TREND AND PATTERN OF ADVANCED AIRTIME/DATA LENDING AND ITS PROBABILITY DISTRIBUTION ON NIGERIAN TELECOMMUNICATION NETWORK

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Abstract

With the ability of the telecommunications operators to develop business strategies in an environment where individuals and corporate organizations have been longing for services, pre-paid airtime/data (Top-up) has become a unique and innovative social business model. But the vendor is left with the problem of understanding the trend and pattern of advanced airtime/data lending and recovery and the probability distribution it follows. Hence, the main aim of this article is to examine the trend and pattern of advanced airtime/data lending and recovery and their probability distribution. The methodology of the article was designed by using Audit Command Language (R-Code) and Easy-Fit XL Evaluation Software with different ranking criteria to analysis secondary data covering 36 months, extracted from the Mobile Decisioning-MODE now ERL Telecoms Services limited and Globacom telecom operator's intelligent network. The research findings revealed that lending and recovery are usually high especially when there is major disaster news, holidays, or festivity periods. The results also show that the drawings from the vendor's account output follow Weibull, Burr, and Pareto probability distribution function while the recovery output, rank Error, Nakagami, and Weibull as the best performing models distribution using Kolmogorov Smirnov, Anderson Darling and Chi-Square ranking criteria respectively. The results of the study can assist the vendor on the amount to be reserve for the customers in the e-top bucket to be able to access the loan service when needed. It, therefore, recommends that the vendor should keep a sound revenue assurance unit that can assist in the reconciliation of all identified issues associated with the business data and also use the suggested distributions to project bucket account (e-top up) refilling. The study has established that there is no known airtime/data lending and recovery template for mobile telecommunication industries in Nigeria that can be used to determine the trend and pattern of airtime/data borrowed/lend by both subscribers and telecommunication providers that can use to determine the

airtime/data bucket reserve.

Keywords: Telecommunication, Lending, Recovery, Distribution-fits, Nigerian-Network

1. Background of the Study

In all spheres of life, communication has become indispensable and has helped in making the world a global village through which one can reach out to anyone in a few seconds no matter the distance. It has bridged relationship gaps as well as saved lives (Ashinze, 2020). In recent years, significant advances have been made in the development of quality services offered by telecommunication operators across the world (Nigeria inclusive). The Nigeria telecommunication industry cannot be rule out among the fastest growing telecommunication industries in the world, and the largest provider of job opportunities for Nigeria teeming population. In terms of growth, Nigeria has ranked the largest and fastest-growing telecommunications market in Africa, and among the 10 fastest growing telecommunications market in the world.

The emergence of Global System for Mobile Communication (GSM) is relatively new in Nigeria, unlike the Code Division Multiple Access (CDMA) (landline) operations that have been in existence for a while to provide means of communication to Nigerians but were bedeviled by gross inefficiency and corruption (Anon., 2012).

Erstwhile to 2001 when Nigeria's telecommunication sector was liberalised, Nigeria had about seven hundred thousand (700,000) lines, which could not meet the growing demand for telecommunications services by Nigerians. Access to information technology was also limited as a result of failed operations by the Nigerian Telecommunications Limited (NITEL) (Deloitte 2015). The liberalisation of the sector marshaled in the first Global System for Mobile Communication (GSM) operator and the award of the first Digital Mobile License (DML) in 2001. Since then, the sector has witnessed an extraordinary outpouring in investments and growth from 2001 to date by modernising existing products, diversify into new areas where capabilities and resources are available, improve general business processes and navigate the complex regulatory landscape effectively. It is however not surprising to see the different value of services added on the different networks of service providers in an attempt to ease off usage and satisfaction to customers. This value of services includes the entry of new operators has also scoop-out the competition in the sector with the crowded subscriber base being better for it. Initiatives like the borrowing of airtime/data and number portability have also enriched consumer experience by limiting hassles to accessing better services on a preferred network.

The first global system for a mobile communication network provider that came on board was ECONET (now Airtel), formally launched on the 6th of August 2001, with MTN Nigeria which follows suit almost immediately. The mobile communication network providers were launched under the 900 MHZ and 1800 MHZ spectrum respectively, with a call cost of N50 per minute. Globacom Nigeria Limited for the first time on board introduced per-second billing and other packages that brought healthy competition to the telecommunication industry (Ogunfunwa, 2019).

Presently, the mobile phone has gone beyond its regular usage to an instrument of utmost ease and convenience. Aside from the basic functionality of making calls after recharging airtime to one device does it all, mobile operators worldwide have taken steps to ensure that their subscribers receive the best, fastest, and most secure services (Seamless Distribution System, 2020). The introduction of other Global System for mobile communication network providers such as Etisalat (now 9mobile), reformed ECONET (Airtel Nigeria) and Globacom Nigeria Limited brought about a huge transformation in the telecom industry. Each of these network providers has its peculiarity in terms of the service packages introduced to its subscribers. These tariff war (competition) among the service providers has given a lot of value for subscribers' spending in the sector (Nilsson, 2017).

