Predictive Human Resource Analytics and Employee Satisfaction in Global System Mobile Network (GSM) Call Centres in Nigeria.

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Abstract
This study examined the influence of predictive human resource (HR) analytics on employee satisfaction in Global System Mobile Network (GSM) Operators' call centres in Nigeria. It is a macro level and a cross-sectional survey that adopted a quantitative approach. A structured questionnaire was used to gather data and the population comprised of four major GSM operators in Nigeria. The total of 102 study participants were purposively drawn from managerial employees of the GSM operators' call centres. With the aid of the SPSS 21.0, a multiple regression was used to ascertain how predictive HR analytics models (retention regression model and utilization programming models) ranked in influencing employee satisfaction. The result showed that retention regression model, while ranking more than utilization programming model, had a strong positive influence on employee retention. It equally found that utilization programming model had a negative influence on employee satisfaction. It also found that, the predictive HR models manifested adequately in the call centres while employee satisfaction was low. It therefore, recommended that, for the GSM call centres in Nigeria to leverage fully on the power of predictive HR analytics, and improve their employee satisfaction, they need to relax the content of their utilization model.

Keywords: *Predictive Human Resource Analytics, Retention Regression Model, Utilization Programming Model, Employee Satisfaction, Big Data Theory* .

Introduction
The Global System Mobile Network (GSM) operators, which make up part of the telecommunication companies in Nigeria have contributed immensely to the growth of the Nigerian economy, and in no doubt also contributed to improving the nation's employment index (NCC, 2018; Adegoke and Babalola, 2011). According to Ndukwe (2005), the unique communication services rendered by these GSM operators have become an essential part of living in Nigeria and the world at large. As a matter of importance, every other business now depends in one way or the other, on the services of the GSM operator for connectivity with clients and stakeholders. As a result of this dependency factor, the GSM operators are saddled with the constant responsibility of having to meet up with customer requirements and queries. Subsequently, the GSM operators run a work unit with which they are able to connect with their subscribers and consequently address their queries and complaints. The call centre, being a work unit where customers' queries are addressed through telephony medium only, are the work unit with which these GSM operators are able to keep subscribers on their networks, and as such a very critical work unit for the GSM operators (Adjaino, 2017). In a similar argument, Akanji, Mordi and Taylor (2015) posit that contributions of the call centre (CC) agents to the operations and survivability of the GSM operators represent an important part of service delivery for the operators, and as such effective workforce management in the call centres should be of concern to them.

While the role of the call centres for the GSM operators cannot be undermined, the stiff competition amongst GSM operators to maintain lead in market share and service quality has brought more pressure in how work is done in the call centre (Adjaino, 2011; Dhanpat, Modau, Lugisani, Mabojane and Phiri, 2018). Similarly, Jacobs and Roodt (2013) established that the nature of work in telecommunication call centres is responsible for the very high level of employee dissatisfaction and turnover experienced in the call centres. Most specifically, Bagnara (2000) in an attempt to understand the nature of work in the call centre in Europe, established that the call centre jobs are stressful due to the strictness in work schedules and call monitoring, unclear career progression path, and damage to health. According to Dhanpat *et al.* (2018), these unpleasant work processes foster dissatisfaction amongst call centre employees. In addition, Whitt (2006) suggests that how employees in the call centres are managed consequently manifest in the degree to which they are satisfied with their jobs.

Accordingly, Brezavscek and Baggia (2014) suggest that, for call centre managers to accurately make decisions regarding scheduling and optimization of call centre employees such to ensure satisfaction, they need to adopt predictive methodologies or strategies. Oehler and Falletta (2015) also established that the application of predictive models in human resource management has helped organizations to improve employee satisfaction constructs that enabled them improve satisfaction and ultimately reduce annual voluntary turnover. This present study lends a voice to several other studies that have attempted to amplify the values of adopting predictive analytics in improving employee satisfaction. Therefore, the study aims to ascertain the influence predictive human resource analytics has on employee satisfaction for the Nigerian GSM call centre agents.

Research Purpose
The purpose of this study is to ascertain the level of influence predictive HR analytics has on employee satisfaction in GSM call centres in Nigeria. Most specifically it seeks to ascertain the level of influence retention regression model has on employee satisfaction and determine the level of influence utilization programming model has on employee satisfaction.

Research Question
Drawing from its purpose, the study seeks to provide answer to the research questions below:
How does retention regression model influence employee satisfaction in GSM Call Centres in Nigeria?
How does utilization programming model influence employee satisfaction in GSM Call Centres in Nigeria?

Research Hypothesis
Consistent with the purpose of the study and to provide a framework for explaining the findings, the study proposes the following two hypotheses in their null forms:
HO_1: Retention regression model does not significantly influence employee satisfaction in GSM call centres in Nigeria.
HO_2: utilization programming model does not significantly influence employee satisfaction in GSM call centres in Nigeria.

