) thanks to low VAT rates and limited mobile-specific taxation (GSMA/Deloitte Global Mobile Tax Review, 2011). Nigeria records the lowest (10%) in the sample tax as proportion of handset cost compared to Cameroon, Democratic Republic of Congo, Nigeria, South Africa and Uganda. The other countries have higher tax rates, and they also have lower penetration rates.

Prior to Obasanjo's democratic government, the Nigerian Telecom industry was faced with various operational and management challenges which reflected in their survival ability, profitability and innovation capabilities. The indispensability of communication then was not magnanimously felt throughout the country, even on the economy of the nation, as there were few telephone lines and users/subscribers. However, the need to attract investment that can propel the needed innovative capabilities of providers which in turn would develop national information and communication technology infrastructure in the country and also to ensure improved teledensity across country, led to the policy and institutional reforms of the telecommunication sector in Nigeria through privatization from the Obasanjo administration. This reforms gave birth to four major telecom giants in Nigeria with different years of establishment.

The telecom industry growth has been mostly in the voice segment. In the last five years, demand for data has grown around the world including Nigeria. In Nigeria this is driven by availability of new services online i.e. Facebook, Twitter, Online newspapers, Blogs, YouTube

etc), devices availability as well as infrastructure provision especially by mobile operators in Nigeria (Aswani, 2015). The rapid developments of information and communications technology (ICT) and the advent of new services over telecommunication networks have given rise to convergence in how services are delivered to customers. However, there is an ongoing race in the digital economy to find better, faster and more efficient technologies to support the value chain of any given organization (Aswani, 2015).

It has been mentioned that telecommunication industry have performed below expectation in terms of it tax contributions due to a combination of problems which ranges from performance and returns themselves through environmental related factors (Ogunsola, 2015). Key among these include technological disruption, lack of focus, lack of business strategy, lack of planning, inadequate research and development, (Ogunsola, 2015). There has been a decline of GSM mobile subscribers as the market grapples with shifts in product options (Proshare, 2017). Consumers are moving away from traditional cellular services to data bundle packs, which allows them to use Over the Top (OTT) services. The fourth quarter of 2016 saw an increase in total GSM subscribers of 0.84% to 154 million (mn). However, subscribers dropped in the first quarter of 2017 by 1.38% to 152mn, the second quarter of 2017 results were worse, dropping 6.15% to 143mn. (NCC, 2017). Offor (2012), stated that the Nigerian telecommunication sector saw stalled growth during the second half of 2016 leading to delays or deferrals of expansions and upgrades to networks and this trend has continued into the second quarter of 2017. GDP in the second quarter of 2017 result showed that the telecommunications sector contracted by 1.92%. The major challenges facing the sector are low consumer purchasing power, currency movements and the recent loss of global investors. The inaccessibility of the dollar in the economy resulted in weak macroeconomic conditions. Nigeria's weak macroeconomic conditions have led to weak labour market dynamics (high unemployment and underemployment), reduced disposable income and poor corporate performance (Olatokun&Nwonne, 2017).

In recent years, the Nigerian telecommunications sector companies have had difficulties accessing foreign currency (FX) to finance their dollar/FX debt. Nigerian Communications Commission (NCC), the telecommunications regulator, recently slammed mobile phone company, MTN Nigeria, a N1.4trillion about (\$5.2bn or £3.5bn) fine for failing to disconnect subscribers with unregistered SIM cards bought before January 2012. Phone companies were told to register their existing customers' Sim cards, which MTN Nigeria allegedly failed to do. These issues have negatively affected the profitability index margin of most telecom operators in Nigeria. Bureaucracy and regulatory complexity throughout Nigeria continue to act as barriers to realising the socio-economic opportunities that mobile services enable, underpinning the need for a transparent, consultative and pro-investment regulatory environment (NCC, 2017).

Explaining why organizations in the same industry and markets differ in their performance remains a fundamental question within strategic management circles (Aswani, 2015). There is probably no conclusively established framework that completely explains the source of variation in organisational performance. While Studies (Aderemi, 2016, Clark & Wheelwright, 2014, Davila, 2016, Ramanujam&Venkatraman, 2015, and Tushman& Nadler, 2016) have established

a direct relationship between innovative technology and performance, the influence of disruptive technology has not been widely investigated. In addition, the difference in tax revenue of telecommunication firms remains to generate questions (Aswani, 2015).

The telecommunication industry's main challenge has shown to be their own innovation strategy and inability to introduce breakthrough innovations to the market. It has thus been proven to be a fertile ground for new innovation strategy implementation, as their core communication services have reached maturity (Oyelade&Ukechukwu, 2014, Pyramid Research, 2014). The study therefore seeks to investigate the effect of disruptive technology on national information technology development levy of the selected telecommunication network providers in Nigeria.