Despite the perceived benefits associated with the utilisation of the modrnised telecommunications sector services in Nigeria, at the moment, the Global System for Mobile Communication is faced with several challenges that are affecting the optimum efficiency and performance of the industry. The network providers complained of the poor infrastructural base, as a key factor inhibiting their ability to meet key factors indicators as prescribed by the Nigeria communication regulatory authority (Nigeria Communication Commission) (NCC) (Ogunfunwa, 2019) of which other challenges in the sector have remained largely uninvestigated. Hence, the study was conducted to examine the trend and pattern of the borrowing and recovery of airtime/data and its probability distribution of services offered by the GSM providers in Nigeria.

2. Statement of the Problem

The telecommunications revolution era that brought growth in the different fields of telecommunications services delivery and regulatory advancement in Nigeria begins in the year 2000 and continues to date. During this era, the Nigerian government enacts telecommunication regulatory policy which enabled the telecommunications regulators to revive the framework in a way that increased the confidence of investors (Micah, 2014). The policy enabled the auctioning of digital mobile licenses in Nigeria in 2001 which spurred many activities in the sector. With the telecommunications operators

developing services in an environment where individuals and corporate organizations have been longing for services, active subscription, and the number of active telephone connections per one hundred inhabitants of an area has risen in the country.

In the last 10 years, there has been an increase in the competition among the Nigerian telecommunication service providers and the number of active subscribers of the network providers. As part of the industry strategies to sustain the current business, Nigeria telecommunication industries had improved on the general business processes by maintaining the existing products, diversifying into new areas for which capabilities and resources are near, and navigate through the regulatory landscape (Deloitte, 2015). The mobile technology has enabled the creation of new services that challenge the definition of the most commonly known form of a stored value system – money. This can create headaches for regulators, banks, and payment system operators and is making it difficult to classify and regulate some new payment models (Mobile money, mobile airtime, cryptocurrencies, and a stored value, 2015).

As of 2019, the network had over 174m active subscribers put together. These vast numbers of subscribers coupled with competition in the telecommunication industries had brought about different innovation packages to attract subscribers which leads to different challenges that need an urgent solution by service providers.

Nigeria service providers are faced with the challenge of a regulation made by Nigeria Communication Commission of not disallowing subscriber to port out of their network service even if payment of borrowed data have not been made by the subscriber. This accumulates to the quantum of bad debt to the vendor. Customers take advantage of this opportunity since they can always return to the ported network within the next 3 months while maintaining the Mobile Station International Subscriber Directory Number.

Also, when subscribers run out of airtime/data, they need a recharge card to top up their accounts. It may be difficult in some situations for the customer to buy a recharge card especially during late-night hours, or while traveling, etc. Under these emergencies, a subscriber may not be able to make calls due to low balance on their mobile line and may result in opportunity loss to network service providers and the subscribers. In the process of providing solutions to the problem to such customers who have consumed their airtime/data and cannot go out immediately to buy a recharge card, the Nigerian telecommunication service providers developed a pre-paid airtime/data advanced package which is meant to be repaid within 72 hours. The customer got advanced airtime/data and coincidentally recharged his line via USSD

within the repayment grace period after sending a request to avail the facility of airtime credit by sending a text on the shortcodes. The system automatically deducts the corresponding amount of the airtime advanced package and service charge/fee at first recharge by a prorated formula configured on the system based on the denomination loaded. This system configuration does not allow the subscriber to enjoy the advanced airtime subscribed to after interest on the plan package had been already charged and deducted by the vendor.

Furthermore, the vendor who had an agreement with the telecom provider to render the service of borrow-me credit otherwise known as airtime loan, often buy airtime into the bucket account (e-top up) developed by the network providers to allow any subscribers who require the service to get the amount of airtime needed after dialing a short code designed for the package as the case may be. Some telecom operators default in the original agreement signed with the vendors to loan airtime to their subscribers who require airtime after lodging a huge lump sum of virtual airtime into the bucket. The vendors over time turn around the initial purchase by reinvesting the payout and sometimes the accumulated interest back into the bucket, which makes the amounts in the bucket continually increase with no subsequent airtime purchase by the vendor. The telco operator feels cheated and sometimes demands a fresh injection of funds into the system. To reconcile these conflicts, it is necessary to have a good knowledge of how to determine when fresh injection should be made into the bucket taken into consideration the subscriber's rate of borrowing airtime.

Therefore, it is however imperative that the vendor knows the trend and pattern of the borrowing and recovery of airtime/data and its probability distribution (reordering model) which is aim of this study, to make predictions for subsequent borrowing and to know how regular provision can be made to refill the airtime bucket and avoid a case where a customer is desperately in need of airtime but dial the shortcode and cannot access the service. The trend and pattern can also assist the vendor to know when it is necessary to inject funds into the airtime bucket and how much to be injected to prevent entering into an unnecessary fresh agreement with the telco providers or contract restructuring where necessary. It can also help to understudy the repayment of loan mechanism within the 72 hour window period and assist to find out which technique of reconciliation of data is appropriate to avoid continuous data reconciliation conflicts for revenue assurance purposes. In conclusion, major stakeholders can be assisted in taking reasonable decisions relating to their agreement to prevent the vendor not to be perpetually at the mercy of the telco operators.

