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BIG DATA MANAGEMENT- A FINACIAL INSTITUTION APPROACH

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Abstract

This study investigates the role of Big Data Management (BDM) on the competitive financial sector, its importance and effective adoption for Nigerian banks. A survey was used to collect primary data from branches of one of the leading banks in Nigeria and 796 usable questionnaires from bank customers, employees and managers were used for analysis. A descriptive research method and correlational study was used to determine the link between Big Data elements such as use of customers' data and predictive analysis of customer trends and patterns in form of differentiation, increased sales, customer engagement as well as cost leadership. The research focused on customer's rate of reviews of Big Data as the independent variables with repeat engagement and interaction as the dependent variables. Descriptive statistics using SPSS program specifically mean and standard deviations was employed for the analysis. Results show that banks create differentiation by introducing a variety of products and product mix from the analysis of customer feedback, trends and pattern which has driven customer satisfaction due to easy access to information and banking, access to products online, pay for bills via mobile banking platform, and response on various social media platforms. However, even though most customers use ATM cards and are on the mobile banking platform, Bank management should focus more on staff training and use of Diagnostic and descriptive statistics in understanding why and how some customers behave especially those who express their concerns on social media.

Keywords: Big Data; Analytics; Management; Financial institution.

1 Introduction

Big Data, like any other commodity, only has real value when it's refined: in this case combined with enhanced analytics to provide insights that help identify opportunities or develop solutions [1]. According to More*et al.* [2] without big data analytics, companies are blind and deaf, wandering out onto the web like deer on a freeway. Big Data by itself cannot be useful to an organization, it is only when it is utilized to draw out information that an organization benefits. It has been estimated that, the volume of business data worldwide, across almost companies, doubles every 1.2 years [3]. In the retail industry, Chen and Zhang [4] found that there are around 267 million transactions per day in Wal-Mart's 6000 stores worldwide. However it is important to determine how easy it is for companies to mine data and obtain analytics. Brown *et al.* [5] predicted a sixty percent margin increase for retail companies who were able to harvest the power of big data. However, despite the numerous big data benefits that are well documented, McAfee and Brynjolfsson [6] posed a question on how

many organizations across the globe are putting it to use and in which way. They demonstrated that Big Data Analytics is increasingly emerging as a new technology that increases overall efficiency of management and better decision-making. When compared to traditional analytics system, Big Data analytics is able to enhance the productivity and performance of organizations in real-time.Chen and Zhang [4] recently revealed that, while seeking for higher competitiveness, Wal-Mart recently collaborated with Hewlett Packard to establish a data warehouse which has a capability to store 4 petabytes of data, i.e., 4000 trillion bytes, tracing every purchase record from their point-of-sale terminals. Adding that, they successfully improve efficiency of their pricing strategies and advertising campaigns by taking advantage of sophisticated machine learning techniques to exploit the knowledge hidden in this huge volume of data. Many studies on adoption of Big Data Analyticshave focused on telecommunication [7,8,9,10] and how companies gain by assimilating Big Data Analytics in full scale and in decision making and for operations [11,12,13,14,6,15]. There is limited research on the adoption of Big Data Analytics in the financial sector for marketing of products.

IDG Connect [16] revealed that infrastructure readiness is already very high, on the move towards Big Data projects across core African markets in Kenya and Nigeria,yet skills still seem fairly low. Also, for smaller organizations with 100 – 499 employees only a small percentage of 40 percent were looking to fully outsource big data projects. Adding that,there is lack of local information on Big Data which certainly need to be addressed for the technology to be implemented effectively. Wamba *et al.* [15] found out that the majority of companies in Africa have barely considered the implication of social media, e-mail and multimedia on the marketing of their products and how they can use the data to communicate with their consumers. Studies on Big Data Analytics in Nigeria and specifically on financial institutions are limited. In spite of these, banks are known to accumulate a lot of data from different sources.

"Big data" are data sets that are too big to be handled using the existing database management tools and are emerging in many important applications, such as Internet search, business informatics, social networks, social media, genomics, and meteorology [17]. Oracle [18] pointed out that the financial services industry is amongst the most data driven of industries as the regulatory environment that commercial banks and insurance companies operate within requires these institutions to store and analyze many years of transaction data, and pervasiveness of electronic trading. Hence, the need to diversify the means of storing, managing these data as bulky and important they can be in the financial system. Russom [19] hinted that big data is forcing numerous changes in businesses and other organizations. Many struggle just to manage the massive data sets and non-traditional data structures that are typical of big data. Others are managing big data by extending their data management skills and their portfolios of data management software. This empowers them to automate more business processes, operate closer to real time, and through analytics, learn valuable new facts about business operations, customers, partners, and so on.

Big Data now has the power to help businesses succeed; but this can only be achieved through appropriate and proper analysis, through the use of what is called 'analytics' of these big volumes of data [13]. The impact or potential impact of this has been (or could be) widespread in many different sectors across the business including Supply Chain, Information Technology, Human Resource as well as Sales and Marketing. Kaoutar*et al.* [20] estimated that by the year twenty twenty (2020), forty three (43) trillion gigabytes of data will have been generated. This will be one thousand (1000) times more than what we currently have. This data is mostly unstructured but represents an immense potential source of information that can be utilized to unlock the competitive edge of an organization if exploited. According to Press [21] the turning point on Big Data is the Internet and the coming into the market improved and more powerful Personal Computers and mobile phones. He had estimated that by the year 2002, data on the internet would overlap voice data. The internet and improved accessibility of the Internet on Personal Computers and mobile phones spurned the use of social media such as Facebook, WhatsApp,Twitter,Instagram and other web platforms that have played a big role in information growth explosion currently being experienced [22].