2.0 Literature reviewed

2.1 Conceptual Review

Innovation

To measure economic progress of a country and competitive nature of the industry, innovation plays an important role. Literature suggests that to increase the productivity of a firm, an effective weapon is the innovation. At the present, this concept of innovation is applicable in every facet of life and as such it becomes more multidimensional and intricate. However, over the years, studies have examined the relationship that exist between strategic factor and firm performance.

Over the decades, scholars have pointed out clearly what can be called innovation with different perspective. There exists a myriad of perspectives to innovation, the early concept of innovation in the development of economic and entrepreneurship was pronounced by Joseph Schumpeter, a German economist whose definition of innovation, it comprises the element of creativity, research and development. It is a process that begins with an invention Act. Audretsch, (1988), Damanpour, (1999) sees innovation as the adoption of an idea or behavior, other studies on innovation that gave definitions include Alvonitis and Salavou, (2007), Lumpkin and Dess (2001), Kuratko and Hodgetts (2004), Thornhill 2006; Jong and Vermeulen (2006), Beaver (2002), and Anderson, (2009). Brouwer, (1991) sees innovations as either product or process. Other authors include Damanpour, (1991), Huibanve Bouhsina, (1998), Higgins, (1995), and Dewar and Dottou (1986). Essentially, to have a transformation involve reorganization, restructuring and rearrangement.

Organizational Innovation

OECD (2005) defined the organizational innovation as implementing new ways of organizing business practices, external relations and work place. Hence, organizational innovation brought ideas such that labour productivity are increased and as well cost of supplies are minimized. The striking feature of this innovation is the organizational method which is peculiar relative to each other. Innovation involve bringing new ideas with which the purpose of existence is not defeated.

Other organizational innovation include: new method of distributing responsibilities and decision making among employee, new concepts for structuring of activities, centralization of activity and greater accountability for decision making. For external relation, new organizational method is the relationship with other firms or public institution.

Forms of Innovation

The early studies classified innovation on different dimensions which include; new products, new production processes, new materials and resources, new markets and new organizational forms. However, the author based the study on the classification by Oslo manual OECD and Eurostat, (2005) as product, process and market innovation.

Product innovation has brought ideas that led to advancement of technology and improve in other industries; the generations of computer, the first microprocessors and digital cameras are examples of such of innovation. The development of new ideas on a product has improved the quality and performance of industry, through product innovation, banking services have been easily accessible and convenient. Firms introduce new products or modify the existing products according to needs of the customers (Adner&Levinthal, 2001). Shorter product life cycle of the products forces the firms to bring innovation in the products (Duranton&Puga, 2001).

Over time, there has been implementation of new production methods on a production line which involve the procedures or techniques employed in the delivery of services. Examples include; introduction of GPS for tracking transport services, development of new techniques for managing a product, implementation of new improved information and communication technology ICT. Process innovation also supports activities such as purchasing, accounting, computing and maintenance.

The objective of innovation is targeted at the satisfaction of customers so as to increase turnover. The peculiar attribute of this innovation compare with others is new marketing method used by the firm. This is the implementation of new marketing method involving a significant changes in product design or packaging, product placement, product promotion or pricing (OECD, 2005). This innovation is designed either to address the introduction of new product or the existing product. This innovation can also take the form of product design which does not hinder its characteristics or intended use (Polder et al. 2010)., example of such is packaging, appearance of a product, new bottle design, these are design to give the product a new look.

Disruptive Technology

The term “Disruptive Technology”, according to Peng (2011) was first introduced by Joseph Bower (Harvard Professor) and Clayton Christensen (a businessman), in 1995 in their article titled-Disruptive Technologies: Catching the Wave. They defined “Disruptive Technologies” as technologies that depart fundamentally from existing ones, usually by being less complicated, more accessible, and less expensive. They explained that one of the most consistent patterns in business is the failure of leading companies to stay at the top of their industries when technologies or markets change. In order to remain at the top therefore, they must look beyond

satisfying small or emerging markets and focus on new technologies that meet the functional demands of mainstream customers.

Clayton (2019) categorized new technology into two: Sustaining **and disruptive**. Sustaining Technology relies on incremental improvements to an already established technology, whilst disruptive technology lacks refinement, often has performance problems because it is new, appeals to a limited audience and may not yet have a proven practical application. He explained that large corporations are designed to work with sustaining technologies for a number of reasons: they know their market; stay close to their customers; and have a mechanism in place to develop existing technology. Conversely however, they have trouble capitalizing on the potential efficiencies, cost-savings, or new marketing opportunities created by low-margin disruptive technologies.

In the world of telecommunications, the technological advancement has intruded into the existing state of things. For instance, in his remarks at the Nigerian International Technology Exhibition and Conference (NITEC 2016), in a paper titled “Role of disruptive technologies in catapulting the African continents’ GDP”.