3. Theoretical Framework

Lending, common terms in the financial sectors have a collation of various

established models that are applicable in various industries including telecommunication industries. Peer-to-peer lending Model, (P2P lending), the practice of lending money to individuals or businesses which match lenders with potential borrowers through online services was assumed to serve as similar models of operation with telecom lending and recovery arrangement plan. Due to some unique characteristics, peer-to-peer lending is known to be an alternative source of financing, and a form of direct lending of money to individuals or businesses without an official financial institution participating as an intermediary in the transaction as depicted in figure I below (Corporate Finance Institute, 2019). P2P lending offers both secured and unsecured loans. However, most of the loans in P2P lending are unsecured personal loans. Secured loans are rare for the industry and are usually backed by luxury goods. In a similar to P2P models reveal how the movement of credits can be without the interference of a bank, it can be deduced that similar events play out in the process of borrowing and recovery of airtime as credit move from the vendor's bucket directly to the customer's account.

Architecture of P2P Lending Process

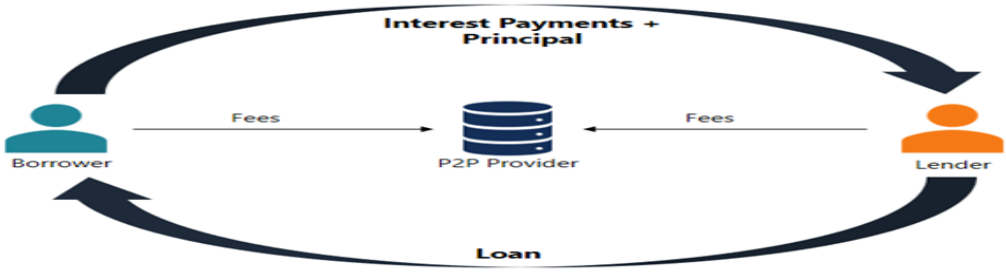

Figure I

Source: Adapted for the study

Conceptual Framework

Since one of the objective of the Nigeria service providers is to allow subscribers to stay connected and continue making calls when they are unable to recharge or buy more airtime by borrowing from the vendor without an intermediary bank, the conceptual frame work for this study is built on **Peer-to-peer** lending models as described by (Corporate Finance Institute, 2019), but modified for this study. The conceptual framework in Figure I and II below represent the interrelated concepts require for borrowing to occur without an intermediary bank, and the frameworks indicates the direction of flow of lending and recovery processes for the borrowing.

Architecture of Airtime/Data Credit Service

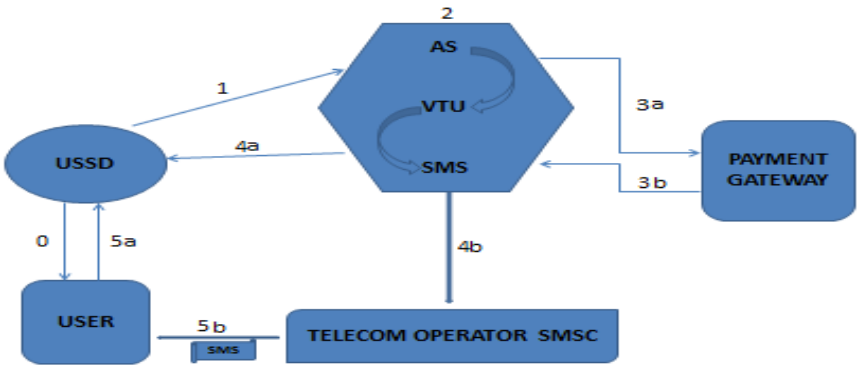

Figure II

Source: Developed for study by author

The diagram above depicts the architecture of airtime/data credit service from the customer through the vendor to the Telco operator. It illustrates how the service user dials the plan code using USSD, the dialing code allow the subscriber to get access to the server to process its request after verifying the customer profile in the SMS by checking the customer's average loading of recharge airtimes. The actual amount that can qualify customers to borrow is revealed and the payment gateway credits the customer after the validation.
AS- Application Server; **VTU**- Virtual Transaction Unit; **SMSC**- Short Message Service Centre; **USSD**- Unstructured Supplementary Service Data; **SMS**- Short Message Service