In terms of key business challenges, Oracle [18] observed that companies in the consumer banking and financial services industry typically have data warehouses and business intelligence tools for reporting on and analyzing customer behavior to better anticipate their needs, and for optimizing operations. By deploying Big Data Management Systems that include data reservoirs (featuring Hadoop and / or NoSQL databases), greater benefits in these areas can be achieved as the business gains more predictive capabilities and becomes more agile, therefore gaining much higher levels of insight into data faster and enables more effective decision making.

RussellNeuman*et al.* [8] commented that data-intensive research is changing the dimension of African researchers and their impact. It is also opening up new career paths in the field of data science. Johnson [1], explained that Big Data Analytics is being used in Nigeria by many institutions as part of the Corporate Strategy to create competitive edge. According to Kale [23] data demand is being fueled in Nigeria by growing insistence on accountability and good governance by citizens as well as the desire by governments at all levels to demonstrate progress and democratic dividends in various sectors due to the current economic challenges facing the country. This has further amplified the demand for accurate, reliable and timely data

on virtually all sectors of the Nigerian economy. Therefore, the following questions are raised: Why is Big Data colliding with Data Management and what is driving its technology adoption in the financial services? What are the ripple effects and benefits of Big Data Management and the future trends in user practices? And what are the big data challenges in Nigeria?

Ogwang [12] noticed that ever changing tastes of customer always play a significant role, that to reach the business pinnacle, one needs to have radical data concerning the merchandise, its competitors and also the dynamic trends within the environment. In line with this, Richy*et al.* [24] posit thata lot of businesses has used the ability of big data to realize success and speed up their businesses in numerous aspects, for example Amazon. Ogwang [12]urges that Big Data have helped companies to be plenty of responsive and responsible towards her customers. By combining consumer data with purchase data, banks can section their customers in fine detail. They will in addition target their customers with made-to-order promoting and targeting. Davenport [13]emphasized that Business Intelligence and big data analytics incorporate a positive impact on industries. Big data facilitates a lot of intelligent promotions that is key to driving sales. In line with this, Johnson [1] stated that Big Data Analytics is being used in Africa by many institutions as part of the Corporate Strategy to create competitive edge. In this study therefore, we shall look at the integration and knowledge of what is driving big data technology adoption, which is the role of Big Data Management on the competitive financial services, its importance and effective adoption.

The study will focus on the monitoring and ensuring the availability of all big data resources through a centralized interface/dashboard in Nigeria. The study will focus on the management team within financial systems that is the leadership team as well as lower level management who are in charge of day to day operations. The third category of focus will be financial systems (banks) customers and this will be sampled from one of the biggest financial houses in Nigeria. The study will look at the trends and performance of financial bodies in monitoring and ensuring the availability of all big data resources through a centralized interface/dashboard, performing database maintenance for better results, implementing and monitoring big data analytics, big data reporting and other similar solutions.

This paper is organized as follows: the next section presents the research methodology, followed by the experimental design and data collection method. We then present the empirical analysis and findings. Finally, the interpretation of the findings and both theoretical and practical implications are described. The paper concludes by presenting the research limitations and proposing avenues for future research.

2 Method

This research adopted descriptive research method and specifically, the correlational research study. Descriptive research involves observing and describing behavior of a subject without influencing it in any way and contributes to high response rate[25]. Correlational design was chosen as this study will aim to determine the link between the Big Data elements such as use of customers' data and predictive analysis of customer trends and patterns to provide the competitive edge in the financial institutions in Nigeria in the form of differentiation, increased sales, customer engagement as well as cost leadership. The research focused on branches of Guarantee Trust Bank (GTB), in Nigeria guided by numbers of customer's rate of reviews of Big Data as the independent variables with repeat engagement and interaction as the dependent variables.The collected data was analyzed for the descriptive statistics using Statistical Package for Social Sciences (SPSS) program, specifically mean and standard deviations.

2.1 Population and Sample

The targeted population in this study involved all the management staff and employees at the various financial institutions in the 231 branches of Guarantee Trust Bank (GTB) and all the customers that are in the system. This study adopted the stratified random sampling technique to select 10 (4.33%) Branches out of 231 Branches. We selected 10 (14.49%) managers out of 69 managers that is, one (1) manager from each of the 10 branches. In addition, 200 (0.02%) out of 10,000 Employee and 600 (0.01%) out of 6,000,000 Customers.The population and sample can be represented in Table I.