Disruptive technology in the telecommunication industry

i. Over-the-Top (OTT) applications

Disruptive technology in the telecommunication industry is seen in areas like Over-the-Top (OTT) applications and services such as Voice over Internet Protocol (IP), live streaming and other social media applications. These OTT Intruders (as they are called) are carried over the networks, deliver value to customers but without any carrier service provider being involved in planning, selling, provisioning, or servicing them. Subscribers prefer to use these OTT platforms for making voice and video calls as well as to send messages. This means that the traditional Telcos cannot directly earn revenue from such services and they are literally now screaming, as they see their incomes continue to nosedive in the face of these disruptors. Other applications like Facebook, Blackberry Messenger (BBM), Viber, WhatsApp, and Skype, to mention a few, are also disrupting the traditional offerings of the Telcos.

ii. Mobile Number Portability (MNP):

Mobile Portability enables mobile telephone users to retain their mobile telephone numbers when changing from one mobile network carrier to another (Sharma, 2012). Mobile number portability (MNP) requires that mobile telephone customers can keep their telephone number including the prefix when switching from one provider of mobile telecommunications services to another. In the absence of MNP, customers have to give up their number and must adopt a new one when they switch operators. As a result, customers face switching costs associated with informing people about changing their number, printing new business cards, missing valuable calls from people that do not have the new number, etc. Based on these considerations, many regulatory authorities have imposed mandatory MNP or are about to require its introduction so as to reduce

customers' switching costs, attempting to make mobile telecommunications more Competitive (Gans& King 2019).

iii.Horizontal Integration (HI):

Horizontal integration is the acquisition of a business operating at the same level of the value chain in the same industry. This is in contrast to vertical integration, where firms expand into upstream or downstream activities, which are at different stages of production. The advantages of horizontal integration are economies of scale, increased differentiation (more features that distinguish it from its competitors), increased market power, and the ability to capture new markets.

iv.Customer Experience Management (CEM)

The origins of the customer experience Management tsunami lie in the dramatic increase in the Commoditization of products, across all markets, driven by the advent of the Internet (Shaw, &Ivens, 2015). Its size has been increased by the demands of an increasingly affluent society which craves more and more stimuli as it develops and self-actualizes. The tsunami has also grown further in strength as the timescales from ‘innovation to imitation’ reduce dramatically and other traditional differentials – price, features, quality and service – are losing their ability to differentiate companies (Shaw,&Ivens, 2015).

v. Soft-SIM(S-SIM)

With the advances in wireless and technology has made it possible to have a Virtual SIM that can be provisioned as easily and cost actively. There is also proposal to replace the current SIM by a tamper resistant module soldered on the mobile phone, also called Secure Element and software SIM downloadable over-the-air. The term Soft-SIM has a particular meaning among some operators and SIM card manufactures, which a virtualized SIM is residing in handset memory.

Due to extensive concern regarding the security of a Soft-SIM and the lack of MNO support of Soft-SIM, there is no widespread concern on their development and technologies.

Firm Performance

According to Garvin, (1987), organizational performance is defined as “the operational ability to satisfy the desires of the company’s major shareholders. The performance of a firm is relative to each other except when they work towards the same goal. Over the years, different authors have provided an evaluation of firm performance, most of them pointing to achievement of goal. Performance is a reflection of the content. The competent of a firm measure by the outsiders depend on its performance (Bonn, 2000). Goals achievement defines firms’ ability (Achrol and Etzel, 2003). The ability to meet both internal and external goals defines firm performance (Lin et al, 2008). Depending on the organizational goals, different methods are adopted by different firms to measure performance. A firm that adopted product innovation method, its performance would varied from that of marketing method. Fraizier and Howell, (1989) suggested that firm’s

performance would vary as a result of the industrial structure. Some authors see performance in different perspective which include; attaining minimal level of average total cost, neo-classical economic theory of performance perspective; process of profit maximization (Trau, 1996) the resources mobilization the firm were able to acquire as a source of sustainable competitive advantage in the market (Wernerfelt, 1984), indicator such as financial and non-financial terms Darroch, 2005; Bakar and Ahmad, 2010).

As reported by Ataley et al., (2013), "organizational performance indicators can be departmental, such as pertaining to production, finance or marketing, or consequential such as pertaining to growth and profit, and can be measured with objective or subjective indicators." Organizational performance in terms of financial performance, employee performance, management performance or even shareholder performance can be measured by the value products and services the organization delivers to its customers. According to Fouad, (2015), organizational performance is seen as a multidimensional construct. It often informs the organization on how well they are doing in terms of meeting their goals, and satisfying customers. Thus, the main role of performance measurement is to know whether the current position of the organization is going according to its planned objectives of satisfying the needs and requirements of customers (Jimenez, and Sanz-Valle. 2011).