Architecture of Airtime/Data Recovery

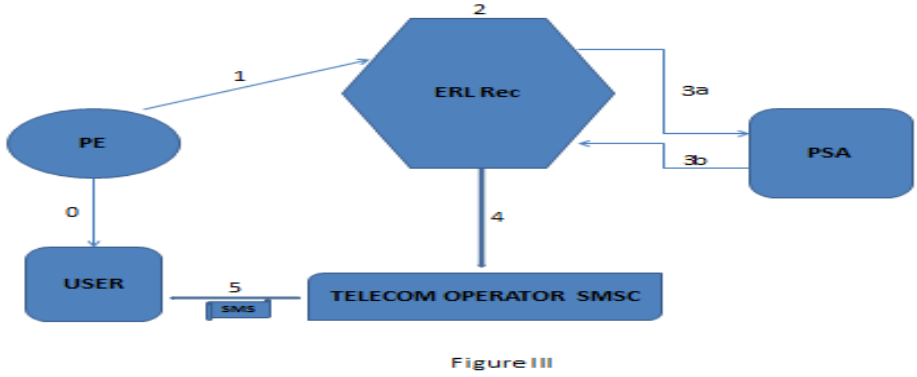

Figure III

Source: Developed for study by author

Figure III above depicts how **t**he network intelligence waits for the

customer's next recharge of his/her mobile phone airtime to deduct the amount borrowed. The promo engine sends the signal to the ERL server while the server informs the operator payment gateway to carry out the loan deduction operation, after which the customer receives the debit alert via the SMS.
PE- Promo Engine; **ERL-Rec**- ERL Recovery; **PSA**- Short Message Service Centre; **SMS**- Short Message Service.

4. Review of Literature

The problem of airtime/data lending and recovery in the telecommunication industry is well recognised. The growing awareness of different telecommunication service providers in the resolution of preference of subscribers for a variety of service provider plans particularly airtime/data borrowing has opened up new areas of study in Nigeria telecommunication industries. The review of the existing literature indicates that there has been limited research on the trend and pattern of advanced airtime/data lending and recovery with distribution it follows, although a significant number of studies have been devoted to the subject of prepaid airtime/data lending in the telecommunication industry, no known study explores the problem of understanding the trend and pattern of advanced airtime/data lending and recovery with their probability distribution they follow. Certain authors identify the influence and importance of subscribing for prepaid airtime/data, but this publication is significantly less numerous than studies focused on influences and significants.

Kabiru & Sani (2019) piloted their study on the Islamic perspective of airtime credit loan. They discuss the modus operandi of airtime credit loan as well as service charge/fee by GSM service providers in Nigeria. They observed that the word Loan used does not imply the Loan transaction under Islamic Law. It is then recommended that Muslim GSM customers are free to patronize the airtime credit loan because it is not prohibited act under the induction of Islamic rules and regulations.

The study of Aron (2018) examines the evolution of mobile money, a recent innovation that provides financial transaction services via mobile phone, including to the unbanked global poor and its important role in widening financial inclusion by exploring the channels of economic influence of mobile money from a micro perspective. The study critically reviewed the empirical literature on the economic impact. In his study, he noted that the technology (Mobile money) has spread rapidly in the developing world, jumping the provision of formal banking services by solving the problems of weak institutional infrastructure and the cost structure of conventional banking. The evidence found convincingly suggests that mobile money fosters risk-sharing, but direct evidence of the promotion of welfare and saving is still mostly rather less robust.

Aamo, Myom, & Shehu (2017) proposes how airtime credit could be used for banking purposes by providing a means of converting airtime credit of any network service provider to a credit alert for a particular bank account user. They demonstrated the aim of their study by showing a simple implementation of the proposed system. The advantage of the proposed system is that it allows customers the right to convert their purchased airtime credit to a credit alert at any time when they no longer wish to use the airtime credit again. Furthermore, they explain the limitations of the proposed system considering regulations in different countries of deployment. They concluded that the approach could be extended to cover other vouchers for banking applications as well.

Blumenstock, Eagle, & Fafchamps (2016) conducted their study on how Rwanda citizen uses mobile phone network to transfer airtime to those affected by unexpected shocks by using an extensive dataset on mobile phone activity in Rwanda and exploiting the quasi-random timing and location of natural disasters. Their study revealed that individuals make transfers and calls to people affected by disasters. They noted that the magnitude of these transfers is small in absolute terms but statistically significant. Reacting to the Lake Kivu earthquake of 2008, they estimate that roughly US$84 in airtime was transferred to individuals in the affected region that 70% of these transfers were immediately used to make outgoing calls and that US$16,959 was spent calling those near the epicenter. In their study, they noted that unlike other forms of interpersonal transfers, mobile airtime is sent over large geographic distances and in response to covariate shocks. They concluded that transfers are more likely to be sent to wealthy individuals, and are sent predominantly between pairs of individuals with a strong history of reciprocal favor exchange.

Also, Eke (2016) in his study examines ways in which smartphone data consumption trends influence demand for airtime data bundles by developing a model of subscriber response to economic and technical stimuli, conditional on cybernetic and subscriber characteristics. He uses three years of survey data, gathered from subscribers of data and voice bundles to evaluate the model empirically. He realized that single SIM smartphones, subscribers are responsive to relative Data Bundle prices and Airtime volume discounts. However, different Data Bundle packages elicit different responses. In particular, some data sharing takes place primarily through subscriber-substitution and intensified smartphone use, while changes in tariff or volume discounts for subscribers having dual SIM smartphones induces frequent and spontaneous network migration. He noted that subscribers and public power constraints bind at different points for different data bundles demand. The results of the study suggest that because multiple data/voice bundle platform interact, subscriber smartphone response coefficient must have multiple

strands to replace incentives to further bundle demands.