Theoretical Foundation

The study was hinged on the big data theory; hence, this section of the paper will be examining the big data theory and attempt to establish its link to the variables of the study.

The Big Data Theory

This theory is currently taking first place among base line theories in the management of data (Harris, 2005). The big data theory is of the assumption that any large volume of data, whether structured or not, that organizations have to deal with on daily basis can be mined for useful information that will aid in improving their strategic decisions (SAS Institute, 2014). Similarly, Chen, Chiang and Storey (2012) opine that the theory focuses on data analyses and stimulates effective strategic business decision-making since it helps in pulling evidences or information from the complexity of today's business environment. According to Finlay (2014), data analysis is mainly achieved through predictive analytics in which the mining of relevant and useful information helps the decision maker to forecast patterns, via the use of statistical models, computer-based and machine learning techniques. The theory has gained recognition in the business world due to the advancement of technology and the fact that organizations have to deal with supposedly large and varying set of data to meet business objectives. Therefore, studies have established that these data can be gathered and examined to gain understandings and insights to improve both operational and strategic objectives (Laney, LeHong and Lapkin, 2013; Brynjolfsson and Saunders, 2009).

Relating the big data theory to this study is built on the arguments of Shah, Irani and Sharif (2017) which explains that, in driving organizational efficiency, the adoption and application of the big data theory assumptions may give profound and new insights for organizations to explore employee attitudes, abilities and behaviors. According to Williams (2001), the big data will aid in unravelling remote antecedents of organizational outcomes given that the nature of work is in constant changing mode and that employees constantly go through some inherent psychological need changes, and these may likely affect how the employees perceive their jobs. As a result, the expectations of individuals from their employer can be based on several factors both within and outside the organization, and these can actually generate huge amount of data (Shah *et al.*, 2017). Hence, for call centre managers to make decisions that will yield employee satisfaction in the call centre, they need to get insights to the factors responsible for employee satisfaction through the application of predictive analytics.

Employee Satisfaction

According to Antoncic and Antoncic (2011), satisfaction refers to the benefit derived from participation in an incidence. This simple definition of satisfaction, leads us to understand that employee satisfaction is the point at which employees come to enjoy their jobs. Maintaining employee satisfaction is important to organizations as it has been found to be inversely related to absenteeism and turnover (Babatunde and Selamat, 2012). Besides, when employees are satisfied, it manifests in the quality of service they render to the customers. This makes keeping employees satisfied a critical function in an organization (Antoncic and Antoncic, 2011). If this is so, it therefore becomes necessary for organizations to examine the factors that trigger employee satisfaction, as understanding these factors will enable organizations develop viable satisfaction strategies.

Subsequently, studies have established that employee satisfaction is triggered by pay, promotions and promotion opportunities, recognition, relationship with coworkers and supervisors, and the fit with the job itself (Branham, 2005). Miskell and Miskell (1994) added work condition, time involved in work and the organization's goodwill. Braham (2005) however clarified that for organizations to measure their performance on employee satisfaction, they need to examine their attitude towards their jobs and towards the organization. Consequently, studies have established that the manifestations of a satisfied employee are trust and motivation to do more, being happy with the job, loyalty, adherence to organizational policies and changes, higher productivity and commitment (Dirks and Ferrin, 2002; Braham, 2005). Consequently, this study measures employee satisfaction on these behavioural manifestations.

Predictive Human Resource Analytics

Predictive HR analytics attempts to forecast the future using past and current data while focusing on the probabilities of future occurrence and potential impact (Fitz-Enz and Mattox, 2014). In a similar line of thought, Mishra, Lama and Pal (2016) state that predictive HR analytics is a forward looking and data-driven insight that facilitates better people-related decisions. Hence, predictive HR analytics is said to take away guesswork from the decision-making process in the HR task (Kremer, 2018). In addition, Galetto (2005) argue that, it is basically focused on analyzing data and manipulating variables in order to derive forecasting capabilities from an array of existing data. Perhaps the explanation that is most adaptable to this study framework is that offered by Grillo and Hackett (2015) which states that predictive analytics entails turning data into information through the use of advanced forecasting tools to model future result or occurrence. A critical analysis of the definitions of the predictive HR analytics offered by these scholars reflects that it is forward looking.

Relying on the work of Grillo and Hackett (2015), this study adopts dimensions of predictive HR analytics in respect to the situational conditions prevalent in the call centre environment and its workforce, and above all, based on variables inimitable to the GSM companies in Nigeria. Based on the foregoing, this study focuses on the following forecasting models as dimensions of predictive HR analytics: (1) Retention Regression Model, and (2) Utilization Programming Model.