2.2. Theoretical Review

This study considers a number of theories relevant to the focus of the study. These are: Disruptive Innovation Theory, Innovation profit theory, Resource-Based Theory, Diamond Innovation Model and The Theory of Innovative Enterprise.

a. Disruptive Innovation Theory

Disruptive Innovation Theory, advanced by Christensen (1997, 2016; Christensen & Bower 1996; Christensen & Raynor 2018), was built up based on a series of previous technological innovation studies. In 1997, Christensen published his influential book entitled *The Innovator's Dilemma*, which made him renowned in the study of technological innovation in commercial enterprises. The book, which became a bestseller at that time, articulated the basic theory of disruptive technology in a comprehensive and detailed manner. In order to resolve the innovator's dilemma over how well-managed incumbent firms can avoid dethronement by developing disruptive technologies from their sustaining competitive paradigms, Christensen & Raynor (2018) published another book entitled *The Innovator's Solution*.

Markides (2016) further argued that technological innovations were fundamentally different from business model innovations, and he called for a finer categorization within disruptive innovation. We also believe that disruptive innovation is a more appropriate term than disruptive technology to describe the entire phenomenon, as business models innovations are heavily involved. Moreover, Christensen refined his theory and emphasized that disruptive innovations could be broadly classified into low-end and new-market disruptive innovations (Christensen & Raynor, 2018). While low-end disruptions are those that attack the least-profitable and most over-served customers at the low end of the original value network, new-market disruptions

create a new value network, where it is the non-consumption, not the incumbent, which must be overcome (Christensen & Raynor 2003).

b. The Theory of Innovative Enterprise

Innovation can be explored in a systems model inspired by the theories of the firm. Slater (1997) explains that “innovation may be concerned with the creation of new businesses within the existing business or the renewal of ongoing businesses that have become stagnant or in need of transformation”. The firm can survive the competitive struggle, not by varying its price and quantity, but by innovating (Porter, 1990).

2.3 Empirical Review

Sanyal and Goswami (2000) investigated the relationship between corruption, tax evasion and laffer curve. The study explains that corrupt tax administration leads to laffer curve behavior (i.e. a higher tax rate leads to a smaller net revenue). This portrays net revenue earned from a truth revealing audit probability always exceeds net revenue through audits, taxes, and penalties. Osoro (1993) used descriptive statistics to investigate the impact of tax administration on government revenue. They found that increasing tax revenue is a function of effective enforcement strategy, which is lacking in Nigeria. These enforcement strategies include; adequate manpower, computers, effective postal and communication system.

Ogbonna and Appah (2012) investigated the impact of tax reforms on economic growth of Nigeria from 1994 to 2009. They used both descriptive statistics and econometric models such as White test, Jacque Berra test, ADF test, Johansen test, Granger causality and Breusch Godfrey test as analytic techniques. The results from the various tests show that tax reforms are positively and significantly related to economic. Ngerebo and Masa (2012) used the ability to generate revenue and ability to influence consumption patterns as measurement parameters to appraise the tax system in Nigeria. Their major emphasis was on Value Added Tax (VAT). They found that VAT has been effective but not efficient. Hence, it was recommended that tax authorities should be record/proprietary conscious to enable them cover the cost of collection machinery and the target amount payable to the government.

Alabede, Ariffin and Idris (2011) used descriptive statistics and moderated multiple regression to investigate the moderating effect of financial condition and risk preference on the relationship between tax payers’ attitude and compliance behavior. The result of the study indicates that taxpayers’ attitude towards tax evasion is positively related to compliance behavior.

Longoni (2009) have examined trade liberalization and trade tax revenues applying panel-data methods to a large sample of African countries from the period 1970-2000. He stated that one of the most widely accepted theories in economics claims there exists a positive relationship between a higher degree of openness to international trade and economic growth though, the relationship between trade taxes and trade tax revenues is nonlinear, giving credit to the existence of a laffer effect. As a consequence of such, government revenue generation will be increase, enabling and secure market environment will be enhanced. Tax revenue is generated

through trade openness that is largely considered as a growth-enhancing strategy because of its positive effect on the promotion of efficiency, the improvement in international competition and the expansion of the trade volume.

Agbeyegbe, Stotsky and WoldeMariam (2004) examined trade liberalization, exchange rate changes and tax revenue using a panel of 22 countries in Sub-Saharan Africa over 1980-1996, they performed GMM regressions to test this relationship because of endogeneity of tax revenue. They found evidence that relationship between trade openness and tax revenue is sensitive to the measure used to proxy trade openness but that in general, trade openness is not strongly linked to aggregate tax revenue or its components- though with one measure, it is linked to higher income tax revenue. Currency appreciation and higher inflation showed some linkage to lower tax revenues or its components.