More also, Madise (2015) attempt to analyses the emergence of money by going back in time. He noted that the future of money may be more in keeping with the past than the present: Back to the future by analyzing the emergence of decentralised cryptocurrencies such as the Bitcoin which are not controlled by state authority. Using a framework developed based on fiat money, he examines mobile money and airtime as emerging forms of currency and noted that while mobile money has quickly been accepted as a new form of payment, and Malaŵi's central bank has issued guidelines regulating it, the emergence of airtime as a currency is still an uncrystallized ambulatory concept. Using the two dominant mobile operators; Airtel and Telekom Networks, Malaŵi introduced mobile money services largely modelled on the successful M-PESA, a financial service that was developed by Safaricom in Kenya. After an in-depth discussion of virtual currencies and how these currencies have shaken the foundational concepts and theories of money and emphasizes on the regulatory issues arising from risks that mobile money and airtime as emerging forms of money pose or may pose from both prudential and business conduct fronts analysis, it was concluded that although mobile money and airtime may not satisfy the key requirements of money in the legal sense, by looking at the origins of money, they do serve as money in the economic sense. The study also noted that airtime, like mobile money, has characteristics of money, and can be used as a means of exchange for value. The study, therefore, proposes that in the same way that mobile money service is quickly being embraced as a constituent part of the national payment system, airtime too may have to be so recognized which calls for a new legal and institutional approach to the regulatory framework of these emerging forms of money.

In addition, the study of Gupta & Sharma (2009) observed that services are always unique from a marketing perspective due to their intangible nature after testing the relationship of customer loyalty and the approach of service providers in India. They looked into the airtime service market in India and delves into the customer psyche. They noted that the observation is high especially in the case of a service like mobile airtime service where there is no service encounter, attributes required for brand loyalty become more complex.

The analysis of studies on the subject calls attention to this gap in the research literature, emphasizing the need for research focusing on the context(s) of trend and pattern of lending and recovering of the advanced airtime/data by the subscribers and service providers. Furthermore, a review of the literature and available data obtained and studied have a limited influence on the phenomenon in question. Researchers and practitioners strive to identify the

main factors influencing the lending and recovery of airtime/data and their effect on the development and growth of the telecommunication industries. For practitioners, it is important to better understand the trend and pattern of the airtime/data lending and recovery. In both cases, a better understanding of trends and patterns of the airtime/data lending and recovery is a significant challenge for researchers, businesses, as well as decision-makers responsible for industrial policies.

Hence, this study aimed to modify the P2P lending models described by the Corporate Finance Institute, (2019) to determine the trend and pattern of the lending and recovering of the airtime/data by the subscribers as described in the conceptual framework in figure I and II below. The framework was developed based on the available information gotten from the first and leading vendor in Africa (Mobile decisioning-MODE now ERL Telecoms Services limited) and Globacom as the major telecom operator. The framework represents the interrelated concepts required for borrowing to occur without an intermediary bank, and also indicates the direction of flow of lending and recovery processes.

5. Research methods

Data were drawn from a pool of population above 40 million customers, containing both the active and non-active subscribers. It is presumed that all active subscribers can access the borrow-me-credit service as long as the customer has spent a minimum of 3 months on the network. Hence, this study used a subset population of 5 million as a sample population to carry out the analysis. A desk review was conducted to collect data from various secondary sources. Although there are more players in the value-added services industry, secondary data covering 36 months were extracted from the first and leading vendor in Africa (Mobile decisioning-MODE now ERL Telecoms Services limited) and Globacom telecom operator's intelligent network as the major telecom operator with a corresponding data format. The study is only limited to information that easily accessible from ERL; a major telecom vendor that provides the 'borrow me credit' service using the operators' platform. The data consist of the msisdn, airtime advanced, date, and recovery, taking into consideration the existing working documents, manuals, procedures, reports, statistical data, policies, regulations, and standards of the selected companies for the review.

To simplify the collected data to what other tools can manage, the data were analyzed using Audit Command Language (ACL) (R-Code). R-Code was used due to its capability of handling the large volume of data generated per day from the subscribers (over 10milllion rows) since Microsoft excel can only handle about 1million row data. Each msisdn was matched with the date of airtime/data borrowing, recovery period and balance as at when due. The matching requires looking at msisdn that repeatedly borrows from the network

to assist in forming an opinion on the trend. The analysis of the bulk data was guided and refined to take care of the observed shortcomings, enhance the validity, and make the analysis easy to carry out.

6. Data analysis and interpretation of the result

Table 1: Preliminary Test

	Gross Lent	Gross recovered
Mean	128	88
Median	129	88
Max	142	98
Min	118	78
Std. Dev.	5.22	3.98
Skewness	0.08	0.04
Kurtosis	2.44	2.97
Observations	356	356

Source: Authors computation from R Studio

Table 1 depicts the statistic of the gross lent and the recovery of the daily information of the airtime loan/data of the service provider and the subscribers.