The Retention Regression Model

The predictive retention regression modeling techniques endeavor to generate models or representations that maximize or minimize function variables that most often are meant to improve the satisfaction metric used for assessment (Smeyer, 2013). Subsequently, retention regression model is a tool that considers how a retention objective is maximized or minimized by the combination of causal variables, expressed in a typical linear regression model, $Y = \beta_0 + \beta_1 X + \varepsilon$, where β_0 = Constant Term; β_1 = Beta coefficients; X= independent variable, Y= dependent variable and ε = Error term. This model when represented with real values, will determine whether the function or independent variables can lead to the target variable and at what varying degrees. The error term in the model measures how credible the model can be when applied in another similar situation

The variables in the function variable of a retention regression model are either leadership based (e.g. managerial support, trust in leadership, manager-subordinate relationship, conflict resolution style, etc.) or work condition based (i.e. work involvement, job security, work load, work hour, job content) or pay related (pay, bonus payout, incentives, financial and non-financial benefits, commissions, etc.). The target variable for the retention regression model on the other

hand, is either retention or intention-to-stay. Subsequently, the objective of a retention regression model is to improve retention or minimize turnover. Studies have shown that organizations have used the retention regression model to identify high risk employees who may likely leave the organization and as such are able to minimize their turnover index and the associated cost of turnover (Singell and Waddell, 2010; SCIOinspire, 2011; Sonja, 2015).

Utilization Programming Model
The utilization programming model is uniquely developed from the adaptation of quantitative linear programming model into HR utilization planning and forecasting. Many quantitative analytics models using linear programming have been developed to effectively allocate resources in an organization (Das, Verma and Gupta, 2017; Kareem and Aderoba, 2000; Aderoba, 2000). Generally, every linear programming model is focused on maximizing or minimizing certain quantities which could either be profit or cost (Akinyele, 2007). Similarly, the concern of linear programming when adopted in agent utilization in the call centre is to maximize the number of calls or minimize abandonment rate in order to maintain favourable service level.

The uniqueness of applying linear programming in call centre manpower utilization is that, it follows in a unique way every property of a usual production management linear programming model. Hence, the call centre utilization programming model used in this study will uniquely consider the four basic property of a linear programming model which are; (1) the objective function (this is the maximization of calls/speed of answer or minimization of abandonment), (2) the constraint, which is the limit to which the objective function can be pursued (in the call centre, this is the availability/ functionality of call routing devices and agent availability), (3) alternative course of action, which is the availability of other options to ensure the objective function is achieved; this centers on choosing from the best option, and is very important in linear programming (Akinyele, 2007), and (4) expression of both objective function and constraint in a linear or first order equation form such as, $5A + 8B = 18$ or $6A + 10B \geq 26$.
This study adopts the use of linear programming model in the area of call centre agent utilization to take care of both low performing call centre agents or call representatives and high performing agents, while considering work facilities, call volume, and of course, operation time as constraints to satisfying the nature of call centre work in developing countries like Nigeria.
Methodology
With the belief that getting knowledge from employees in their work environment is hard and as such should be sought for objectively, this study philosophically aligns with the positivism-objectivism assumption. In addition, the study is a macro level, correlational and cross-sectional survey adopting a quantitative approach. The population is drawn from four major GSM operators in Nigeria who have very large subscriber base (Airtel, Glo Mobile, MTN and 9mobile). The total number of participants used for the survey was 102 managerial employees of the four GSM operators' call centres in Nigeria. Data was collected through a structured questionnaire. Out of 102 copies distributed, 98 were retrieved but only 94 were used for analysis. The opinions of experts in human resource management, data analysis and call centre management were used to validate the study instrument. In addition to ascertaining the goodness of measure for the instrument, the internal consistency reliability of the instrument was tested with the SPSS tool, and the Cronbach Alpha Coefficient of .814 (retention regression model), .901(utilization programming model), and .711(employee satisfaction) was obtained. A descriptive statistic was also carried out to ascertain how each of

the study variables manifested in the GSM call centres in Nigeria. The hypothesis was tested using a multiple regression to ascertain the ranking in influence as well as direction of the influence each of the predictive models had on employee satisfaction. The instrument was based on a 5-point Likert Scale rating coded as: 'strongly agree'=4, 'agree'=3, 'neutral'=0, 'disagree'=2, 'strongly disagree'=1.

Result

The first result examined is the descriptive statistics on the three variables – retention regression model, utilization programming model and employee satisfaction. The descriptive statistics was carried out to ascertain how these variables manifested in the GSM call centres in Nigeria.

Table 1: Descriptive Statistic

	N	Mean	Std. Deviation
Retention Model	94	2.74	.674
Utilization Model	94	2.66	.692
Employee Satisfaction	94	1.97	.740
Valid N (listwise)	94		

Source: SPSS 21.0 Output

With a mean score of 2.74 and .674 standard deviation (SD) score, the retention regression model is said to have manifested highly in the call centres, similarly, with a mean score of 2.66 and .692 SD score, the utilization programming model is said to have also manifested high in the call centres, and with a mean score of 1.97 and .740 SD score, employee satisfaction is said to have manifested very poorly in the call centres. The implication of this result is that, while retention regression model and utilization programming model was adequately used, employee satisfaction seemed to be low in the call centres.