Baunsgaard and Keen (2005) examined tax revenue and trade liberalization, based on results, for high income countries, over the last 25 years have countries actually managed to offset reductions in trade tax revenues due to liberalization by increasing their domestic tax revenues. For middle-income countries, there has been strong signs that this had been in the order of 45-60% of surplus domestic tax revenue for each dollar of trade tax revenue, with apparently full recovery when separately identifying the episodes in which trade tax revenues fell. For low-income countries, however, recovery had been far from complete. At most, they had recovered on more than around 30% of each lost dollar on average.

Disruptive Technology on National Information Technology Development Levy

Solomon and Nicholas (2012) conducted a study on the effect of disruptive technology on performance of firms in the telecommunication sector in Kenya. The objective of this paper is to investigate the effect of disruptive technology adopted by firms in the telecommunication industry in Kenya on performance. Data was analyzed through descriptive statistics and the relationship between the variables established using regression analysis. The descriptive statistical tools such as Statistical Package for Social Sciences (SPSS) and MS Excel were used to help the researcher describe the data and determine the extent. The data was presented through percentages, means, standard deviations and frequencies. The paper concludes that adoption of disruptive technology affected performance of the firms to a great extent. Paulo and Filipa (2012) investigated the disruptive technology through innovative services and business models supported in electronic platforms. Ann, Itanyi and Wilfred (2012) investigated managing innovations in telecommunications industry in Nigeria. Ann, Itanyi and Wilfred (2012) averred that of all the challenges faced by managers today, the management of technological innovation (MTI) is one of the most demanding. Get it right and firms create value and profit. Get it wrong and firms can face serious and perhaps terminal problems, losing money, workers, and reputation. This will lead to revenue loss, company closures and increased unemployment.

The objective of this study was to assess the level of innovation in Nigeria's telecommunications industry. The aim was to ascertain how innovative the operators in the industry are which in turn determines how competitive the industry is. Data was collected from available literature on the

telecommunications industry. The study proved that there are innovative activities being carried out by the various operators but there is still a lot of room for improvement. The study also found out that government and regulatory authorities need to do more in the area of infrastructural development and policy formulation to ensure a level playing field for both the old and new entrants. The study recommended that all stakeholders in the telecommunications industry, especially the regulator, shareholders, sponsors/directors, top management, and the government, should ensure that there is an innovation strategy in place which should be managed to ensure a high level of productivity and competition amongst the various operators. The study concluded that most of the service providers do not have designed corporate innovation strategies or processes. Furthermore, there are no agents of innovation and innovation teams across the various organizations, champions who will assist the project manager with the implementation and tracking of ideas, innovations and changes. Therefore, there is the need by the various service providers to breakdown functional barriers in their various organizations. However, it is equally important for these organizations to minimize the impact of hierarchies so that a seamless flow of ideas is made possible.

Seyedeh, Jayaraman, Syed and Ali (2017) conducted a study on disruptive technology and pricing practices for performance in Malaysian telecom. Their study aimed to test the role of pricing practices as an intervening variable in the relationship between disruptive technology (innovation strategy, innovation process, cross-functional organization, tools/technology, and system integration) and firms' performance in an emerging economy. Data were collected from 249 managers representing the Malaysian telecommunications sector using a structured questionnaire. Structural equation modeling (SEM) with SmartPLS software, version 3, was used to achieve the research objectives and to analyze the measurements and structural model. The results showed that, whereas innovation strategy, innovation process, cross-functional organization, and system integration positively influence pricing practice, tools and technology has an insignificant effect on pricing practice. Interestingly, pricing practice mediates the relationship between innovation strategy and system integration regarding firm performance. The findings of this study suggest that, in the formulation of such a strategy, service firms should consider the pricing factor. Telecommunications service providers could use this model to implement pricing practices particularly driven by innovation practices to achieve the desired performance.

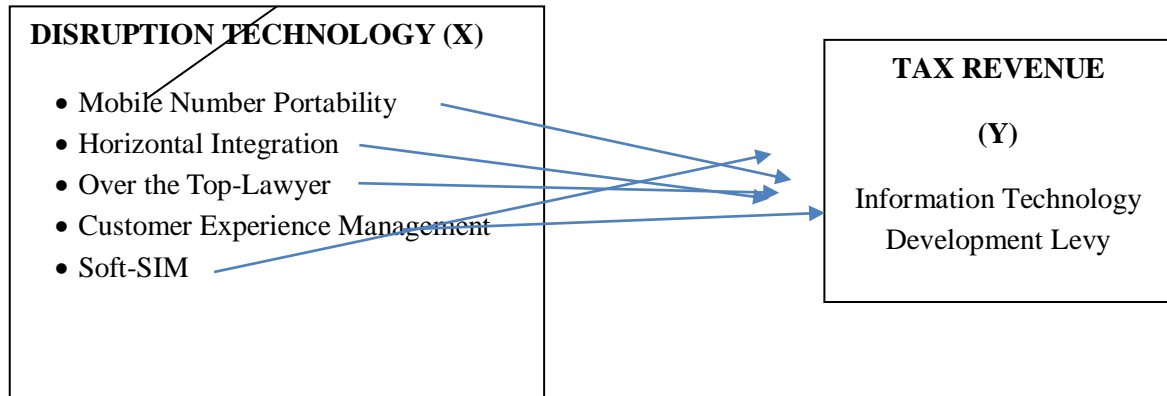
2.4 Overview of Nigerian Telecommunication Industry