Table I: Population and Sample of the Study

Target	Population	Sample Size
GTB Managers	69	10
GTB Employees	10,000	200

GTB Customers	6,000,000	600
Total	6,010,069	810

3 Experimental Design and Data Collection

3.1 Experimental Design

The self-structured questionnaire was developed in English. The questionnaires contained closed ended questions. Closed ended questions ensure that the respondents are restricted to certain categories in their responses. The questionnaire was divided into four (4) parts. First, was on general information provided to all participants and this section looked at background information about the respondent such as Age, Sex and Education.The second part looked at customers banking behaviors and online services availability to customers. The third part looked at use of BDM in assessing customer trends and patterns with specialfocus on the employees in trying to understand whether Big Data is used within the organization to align the firm to customer needs. The fourth part focused on the customers and gathered information on how they impact repeat purchases. The last part focused on the senior managers and focused on obtaining data on the use of BDA and BDM to assist management in establishing a customer leadership model in GTB.The Research instrument was validated by two senior lecturers from FederalUniversity, Lafia and one measure and evaluation expert with the Ministry of Education Lafia, Nasarawa State.This was done to improve the face validity and content validity of the instrument. A pilot survey with Ten (10) employees who were randomly selected and were not to be part of the final data collection process to ensure that the questionnaires are complete, precise, accurate and clear. This is important to ensure reliability of the data collection instrument [26].This was followed by the main survey conducted using a face-to-face interview led by research assistants who were adequately instructed on what to do, however, administered carefully and skillfully without boring the respondent.

3.2 Data Collection

Table II represents the data for this study obtained through the survey. The questionnaires were administered to a total of Ten (10) GTB branch offices in Nigeria which includes Two (2) GTB branch offices in Lagos and One (1) GTB branch offices each in Abuja, Nasarawa, Kebbi, Kano, Borno, Kwara, Adamawa, and Ebonyi. Figure I shows the various locations of the GTB branch offices selected for this study. A total of Eight Hundred and Ten (810) questionnaires were administered to the managers, customers and employees in operation.To ensure the active involvement of participants in the survey and to improve the response rate, we provided some incentives (pen and candy) to the respondents.Of the 810 questionnaires distributed, a total of 796 responses were received, corresponding to an initial response rate of 98.27 percent, of which 46.61 percent responses were from males and 53.39 percent from females.The age of respondents ranges from 21 to 70, with the highest 41.83 percent in the age range of 31-40, followed by 39.70 percent for age groups 21-30. The next, was 14.20 percent for age group of 41-50 while the least was 4.27 percent for age group 51-above. Majority of the respondents were married 53.14 percent, followed by youths that are single 25.63 percent. The next were the widows 12.31 percent while the least were divorced 8.92 percent. Majority of the respondents have low education with secondary school certificate 36. 18 percent, followed by those with university degree 31.03 percent and diploma 28.64 percent.The least were those with masters and PhD with 2.28 and 1.26 percent respectively. Amongst the customers that were interviewed, majority of the respondents were civil servants 45.22 percent, followed by businessmen 33.62 percent. Next were students 14.68 percent, while the least were farmers 6.48 percent.The majority of customers have used their ATM cards for a period of 1-3 years 43.17 percent, followed by those that used their ATM cards for 7-12 months 20.65 percent. The next were those that used their ATM for 4-6 years 15.87 percent, followed by those that used theirs for 7-above years 13.65 percent, while the least were those that have used theirs for 0-6 months 6.66 percent.

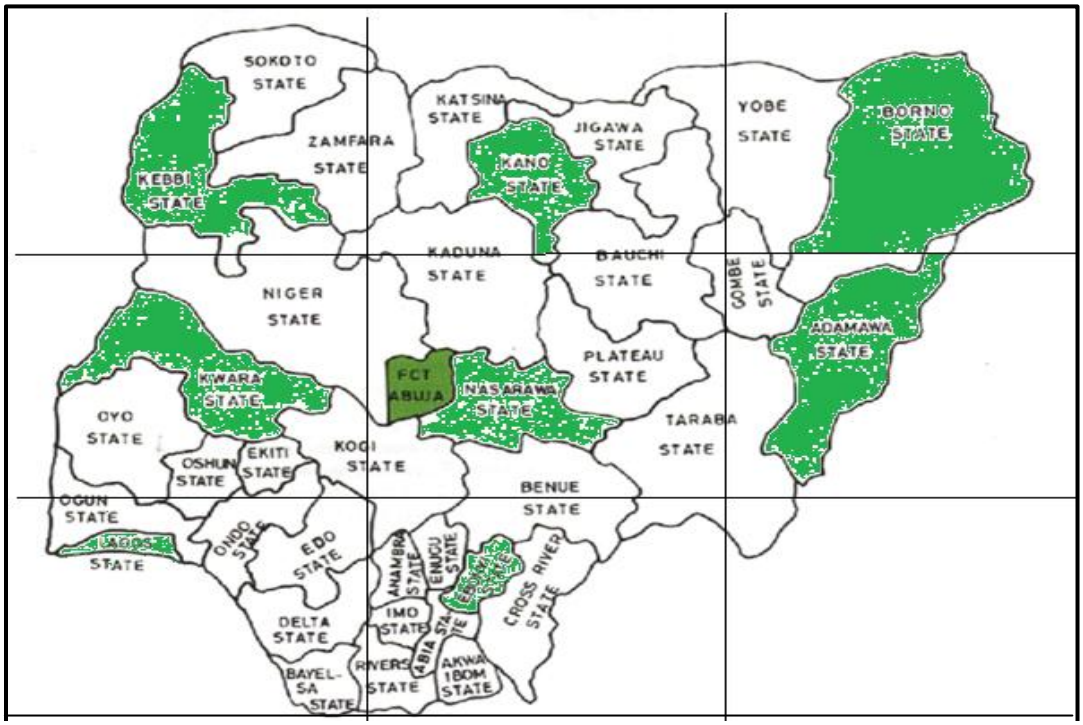

Fig. I: Map of Nigeria showing locations of sampled study area [27].