Subscribers Pattern of Lending

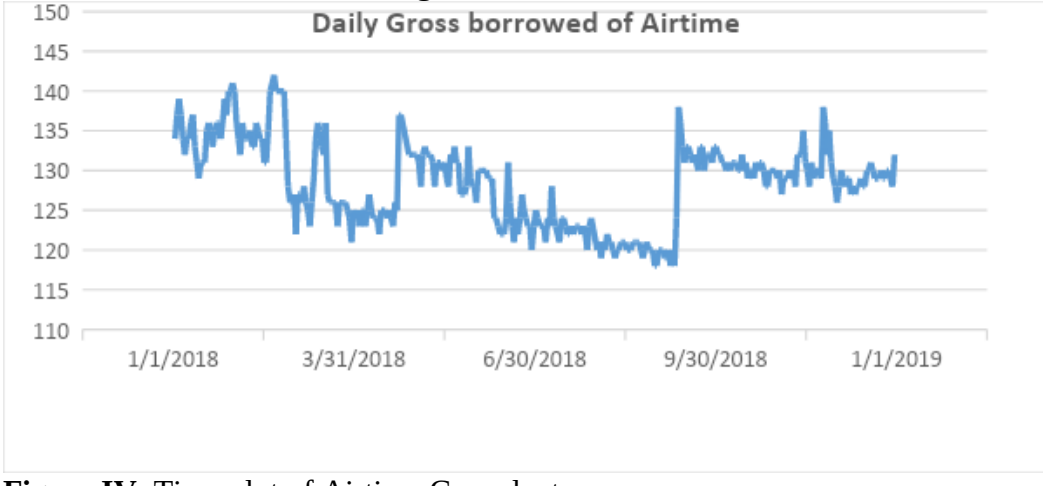

Figure IV: Time plot of Airtime Gross lent

Table 1 depicts the statistic of the gross lent and the recovery of the daily information of the airtime loan/data of the service provider and the subscribers. Figure IV above shows the graph of the R-Code use to plot the data of the total airtime gross lent (y-axis) against the period of lending (x-axis) of the telecom service provider and the subscribers.

Telecommunication Operators Pattern of Recovery

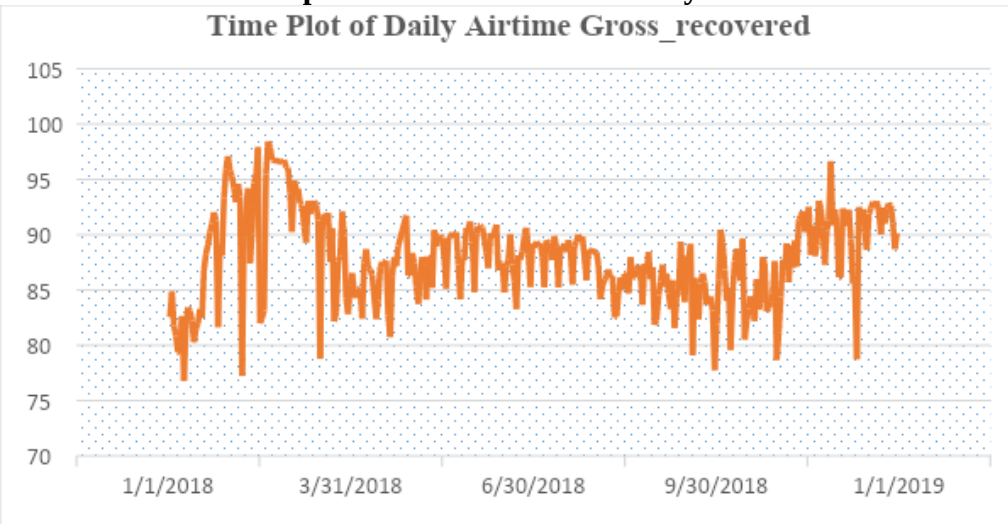

Figure V: Time plot of Airtime Gross Recovered of loan

The figure V above depicts the graph of the R-Code use to plot the data of the total airtime gross recovered (y-axis) against the period of lending (x-axis) of the telecom service provider and the subscribers.