MTN Nigeria became the first GSM network after a lauded auction process. This was followed by Econet (now Airtel) in the same year. After which Globacom and Etisalat (now 9mobile) came in 2003 and 2007 respectively.

As a result, the telecommunication industry in Nigeria has grown tremendously in the last 10 years. For instance, the subscribers to mobile telecom networks as at September 2013 were reported to be 121,271,218 with a teledensity of 86.62% (NCC, 2015). As at September 2014; this figure rose to 134,618,994 with teledensity of 96.87%. Recently, in September 2019, the population of Nigerian mobile network subscribers has risen to 150,660,631 with teledensity of 107.61% (NCC, 2020). While there have been several porting activities among the subscribers –

switching across networks as reported by the Nigerian Communication Commission's monthly bulletin, the competitive intensity in the industry has become so unimaginably high that the network operators continue to remain vigilant particularly regarding the developments in both the micro-and macro-environments of their businesses (Adelaja, 2011; Thomas, 2014).

2.6 Researcher's Conceptual Model



Source: Researcher's Conceptual Model, (2021)

3.0 Methodology

Ex-post facto research design was used for the study using published secondary data of listed Telecommunication companies under study. Time series secondary data published by The FIRS and Ministry of Budget Planning were collected for both tax revenue and disruptive technology for the period of 2001 to 2019. The network providers selected for the study are the first four in the industry vis a vis; MTN, Globacom, Airtel and 9-mobile. These companies have been selected because they are listed on the Nigerian Stock Exchange and they are the key player in the telecommunication industry (NCC, 2016). The choice of the use of is that, its enables researchers sift through large volumes of data, as a means of eliciting data from the secondary sources.

The study employed quantitative method of data analysis to examine the relationship between the Disruptive Technology and Tax Revenue. The data was used to look for cause and effect relationships and therefore, can be used to make predictions. The quantitative method will be aided with the use of SPSS statistical software. The mean, median, minimum and maximum values for the data were computed. Also, Skewness and Kurtosis test for normality were computed the research will adopt 5% level of significance in the study.

Model Specification

One of the advantages of panel data is its ability to capture dynamics of changes or adjustment in data. In this study, dynamic panel model shall be employed to model the relationship existing among the variables of interest. Specifically,

Y = Dependent Variable: Information Technology Development Levy (ITDL)

X = Independent Variable: Disruptive Technology

The model formulated for the study is:

$$Y = f(X_{DT})$$

$$X_{DT} = (x_1, x_2, x_3, x_4, x_5).$$

Therefore,

$$Y = f(x_1, x_2, x_3, x_4, x_5).$$

$$y = f(x_1MNP_{it} + x_2HI_{it} + x_3OTTL_{it} + x_4CEM_{it} + x_5S-SIM_{it})$$

$$ITDL = \beta_0 + \beta_1MNP_{it} + \beta_2HI_{it} + \beta_3OTTL_{it} + \beta_4CEM_{it} + \beta_5S-SIM_{it} + \epsilon_i \text{-----Eqn 1}$$

X = **Disruptive technology**

x₁= Mobile Number Portability (MNP)

x₂= Horizontal Integration (HI)

x₃= Over the Top-Lawyer (OTTL)

x₄= Customer Experience Management(CEM)

x₅= Soft-SIM(S-SIM)

Y= Information Technology Development Levy (ITDL)

DT_{it} is a vector of variables measuring disruptive technology such as; Mobile Number Portability, Horizontal Integration, Customer Experience Management and Soft-SIM.

4.0 DIAGNOSTIC TREATMENT TEST FOR ALL VARIABLES

Before the data were subjected to inferential analysis, normality test, a diagnostic test was conducted to ensure that the data do not violate important assumptions of regression analysis. Data are normal if they follow a normal distribution. The normality of data distribution was assessed by examining its skewness and kurtosis. A variable with an absolute Skewness value greater than 3.0 is extremely skewed while a kurtosis index greater than 8.0 is an extreme kurtosis.