The second result analyzed in this study is the multiple regression result and its implication for the study. The multiple regression examined is $Y_{ES} = \beta 0 + \beta 1 RRM + \beta 2 UPM + \varepsilon$, where ES (employee satisfaction), RRM (retention regression model), UPM (utilization programming model), and ε (error term). The result of the analysis will be used to address the research questions and hypotheses while determining the ranking of the predictive models in relation to how they influenced employee satisfaction.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.663[a]	.439	.427	2.643	.439	35.673	2	91	.000

a. Predictors: (Constant), Utilization Model, Retention Model
b. Dependent Variable: Employee Satisfaction

Table 3: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7.548	1.681		4.491	.000		
	Retention Model	.537	.082	.517	6.519	.000	.979	1.021
	Utilization Model	-.351	.080	-.347	-4.378	.000	.979	1.021

a. Dependent Variable: Employee Satisfaction

Source: SPSS 21.0 Output

The model summary table above indicates an R^2 value of .439 indicating that the combination of retention model and utilization programming model is responsible for about 44% manifestations of employee satisfaction while the sig F change of .000 shows the model is a good fit. Also, Table 3 shows: retention regression model (standardized $\beta = 0.517$**, $p < 0.01$); utilization programming model (standardized $\beta = -0.347$**, $p < 0.01$). From the standardized β values, it

shows that retention regression model ranks higher than utilization programming model in influencing employee satisfaction. The values also show that retention regression model has a strong positive influence on employee satisfaction while utilization programming model has a moderate negative influence on employee satisfaction. There was also no multicollinearity problem detected since the tolerance values for the variables show 0.979. Most importantly, the p-value of 0.000 shows that the level of influence is significant. Therefore, the null hypotheses $H0_1$ and $H0_2$, were rejected.

Discussions of Findings
Several findings were outstanding in this study. The first was that the predictive HR analytics models were adequately used in the GSM call centres while employee satisfaction was very low in the call centres. This finding regarding the low employee satisfaction in the call centres supports other similar studies that have established such manifestations in Europe, America and Asia (Oehler and Falletta, 2015; Sullivan, 2013; Dhanpat *et al*., 2018). Secondly, the study found that retention regression model positively influences employee retention in the call centres while utilization programming model negatively influences employee satisfaction. The finding regarding the positive influence of retention regression model supports the work of similar studies in this regard (Sonja, 2015; Sullivan, 2013). Thirdly, it found that the retention regression model ranked higher than utilization programming model in influencing employee retention, and no study has established this. Likewise, there has not been any particular study showing the negative influence utilization programming model has on employee satisfaction. Fourthly, the study found that the combination of the predictive HR analytics (retention regression model and utilization programming model) accounts for approximately 44% of the manifestation of employee satisfaction while the remaining 66% can be attributed to other unexplained variables.

The implication of the finding is that, as the GSM call centres thrive to maximize the utilization of the call agents in order to improve their service level objectives, the more used and stressed the agents feel and become respectively, thus dampening how they feel about their job. This subsequently leads to dissatisfaction. This finding in simple terms indicates that, the higher the utilization, the lower the employee satisfaction.

Conclusion and Recommendations
Based on the result of the analyses carried out, the study established that, employee satisfaction is low in GSM call centres in Nigeria. Secondly, it established that the retention regression model and utilization programming model are both highly utilized in managing the call centre workforce in Nigeria. Thirdly, it established that, while retention regression model positively influences employee satisfaction, utilization programming model negatively influences employee satisfaction. It also asserts that the predictive models examined in this study, account for approximately 44 % of the manifestation of employee satisfaction in GSM call centres in Nigeria. Following these findings, the study was able to address the research questions while rejecting the two hypotheses of the study. Fourthly, the study has succeeded in innovatively developing unique labels for predictive HR analytics models used in the GSM call centres in relations to advance forecasting techniques and human resource management. With these findings, the study therefore, recommends that:
To improve their employee satisfaction, the management of GSM call centres in Nigeria need to relax the target variables of their utilization model, as doing so would help to improve their employee satisfaction, and consequently, help to change their employee dissatisfaction and intention-to-leave narratives.

That other call centres in Nigeria asides the GSM call centres, need to leverage on the benefits of predictive HR analytics to improve their employee satisfaction objectives. In addition, they need to use models that are user friendly and specific to their business objective in order to facilitate easier understanding, thus, fostering employee retention.

A qualitative study can be carried out to ascertain the specific labels used for the predictive HR analytics models used in GSM call centres in Nigeria.

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