Table II: Demographics of the Respondents					
Categories	**Percentage**	**Categories**	**Percentage**	**Categories**	**Percentage**
Designation		**Marital status**		**Customer occupation**	
Manager	01.26	Single	25.63	Student	14.68
Employee	25.12	Married	53.14	Civil Servant	45.22
Customers	73.62	Divorced	08.92	Farming	06.48
Gender		Widow	12.31	Businessmen	33.62
Male	46.61				
Female	53.39	**Education**		**Use of ATM cards**	
Age range (21-70 yrs)		PHD	01.26	0-6 months	06.66
21-30	39.70	Masters	02.89	7-12 months	20.65
31-40	41.83	BSc. Diploma	31.03	1-3 years	43.17
41-50	14.20	Diploma	28.64	4-6 years	15.87
51-above	04.27	Secondary	36.18	7-above years	13.65

4 Result and Discussion

4.1 Employees View of Customer Banking Details

Table III shows the employee view of customers banking details. An interview with the managers and employees of the bank have revealed that the predominant customers account type is savings 54.76 percent against current 45.24 percent.Of the number of customers that subscribe to notification via email about 37.14 percent of the employee are of the view that the number is within the range of 5001-10,000, followed by 25.24 percent who said 1-5000, 16.19 percent said 10,001-15,000, 11.43 percent said 15,001-20,000, 8.10 percent said 20,001-25,000, while the least 1.90 percent said 25,001-above. Among the number of customers that subscribe to notification via SMS about 34.29 percent of the employee are of the view that the number is within the range of 10,001-15,000, 27.14 percent said 5001-10,000, 14.76 percent said 1-5000, 12.86 percent said 15,001-20,000, 7.14 percent said 20,001-25,000, while the least 3.81 percent said 25,00-above. Only few employee 10.95 percent agreed to the fact that some customers do come to the bank due to received bulk SMS while 89.05 percent did not agreed to that. Of the employee that agreed, 86.96 percent said the number is 1-500, while 13.04 percent said 501-1000. About 62.86 percent of the employee agreed that majority of the customers prefer self-service, while 37.13 percent did not agree to the fact. Of the employee that agreed 48.48 percent said the number is 1501-2000, 21.21 percent said 1001-1500, 19.70 percent said 501-1000, and 10.61 percent settled for 1-500.

Table III: Employee Response on Customers Banking Details

Categories	**Percentage**	**Categories**	**Percentage**	**Categories**	**Percentage**
Account type		**No. Sub. to notification via SMS**		**No. Visiting bank due to bulk SMS**	
Savings	54.76	1-5000	14.76	1-5000	86.96
Current	45.24	5001-10,000	27.14	5001-10,000	13.04
No. Sub. to notification via email		10,000-15,000	34.29	**Customers prefer self-service**	
1-5000	25.24	15,001-20,000	12.86	Yes	62.86
5001-10,000	37.14	20,001-25,000	07.14	No	37.13
10,000-15,000	16.19	25,001 above	03.81	**No. that Prefer self-service**	
15,001-20,000	11.43	**Visiting bank due to bulk SMS**		1-5000	10.61
20,001-25,000	08.10	Yes	10.95	5001-10,000	19.70
25,001 above	01.90	No	89.05	10,000-15,000	21.21
				15,001-20,000	48.48

4.2 Bank Services Available to Customers

Table IV shows the employee view of the various banking services that the bank have made available for their customers. All the employee 100 percent agreed that the bank has mobile banking application for their customer. Of the total number of employer, 55.24 percent said that the total number of customers that use the mobile application is 2501-above, 34.76 percent said 2001-2500, while 10.00 percent said 1501-2000.The majority of the employee 92.86 percent said that customers response to mobile banking application is excellent, 7.14 percent said their response is average, while none said the response is poor.For the transaction that is mostly performed by the customers using the mobile application, majority of the employee 44.29 percent chose fund transfer, 32.38 percent chose payment of utility bills, 16.19 percent chose booking of flight, while 7.14 percent chose shopping. The majority of the employee 72.38 percent said the bank uses socialmedia network for advertisement, while 27.62 percent said they don't. For the social media network that the bank mostly used for advertisement,

26.19 percent of the employee chose Yahoo mail, 21.91 percent chose Gmail, 20.95 percent chose Facebook, 15.24 percent chose twitter, 10.00 percent chose Instagram, and 5.71 percent chose others. On customer response to the use of social media network, majority of the employee 66.67 percent said customer respond excellently, 16.19 percent said the response is average, while 17.14 percent said the response is poor.