The results of the normality test of the Information Technology Development Levy of the selected telecommunication network providers in Nigeria in appendix 2 indicated that the skewness and kurtosis fall with the acceptable range as shown. The highest value for skewness is 1.575(AIRTEL) while the highest for Kurtosis is 0.585 (AIRTEL). This implies that the data used for the study are normal and satisfy the assumption of normality. They are therefore suitable for regression analysis.

4.1 Hypotheses Testing

Disruptive technology does not have significant effect on Information Technology Development Levy of the selected telecommunication network providers in Nigeria.

x₁= Mobile Number Portability (MNP)

x₂= Horizontal Integration (HI)

x₃= Over the Top-Lawyer (OTTL)

x_4 = Customer Experience Management(CEM)

x_5 = Soft-SIM(S-SIM)

Y = Information Technology Development Levy

$$ITDL = \beta_0 + \beta_1MNP_{it} + \beta_2HI_{it} + \beta_3OTTL_{it} + \beta_4CEM_{it} + \beta_5S-SIM_{it} + \epsilon_i$$

Multiple regression analysis is used to examine the effects of disruptive technology dimensions on Information Technology Development Levy of the selected telecommunication network providers in Nigeria. Table 1 presents the model fit which establishes how the model equation fits the data and Adjusted R-square (Adj. R²) used to establish the predictive power of the study’s model. The table further presents the coefficients of the identified disruptive technology dimensions with respect to Information Technology Development Levy of the selected telecommunication network providers in Nigeria.

Table 1: Summary of multiple regression analysis for the effect of disruptive technology dimensions on the Information Technology Development Levy of the selected telecommunication network providers in Nigeria.

Model	Beta	t	Sig.	R	R ²	Adj. R ²	ANOVA Sig.	F(df)
(Constant) Telecoms industry	0.43	4.51	0.00	0.68	0.462	0.459	0.000	149.27 (5,869)
Mobile Number Portability (MNP)	0.12	3.27	0.00					
Horizontal Integration (HI)	0.26	7.65	0.00					
Over the Top-Lawyer (OTTL)	0.13	3.71	0.00					
Customer Experience Management(CEM)	0.29	8.81	0.00					
Soft-SIM(S-SIM)	0.10	3.58	0.00					

Source: Computed by the Researcher (2021)

Table 1 presents the results of multiple regression analysis for the effect of disruptive technology dimensions on Information Technology Development Levy of the selected telecommunication network providers in Nigeria. When all the companies were considered as a whole, the result shows that disruptive technology dimensions have positive and moderately average relationship with Information Technology Development Levy of the selected telecommunication network providers in Nigeria (R = 0.68, p=0.000). The adjusted coefficient of determination (Adj R²) of 0.459 showed that disruptive technology dimensions explained 45.9% of the variation in Information Technology Development Levy of the selected telecommunication network providers in Nigeria while the remaining 54.1% variation in Information Technology Development Levy of the selected telecommunication network providers in Nigeria is explained by other exogenous variable different from those considered in this study.

Furthermore, Table 4.27 presents the results of ANOVA (overall model significance) of regression test which revealed that the disruptive technology dimensions have a significant effect

on Information Technology Development Levy of the selected telecommunication network providers in Nigeria. This can be explained by the F-value (149.27) and p-value (0.000) which is statistically significant at 95% confidence interval.

The results of regression coefficients for disruptive technology dimensions in relation to Information Technology Development Levy of the selected telecommunication network providers in Nigeria revealed that at 95% confidence level,

Mobile Number Portability ($\beta = 0.12$, $p= 0.000$), Horizontal Integration ($\beta = 0.26$, $p= 0.000$), Over the Top-Lawyer ($\beta = 0.13$, $p= 0.000$), Customer Experience Management ($\beta = 0.29$, $p= 0.000$), and Soft-SIM ($\beta = 0.10$, $p= 0.000$) were statistically significant as the p-values were less than 0.05 and the t-values greater than 1.96.

Based on the coefficients of regression in table 4.27, the regression model is restated as follows:

$$ITDL = 0.43 + 0.12MNP + 0.26HI + 0.13TL + 0.29CEM + 0.1 S-SIM..... Eq. (i)$$

According to the regression equation above, taking all factors constant at zero, Information Technology Development Levy of the selected telecommunication network providers in Nigeria is 0.43. The result also indicates that taking all other independent variables at zero, a unit change in Recruitment Selection and Placement will lead to a 0.12 increase in Information Technology Development Levy of the selected telecommunication network providers in Nigeria.

Mobile Number Portability will also lead to a 0.12 increase in the Information Technology Development Levy of the selected telecommunication network providers in Nigeria given that all other factors are held constant. Similarly, the results also revealed that a unit change in Horizontal Integration will lead to a 0.26 increase in Information Technology Development Levy of the selected telecommunication network providers in Nigeria given that all other factors are held constant.