Histogram of the Distribution of the Telecommunication Operators Gross Lent

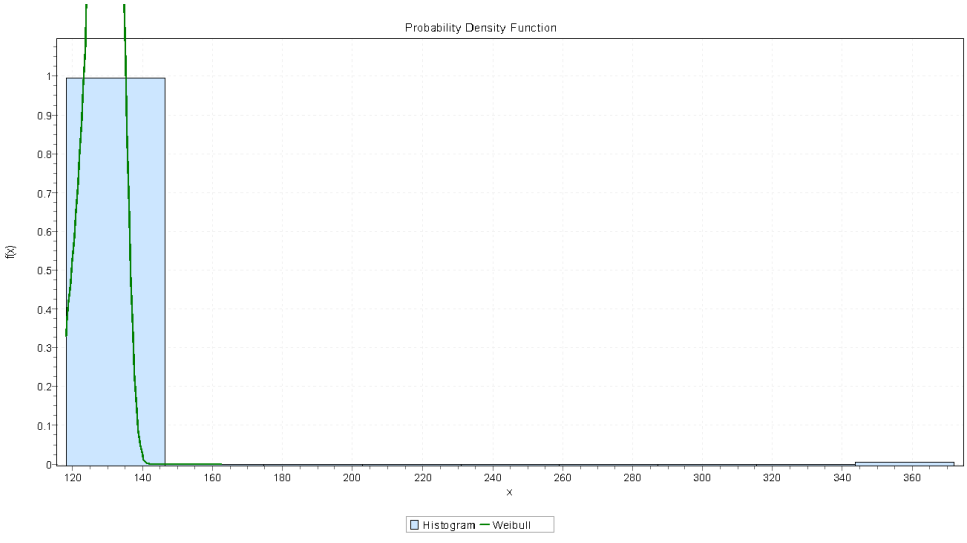

Figure VI: Probability function of Airtime Gross lent of loan

Figure VI above depicts the graph of the Easy-Fit XL Evaluation software used to plot the data of the probability function (y-axis) against the Airtime Gross lent (x-axis) of the telecom service provider and the subscribers.

Histogram of the Distribution of the Telecommunication Operators Recovery

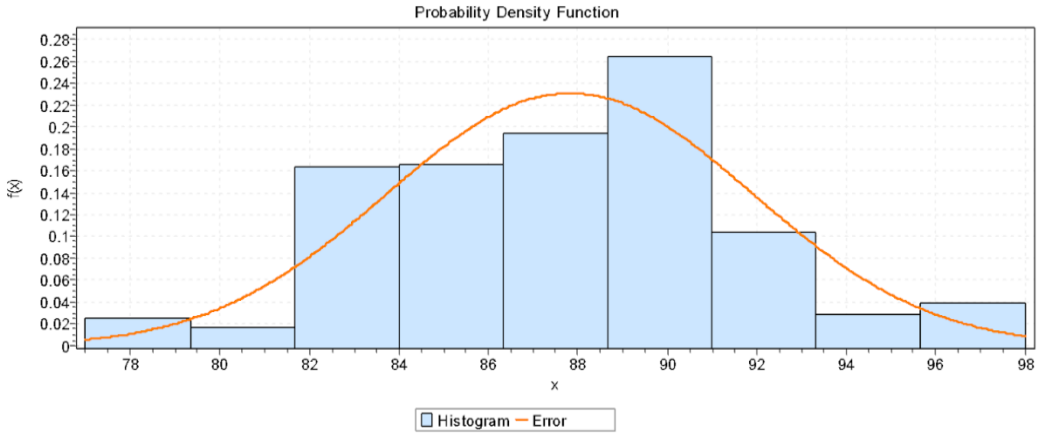

Figure VII: probability function plot of Airtime Gross Recovered of loan

The figure VII above depicts the graph of the Easy-Fit XL Evaluation software use to plot the data of the probability function (y-axis) against the Airtime Gross Recovered (x-axis) of the telecom service provider and the subscribers.

7. Discussion of the findings

To support the growth of telecommunication service provider's ability to meet growing telecommunication demand, the advent of mobile phone airtime loan plan, and ideological shift towards the lending loan to customers without passing through the financial institution, Nigeria telecommunication industry initiate borrow-me credit/data plan. The service providers translate the idea of bank/financial institution loan to pre-paid airtime advance service, a profit-making business portfolio of the world renounced micro-finance that allow pre-paid customers to receive airtime in advance and pay for it later. The plan had increases the customer base of the telecom providers and allow the customers to stay connected and continue making calls when they are unable to recharge or buy more airtime. The plan has spread through the telecom service provider industries indicating that the plan's scale is expansive and its developmental potential is also geographical vast.

The results of the data analysis as indicated in table 1 above, show the summary of the daily lending of airtime by customers and the recovery made by the operators. It was observed that the minimum amount borrow daily was N118 and the maximum amount on average is N142. On average, the amount borrowed on a daily bases by a customer was N128, while on the other hand the company also recovered the minimum amount of N78 and maximum of N98 daily. The overall amount on average recovered by the telecommunications operators is shown to be N88 daily according to the result of the analysis. The skewness and kurtosis for the recovery by operators are

normally distributed while the borrowing skewness and kurtoses have a slight deviation. The total no of days considered was 356.
The table I also depicted that on average 128 and 88 airtime lending and recovery were observed daily. This implies that more airtime of data lending occurs than recovery. This is a result of the fact that the airtime borrower has about 72 hour's window period to repay their airtime loan since the interest has been held back before the loan is released. Hence 68.8 percent of airtime loan issues out to subscribers are recovered daily which is significantly reasonable for the business going concerns. Although, interest gained is distributed between the vendor and Telco operator depending on the business agreement hence, the vendor can still comfortably survive the insignificant bad debt in case anyone arises as long as the Telco operator does the benefit payout as agreed.