Table IV: Bank Service Available to Customers

Categories	**Percentage**	**Categories**	**Percentage**	**Categories**	**Percentage**
Availability of Mobile banking App		**Customer response to mobile App**		**Social Media mostly used for advert**	
Yes	100.00	Poor	0.00	Instagram	10.00
No	0.00	Average	7.14	Twitter	15.24
No. of Customer using mobile App		Excellent	92.86	Facebook	20.95
1-500	0.00	**Most frequent transaction**		Gmail	21.91
501-1000	0.00	Pay utility bills	32.38	Yahoo mail	26.19
1001-1500	0.00	Book flight	16.19	others	05.71
1501-2000	10.00	Shopping	07.14	**Customer response to social media advert**	
2001-2500	34.76	Fund transfer	44.29	Poor	17.14
2501 above	55.24	**Use of social media for advert**		Average	16.19
		Yes	72.38	Excellent	66.67
		No	27.62		

4.3 Big Data Management Issues

Table V shows the mean and standard deviation of the employee response on the Big Data Management issues calculated on a two point scale of agree and disagree. Based on the statistics, majority of the employee are certain that the bank management make use of big data technology in every aspects of its operation (96 percent) with well-established platform that allows customers to lay complain for services they are not satisfied with or make certain service inquiry (95 percent), while benefiting maximally with the implementation of this latest technology in handling huge volume of data (94 percent). Though there are no platforms/windows that allows for customer-customerinteraction (19 percent), customers are followed when using any of social media network (93 percent) with well-established organizational policies in place to align the requirement policy for Big Data Management and analytics (93 percent). Majority of the employee have attest to the fact that the bank have enough staff who possess adequate skill to handle and implement the latest technologies of big data (84 percent) with well-established infrastructure in place in handling big data (78 percent) even though the bank management have failed to organize workshop with the sole aim of training staffs on handling big data, its management and analytics (47 percent).

Table V: Employee Response on Big Data Management Issues			
Category	**$\bar{X}$**	**S**	**Decision**
Weather bank uses social media networks for advertisement	1.72	0.45	Yes
Are there platforms/windows that allows for customer-customer interaction	1.16	0.63	No
Are there platforms that allows for customers to lay complain for service dissatisfaction or make certain service inquiry	1.95	0.21	Yes
Are customers tentatively followed when using any of your bank social media network	1.93	0.25	Yes
Does your branch make use of Big data technology in every aspect of its operation	1.96	0.20	Yes
With the acceptance of big data technology in both financial and non-financial institution, do you think you have benefited maximally with the implementation of this latest technology in handling huge volume of data	1.94	0.23	Yes
Are there established infrastructure in place in handling big data	1.78	0.41	Yes
Do you have enough staff who possess adequate skill to handle and implement the latest technologies of big data	1.84	0.37	Yes
Are there established organizational policies in place to align the requirement policy for Big Data management and analytics	1.93	0.25	Yes
Do your bank organize workshop with the sole aim of training staffs on handling big data, its management and analytics	1.47	0.50	No

4.4 Customer Satisfaction Level of online Banking Services

Table VI shows the mean and standard deviation of the customer satisfaction level with online banking service. From Table VI it shows that in generalmajority of the customers are satisfied with the online banking service especially when using their cards for online shopping (77 percent). They also believe that the bank has good quality of online banking and are satisfied with the online products and services (72 percent). Customers can get services with ease (70 percent) and are also satisfied with the cost of online banking services at GT Bank (65 percent) as shown inFigure II.

Table VI: Mean and Standard Deviations for Customer Satisfaction Level			
Category	**$\bar{X}$**	**S**	**Decision**
Customers response to mobile banking application	4.52	0.63	Good
Customer's response to using social networks	3.73	1.20	Good
Ease of getting services	3.86	1.21	Agree
Use of ATM card regularly while shopping	4.02	1.15	Agree
Satisfaction with the quality of online banking	3.91	1.17	Agree
Satisfaction with the variety of products and services	3.91	1.17	Agree
Satisfaction with cost leadership of online banking	3.73	1.24	Agree