In addition, the results also revealed that a unit change in Over the Top-Lawyer will lead to a 0.13 increase in Information Technology Development Levy of the selected telecommunication network providers in Nigeria given that all other factors are held constant. The Information Technology Development Levy of the selected telecommunication network providers in Nigeria will experience a 0.29 increase given a unit change in Customer Experience Management given that all other factors are held constant. Lastly, The Information Technology Development Levy of the selected telecommunication network providers in Nigeria will experience a 0.10 increase given a unit change in Soft-SIM given that all other factors are held constant.

Overall from the results, Customer Experience Management had the highest relative effect on Information Technology Development Levy of the selected telecommunication network providers in Nigeria with a coefficient of 0.29 and t value of 8.81, followed by Horizontal Integration with a coefficient of 0.26, and t value of 7.65. Over the Top-Lawyer was next in line, with a coefficient of 0.13 and a t value of 3.71, followed by Mobile Number Portability with a coefficient of 0.12 and a t value of 3.27 while Soft-SIM had the least relative effect with a coefficient of 0.10 and a t value of 3.58. Given these results, this study can conclude that

disruptive technology dimensions significantly affect Information Technology Development Levy of the selected telecommunication network providers in Nigeria. On the strength of this result ($\text{Adj } R^2 = 0.459$, $F(5,77) = 149.27$, $p = 0.000$); this study rejects that disruptive technology dimensions have significant effects on Information Technology Development Levy of the selected telecommunication network providers in Nigeria.

5.0 Conclusion and Recommendations

Today we are at the beginning of a new and accelerating phase of technological innovation, one that may alter the development path of emerging markets in particular. This new phase is supercharged by the convergence of rapid connectivity and digitalization, which, by linking billions of individuals, businesses, and machines in new ways, is creating an unprecedented tsunami of data. Businesses and governments are harnessing this data revolution to connect directly with individuals, businesses, and citizens, and to gain new insights into both microeconomic transactions and aggregated macro-level trends.

Nigeria has the largest mobile market in West Africa, sustained by strong mobile broadband infrastructure and improved international connectivity. Accelerating access to digital technologies shoots efficiency, productivity, and most importantly innovation bringing about choice and opportunities for greater growth and organizational performance. It was discovered that Mobile Number Portability, Horizontal Integration, Over the Top-Lawyer, Customer Experience Management and Soft-SIM significantly affect Information Technology Development Levy telecommunication network providers in Nigeria. Customer experience management has the highest contribution while soft-Sim contributes the least among others.

Over the years, there have been series of SIM card transformations as SIM has reduced significantly in size than the standard size. Soft-SIM is anticipated to be the next generation of SIM. Therefore, the likelihood of soft-SIM acceptance is one of the focus of the study. There is need to pursue context-specific approaches that will prioritize key interventions and advance the digital economy in Nigeria to promote rapid growth, more and better jobs, and more accessible and higher quality public and private services. According to Gans (2016, 18), new technological breakthrough initially takes so much time to improve on the success, however, little effort at some point triggers success.

The regime of taxes and levies ought to be ascertainable in order to assist planning and forecasting for business endeavors and the economy. While it is accepted and common practice that taxes and levies form a veritable source of revenue for government, it is imperative that citizens should be able to determine or know in advance what taxes they are liable to pay. The computation of taxes and levies should therefore be predicated on clearly defined criteria. The absence of these as discussed earlier, negates regulatory propriety and certainty which negatively impact investor confidence and subsequent investment decisions by telecommunications operators. The phenomenon affects the perception of Nigeria as a preferred investment destination, with unfavorable consequences for the national economy.

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Appendices

Appendix 1: Information Technology Development Levy of the selected telecommunication network providers in Nigeria.

YOA	MTN (₦)	GLO (₦)	AIRTEL (₦)	9 MOBILE (₦)	Log MTN (₦)	Log GLO (₦)	Log AIRTEL (₦)	Log 9MOBILE (₦)
2019	2743220074	56230509.3	123251440	0	9.438261	7.749972	8.090792	0
2018	1104969270	0	0	0	9.04335	0	0	0
2017	1350723400	0	0	0	9.130566	0	0	0
2016	0	0	663516004	0	0	0	8.821851	0
2015	2906063550	92642891.3	0	0	9.463305	7.966812	0	0
2014	3108459850	0	0	0	9.492545	0	0	0
2013	3058510380	0	0	0	9.48551	0	0	0
2012	3410965496	307931320	0	0	9.532877	8.488454	0	0
2005	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0

Appendix 2: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
MTN	19	.00	9.53	5.4281	4.75753	-.346	.524	-2.113	1.014
GLO	19	.00	8.49	1.6960	3.37677	1.551	.524	.451	1.014
AIRTEL	19	.00	8.82	1.6695	3.33402	1.575	.524	.585	1.014
MOBILE	19	.00	.00	.0000	.00000
Valid N (listwise)	19								