On the trend and pattern graph figure IV, event shown on the vertical line; the total airtime gross lent (y-axis) is plotted against the period of lending on the horizontal line (x-axis). A thread hood line (average line) parallel to a period is drawn using the value of the data set to obtain the zig-zag movement (fluctuation line) of the data. Also, from the result of the analysis of the R-Code used to examining the fluctuations in the pattern and trend of the extracted data, indicate that there is an irregular pattern of the lending from the graph in figure IV above. This may be a result of different events occurring in the different months which determined the rise and fall of the trend and pattern of the airtime loan lending.

From the graph of figure IV (Time plot of Airtime Gross lent), it was observed that more borrowing took place in some specific months especially when there is major disaster news, holidays, or festivity months. The rate of borrowing in February was high, maybe as a result of valentine celebration in the month, while others may be due to one observable event or the others. This was observed as the borrowing increased arbitrarily from September to October and was averagely sustained till December as more borrowing would likely to take place. The findings also show that sometimes borrowing could be low owing to network downtime and emptiness of the airtime borrowing bucket.

Figure V also depicts an irregular fluctuation of the airtime loan recovery as shown in the graph of the time plot of Airtime Gross Recovered of airtime loan above. The event shown on the vertical line; the total airtime gross recovered (y-axis) is plotted against the period of lending on the horizontal line (x-axis). A thread hood line (average line) parallel to a period is drawn using the value of the data set to obtain the fluctuation line movement of the data and checked through the run chart, the improvements of the loan recovery that have been put into place. The fluctuation in the recovering pattern may be a result of different events occurring at different periods which

may have led to the rise and fall of the trend and pattern of the airtime loan recovery. Since the mode of recovering the borrowed airtime loan by the subscribers is designed to be automated, the recovery of the airtime loan was attained with the corresponding loan taken by the service subscribers as shown in figure V.

The results of the Easy-Fit XL Evaluation software using Kolmogorov Smirnov, Anderson Darling, and Chi-Square ranking criteria ranks the Weibull probability distribution function with statistic value of 0.08995, Burr probability distribution function with statistic value of 3.862, and Pareto probability distribution function with statistic value of 0.00609 respectively as the best performing models for the gross lent trend and pattern (Goodness of best fit). While the summary of the best performing models parameters estimated by the software are given as follows; Weibull probability distribution function, Burr probability distribution function has parameter has, while Pareto probability distribution function has

Further, concerning the recovery airtime/data borrowing, the software result suggested using Kolmogorov Smirnov, Anderson Darling and Chi-Square ranking criteria: Error probability distribution function with statistic value of 0.05403, Nakagami probability distribution function with statistic value of 1.0873, and Weibull probability distribution function with statistic value of 6.5132 respectively as the best performing models for the recovery trend and pattern (Goodness of best fit). The software also estimates the summary of the best performing models parameters as; Error probability distribution function has a parameter, Nakagami probability distribution function has the parameter, and the Weibull probability distribution function has.

8. Conclusion

While the study flagged some loopholes on the routes to healthy airtime borrowing, recovery of airtime loan and the suggested probability they follow, the direction of the momentum of the airtime loan plan and recovery still seems promising with building a very sound business intelligence unit so that business operations can be policed. Sometimes vendors may be making huge losses owing to the ratio of recovery per the 72 hours loan window period. The analysis of the study shown that drawings from the vendor's account follow Weibull, Burr, and Pareto probability distribution function while the recovery follows Error, Nakagami, and Weibull as the best performing models distribution using Kolmogorov Smirnov, Anderson Darling, and Chi-Square ranking criteria respectively. These results imply that it can be easily presumed how much could be recovered when considered what had been borrowed per moment. Hence, the vendor can plan for the reserve to be made available in the bucket of e-top up.

9. Recommendations

To be able to increase the number of active mobile users', the telecommunication service providers need to design more entertainment services for service subscribers aside from the basic functionality of making calls after recharging airtime. The telecommunication service providers should make airtime/data packs available for subscribers' at lower and avoidable prices to drive the growth of the mobile VAS market since the traditional telecom services plans like email service, Short Message Service (SMS), and Multimedia Services (MMS) are now challenges facing by the telecom industry which are now overruling by the Value Added Services (VAS) and various internet-based applications. The telecom industries must find a strategy to retain the customers to use their services as the internet-based applications are attracting more consumers. The mobile VAS should be expanded to rural areas where there is more need for banking, gaming, and music.

In conclusion, to increase the profitability of the plans, the vendors should bring up some major directors from the telecom operator as equity-holders so that the payout of the business proceeds can be released by the telco. The vendor must also have a well-grounded revenue assurance expert that can argue repeated for the revenue of the business to avoid short change of the amount recovered from the customers by the telecom as it were in the usual practice with other VAS providers.

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