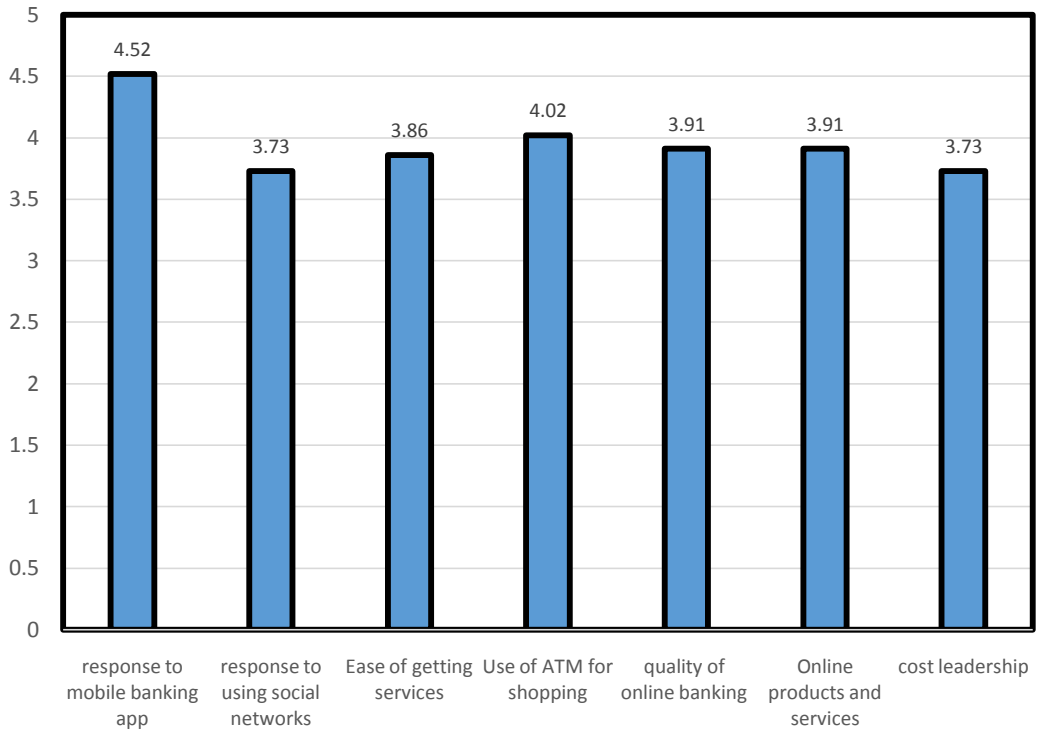

Fig. II: Customer Satisfaction Level

4.5 Customer Satisfaction Level and ATM Card Usage

Over time, there has been a gradual increase in the number of loyalty card holders at GTBank. This has led to subsequent increase in the number of shoppers. From Table VII, a cross tabulation of the customer satisfaction level and duration of ATM card usage shows that GTBank management also points to an equally a strong correlation between increased sales and increased loyalty card numbers at GTBank branches especially those that have used their cards for an average of 1-3 years. Increase in Sales at GTBank driven by increased loyalty card holders has helped GTBank take advantage of scale to reduce on its per capita costs as shown in Figure III. Therefore, this gives GTBank advantage in terms of higher margins per product sold as compared to other competitors.Most customers (65 percent) are satisfied with the pricing of online banking services at GT Bank, thus driving the repeat purchases.

Table VII: Customer Satisfaction Level According to Duration of ATM Card Usage

Category	**Length with ATM Card**				
	0 – 6 Months	**7 – 12 Months**	**1 – 3 years**	**4 – 6 years**	**6+ years**
Ease of getting service	8.53	17.41	32.25	6.14	6.14
Use of card for shopping	9.38	18.43	35.84	6.99	6.82
Quality of online banking	10.24	16.72	31.40	5.80	8.19
Online products & services	10.24	16.72	31.40	5.80	8.19
Cost leadership	4.61	16.72	29.52	7.34	7.17

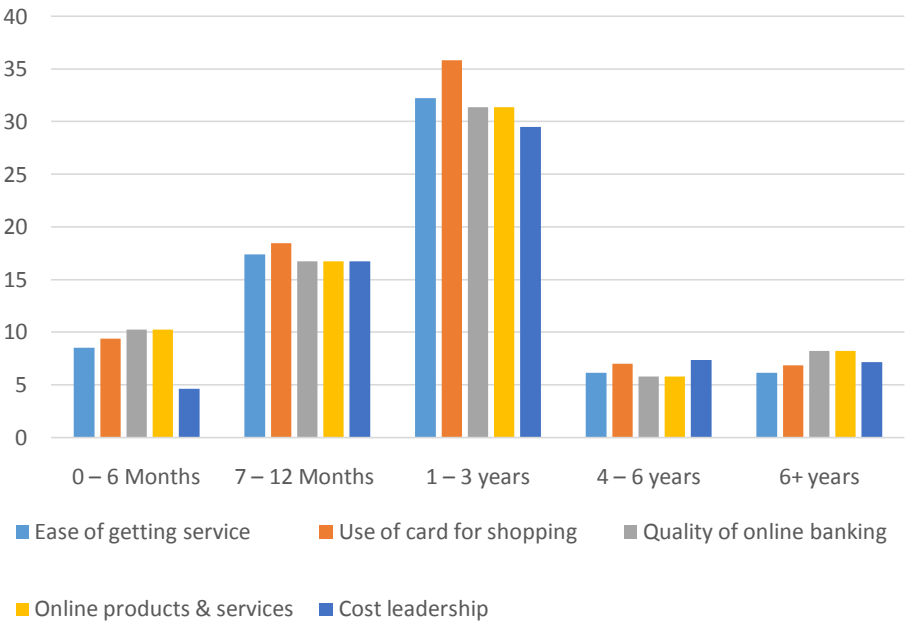

Fig. III: Customer satisfaction level with duration of ATM card usage

5 Theoretical Implications

The findings from the study indicate that despite the fact that most of the surveyed respondents use ATM cards and are on the mobile banking platform, there were divergent views on the measured attributes regarding repetitive buying driven by use of ATM cards online. Customers response to mobile banking has been very good, the attribute have a high mean (4.519) and the least standard deviation (0.626). Customers clearly use their ATM cards regularly while shopping, the attribute had a fairly high mean of (4.022) and standard deviation (1.151). Moreover, the study found consistency that the consumers who have had their ATM card for 1-3 years were likely to give a positive rating on the surveyed parameters as shown on the cross tabulations between the attributes and the length of having the ATM card and online banking. Majority of the customers state that Guaranty Trust Bank has good quality products compared to other similar banks with a mean of (3.908) and standard deviation of (1.169). With a wider standard deviation though at (1.187), the extent of customers using their ATM card at other POS averaged at (3.667) score which was marginally below the mean mark (3.914). This positive customer experience at Guaranty Trust Bank that is ease of getting what they want, satisfaction with measured attributes that has been made possible by the analysis of Big Data at the company and also the regular use of ATM card when shopping and online/mobile banking has driven repetitive buying on the web.

ATM cards was introduced to Nigerian banking customers in 1991 for withdrawals, while using the ATM cards for electronic bill payments was not until 2011 [28]. Following the Implementation of 'cashless policy' in Nigeria in 2012 led to the adoption of mobile banking [29,30]. Findings of Figure III for customers that adopt use of ATM cards for online shopping and transactions can be explained in line with the adoption model explained by Rogers [31] who explain the rate of adoption (the relative speed with which an innovation is adopted by members of a social system) as S-shaped curve. According to Rogers [31], the categories of adopters are: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%). From Figure III, those that have used their cards for 6 years and above (6.82 percent) could be categorized as the innovators. According to Rogers [31], they are the first to adopt technology due to a desire for the rash, daring, risky and willingness to accept an occasional setback when a new idea proves unsuccessful. Such customers control substantial financial resources which help in absorbing the possible losses from an unprofitable innovation and are able to cope with a high degree of uncertainty about an innovation at the time they adopts. Those that have used their cards for 4 – 6 years (6.99 percent) could be categorized as the early adopters. Rogers [31] explained that such customers have the highest degree of opinion leadership and potential customers look up to them for advice and information about an innovation. These customers are considered by many to be "the individual to check with" before adopting a new idea because they are not too far ahead of the average individual in innovativeness, hence, they serve as a role model for many other customers which help trigger the critical mass when they adopt an innovation. Those that have used their cards for 1 – 3 years (35.84 percent) could

be categorized as early majorities. According to Rogers [31], such customers interact frequently with their peers but seldom hold positions of opinion leadership in a system. They are one of the most numerous customer categories, making up one third of all customers. They may deliberate for some time before completely adopting a new idea. Those that have used their cards for 7 – 12 months (18.43 percent) could be categorized as late majorities. Rogers [31] explained that these customers adopt new ideas just after the average customer and could also form one third of the members of a system. Adoption may be both an economic necessity and the result of increasing peer pressures. Innovations are approached with a skeptical and cautious air, and they do not adopt until most customers have already done so. Those that have used their cards for 0 – 6 months could be categorized as laggards (9.38 percent). According to Rogers [31], suchcustomers' innovation-decision processes are relatively lengthy, with adoption and use lagging far behind awareness knowledge of a new idea, very suspicious of innovation, and therefore, are last customers to adopt an innovation (maybe due to fear of online fraud). Their decisions are often made in terms of what has been done previously, and these customers interact primarily with others who also have relatively traditional values.

With respect to creating cost leadership, the findings show that Big Data management has had a relative advantage on the adoption of banking ideas coming from Guaranty Trust Bank as the management makes decisions based on the data collected and analyzed and this has improved the company's understanding of customer trends and customers as a whole. This data also helps them decide on when and how to introduce a new service idea or product and make decisions on slow moving trends. Guaranty Trust Bank management is focused on embracing technology to achieve its strategic goal. Part of technology is use of Big Data Management and this has been made possible by the management investing in the right infrastructure, technical skills and IT platforms to implement Big Data Management and Analytics technology and on overall, the company finds it relatively easy to implement and use Big Data Management supported by top management although there is more to be done to reach the scale.

6 Managerial Implications

Some implications can be drawn based on the above result. The Bank's Management should understands the need for a timely, reliable and accurate information flow within the Bank, for effective decision making and enhanced financial reporting. Carry out continuous upgrade of their card systems to ensure optimum security, absolute efficiency, cost effectiveness and customer satisfaction is of utmost importance. Also implementation of stringent fraud control measures to reduce financial loss to the bank and customers is very necessary. Bank managers can position themselves a notch higher than their competitors by creating differentiation by introducing a variety of products as they analyze customer feedback and act on it. This is a driver for customer satisfaction as seen from very high ratings of the attributes. The company can arrange services systematically, with some having combinations from customer feedback. This can make it easy for customers to access services online thus improving the customer experience across the bank and its branches.

Gartner [32] stated that thirteen (13) percent of organizations are using predictive analysis but only 3 percent are using prescriptive analytics. According to Marr [14] predictive Analytics uses big data to identify past patterns to predict the future.Our findings indicate that Guaranty Trust Bank are part of the 13 percent that are using predictive analysis to analyze trends and patterns of customers thus being able to anticipate the customer needs. Managers most understand that using Big Data Management and Analytics on a large scale can help to inform business decisions in the company like introduction of new services, or getting rid of old platforms and alsoarrange products systematically, with some having combinations from customer feedback. Managementshould create an action log track for end to end implementation and review the data collected regularly for the company to be able to optimize on Big Data Management. This is in line with Marr [14] who stated that properly tuned predictive analytics can be used to support sales, marketing, and for other complex forecasts.

On a small scale though, Guaranty Trust Bank also uses prescriptive analysis that gives a laser-like focus to answer specific questions. For example, at Guaranty Trust Bank, they are able to "prescribe" the needs of some specific customers' that is introducing specific item mainly for a particular targeted group. The bank have not fully embraced Diagnostic Analytics that is used for discovery i.e. to determine why something happened [33]. This could be because they are not really focused on the social media marketing campaign that can adopt descriptive analytics to assess the number of posts, mentions, followers, fans, page views, reviews, pins, etc. There can be thousands of online mentions that can be distilled into a single view to see what worked in the past campaigns and what didn't. Therefore, management needs to focus on the use of Diagnostic and descriptive statistics to now go further into understanding why and how some customers behave or do what they doso as to also target their customers who express their concerns on social mediain terms of customer feedback point.

From the findings, customers clearly use their ATM cards regularly while shopping; both online and physically with Point-of-Sale (POS). By December 2016, GTB recorded International transactions ranged to a total of 1,032 with ATM cards, 4,030 on POS/Web, locally, ATM transactions were to the tune of 157,101 and POS/Web 26,725. With a summary of value

transactions done internationally, raking in 47,350 on ATM, 81,305 on POS/Web and local transactions on ATMs reaching a total of 1,570,148 which culminates and proves where and how their result-oriented use of big data management and analytics has carefully reflected in repetitive buying by their customers locally and internationally.

Guaranty Trust Bank also stores and shares information on purchasing trends allowing GTBank to target and personalize the offers they make, this was validated by the study as findings indicate that GTBank collects ATM card, POS/Web data on a large scale and the data is analyzed to understand the trends i.e. customer spent, the combinations of items bought, frequency, amount spent etc. In line with Philipet al.[7]who explained that data is all around us and that organizations need to be able to pick on what scope of data will be relevant for its use. Therefore, Bank management have to be able of prioritize on the type of data to pick for analysis such that they do not get overwhelmed with so much data that is not actionable. According to Baesens [34]Big Data Analytics requires experienced analysts able to analyze and decipher data to churn out the requisite information. These skills are still scarce and organizations need to build the capability required.

Finally, the management should continue to proactively work ahead of technological innovations so as to deal with the changing dynamics in the big data analytics.In line with Hoffman and Podgurski [35] the company can also focus on using Big Data for management that involves understanding the meaning of big data in a company databases using pre-determined queries and multidimensional analysis. This can be done by use of transactional data like years of customer purchasing activity, and inventory levels and turnover by asking questions and getting answers in real-time that can be used to help make short-term business decisions and longer term plans.

7 Conclusions

The study was intended to analyze the role of Big Data Management (BDM) from a financial approach in Nigeria. Specifically, the focus was placed on customer needs and trends, customer loyalty and use of big data in creating cost leadership for bank and financial managers. The findings for each of these are as summarized hereunder;

From the study, we can conclusively say that Guaranty Trust Bank (GTB) uses Big Data Management and Analytics on a large scale, and this analysis is done at the head office and results cascaded downwards, that is to the branches through the branch managers. Fundamental Big Data at Guaranty Trust Bank are mobile banking data and Sales Data and is done on a large scale. The company also collects social media data though is done on a fairly midlevel scale. The data collected is reviewed by a team of analysts, and findings used to inform business decisions in the company like introduction of new items, or getting rid of unrealized ideas. It is from this analysis that Guaranty Trust Bank has been able to position itself a notch higher than its competitors, thus creating differentiation by introducing a variety of products, this is from the analysis of customer feedback and acting on it. This has driven customer satisfaction as seen from very high ratings of the attributes. The company has also been able to arrange products systematically, with some having combinations from customer feedback, making ample use of the web and creating a level playing ground for customers to easier access information, help thereby having a ripple effect on the ease of banking with the institution. This has made it easy for customers to access products online, pay for bills via the ever improving mobile banking platform, response on various social media platform, thus improving the customer experience at Guaranty Trust Banks which in return has given them the upper edge of differentiation from their competitors. All this is because of Big Data Management, where there were able to analyze trends and patterns.

Use of big data has enabled GTBank to have a clear differentiation amongst its competitors by anticipating the customer needs and addressing them in time before the customer sees the need to switch to competitor banks thus helping them retain most of their customer base and earn new ones. They have been able to drive satisfaction amongst their customers thus clearly winning over competition. ATM cards incentivizes for customers as seen with the high rate of repeat purchases as consumers are motivated by interest they earn, customers are motivated by the fact that the more the shop at GTBank, the more they earn the points and therefore the more the returns. This has driven regular use of the ATM cards. The ease with which they do banking has also encouraged customers to continue banking either online or physically.

8 Limitations

Some limitations are worth mentioning and can be considered for further studies. First, we did not take into consideration samples from other banks as we only focused on a particular bank and its branches. The present sample may not represent fully the financial industry of Nigeria. Further research using the samples from other banks and other financial cooperation's will help to understand the role, level and extent of Big Data Management in the other banks and the financial industry of Nigeria as a whole and also to have a comparison of the Big Data Management across board of the financial institutions. Second, our analysis was only based on stated preference data because most Banks in Nigeriaalways refused to give out their data. Although this research provides some significant insights into Big Data Management from the employee and customer perspective in the Nigerian banking industry, there is still a chance to extend the findings to gain a more comprehensive

understanding of the nature or interpret analytics of Big Data Management based on meta-data. An analysis based on a combination of stated preference and bank-supplied online customer banking data would reveal more information and extend the study's applicability. Furthermore, a study comparing the performance of foreign banks and local Nigerian banks in terms of Big Data Management is recommended.

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