Modelling Motadata Software Application Use and Performance in an Automobile Service Company in Nigeria: The Roles of FIT and Voluntariness

Osang, F.B. (Ph.D.) & Umoren, I. Ph.D.
[1]Computer Science Department, National Open University of Nigeria (NOUN), Abuja, Nigeria

[2]Computer Science Department, Akwa Ibom State University, Ikot Akpaden, Nigeria

Email: [1]fosang@noun.edu.ng, bukie3osang@yahoo.com; [2]imehumoren@aksu.edu.ng,

ABSTRACT

The adoption of information systems has brought remarkable changes to organizational outputs. While public and private institutions continue to invest heavily on these innovations with high expectations on return of investment, the critical variables determining human interactions resulting to performance outcomes especially in low voluntary context remain under researched. This work integrated voluntariness into the Technology Utilization Satisfaction Model (TUSPEM) to investigate performance outcome. Using stratified sampling technique, the views of 136 employees of a private automobile were collected and analyzed using structural equation modelling (Smart PLS 3.0). The model predicted 81% of performance impact. The result confirmed the significant relationship between voluntariness and utilization, satisfaction. Utilization and satisfaction also influenced performance. Critical evaluation of the performance of these technologies as it relates to organizations, employees and researchers is critical if the sustainability of information system is anything to go by.

Keywords: TUSPEM, voluntariness, Coscharis, TTF, automobile sector etc

1. INTRODUCTION

The advent of information and communication technology is forcing industries to change their operations, ways of doing business and customers. In 2016, the World Economic Forum through a survey of 371 employers of labour identified 9 technological drivers of change across the industries globally World Economic Forum (2016). Similarly, as reported by WaLkerall, Bowkett, and Duchaine (2018), Canada has identified these technological drivers already in play to include: (a) virtual and augmented reality, (b) fifth-generation mobile technology, (c) 3D printing, (d) block chain, and (e) artificial intelligence (AI). By implication, companies are increasingly integrating ICT innovations into their business models even in core operations. As one of the oldest industries, the automobile industry is not left out. Today modern cars are embodiments of services that transcends beyond mere transportation. Big players in the industry are acknowledging the importance of software applications as enablers in departments such as front desk department, spare parts, accounting and workshop departments Mahmoudsalehi, Feizi, Taqhavifard and Raeesi (in-print).

In-vehicle computer systems are being integrated for improving vehicle safety, security, comfort and performance Morris, Madzudzo, & Garcia-Perez (2018). As more and more industries integrate ICTs into their operations, the demand for higher productivity, changing employability and services increases.In developing countries like Nigeria, the deployment of applications at dealership levels (an important part of the distribution and service chain) is still at infancy stage.

In the early days, Coscharis Motors Limited ran their transactions manually- using pen and paper for every form of documentation, but with the emergence of software applications, focus was shifted to software applications because it made the job easier, faster and much more efficient. The first experienced with Autoplus (AUTO+) was daunting as the non-usage of internet connection isolating branches from head office control. Other challenges observed included: staff clocking challenges, inaccessible job orders, inadequate workshop operations, non-user friendliness of the application, poor vendor support among others resulted to eventual abandonment of the application.   In order to rid of these shortcomings, importer dealer automotive management system (IDAMSS) was introduced and later abandoned. Hence, the introduction of Motadata software technology that centralized all IT data analytics, streamlining all IT-related processes and morphing IT into an effective, accessible and productive component of the business.

However, despite the deployment of the technology, a number of constraints are still being experienced namely:
-   Poor technical expertise of staffs handling the application due to poor training,
-   Poor internet connection- MOTADATA is dependent on internet access to function. In an event of poor/ no internet connection the after sales comes to a stand-still pending when internet is restored. Whilst working on a particular repair order, the system usually locks users out after a while in case of any fluctuation in network thereby warranting the attention of the I.C.T administrators. This can be quite frustrating on the part of the staff and the customers.

Consequently, it has become difficult to actually measure whether the new technology being deployed is actually being fully utilized and how utilization and satisfaction results to organizational performance.

1.1 Research Objectives
(a) To develop a suitable model for predicting performance impacts, usage and user satisfaction using Motadata technology in Coscharis automobile company where usage is mandatory.
(b) To determine the causal relationship between constructs in the developed model in (a) above and their effects on employee satisfaction and job performance.

The study adopted an integrated Task-technology fit (TTF) and Technology utilization, satisfaction and performance (TUSPEM) model components as the theoretical foundation. The TUSPEM model state that for a technology to impact on performance, it must not only fit the technology and be used; it must satisfy the users Osang et al (2014).

2. RELATED LITERATURE

The adoption of software technologies has brought about remarkable improvements especially in workplaces. Regarded as the drivers of processes in most large and medium companies, understanding of the interaction of users with these technologies results to work-related outcomes such as job satisfaction, IT success and performance.
The provision of the underlying principles associated with these interactions and how they could be maximized to for improved outcomes has been the focus of many information systems theories and models which has gained prominence over time.

This study uses the TUSPEM model. The TUSPEM model is a hybridization of the technology acceptance model (Davis, Bagozzi, & Warshaw, 1989), the Task-Technology Fit model (TTF) (Goodhue & Thompson, 1995), satisfaction from DeLone and McLean (2003), computer self-efficacy from Compeau and Higgins (1995) and has more explanatory power than any of the previous models alone [Osang and Mbarika (in-print; Dishaw & Strong, 1999]. The TUSPEM model maintained that for a technology to impact on performance, it must not only fit the task and be used; it must satisfy the users Osang (2016). The model is hinged on a tripartite dimensions predicting performance impacts of technologies and information systems namely the task technology fit dimension, the pre-cursors of utilization dimension as well as the satisfaction dimension.
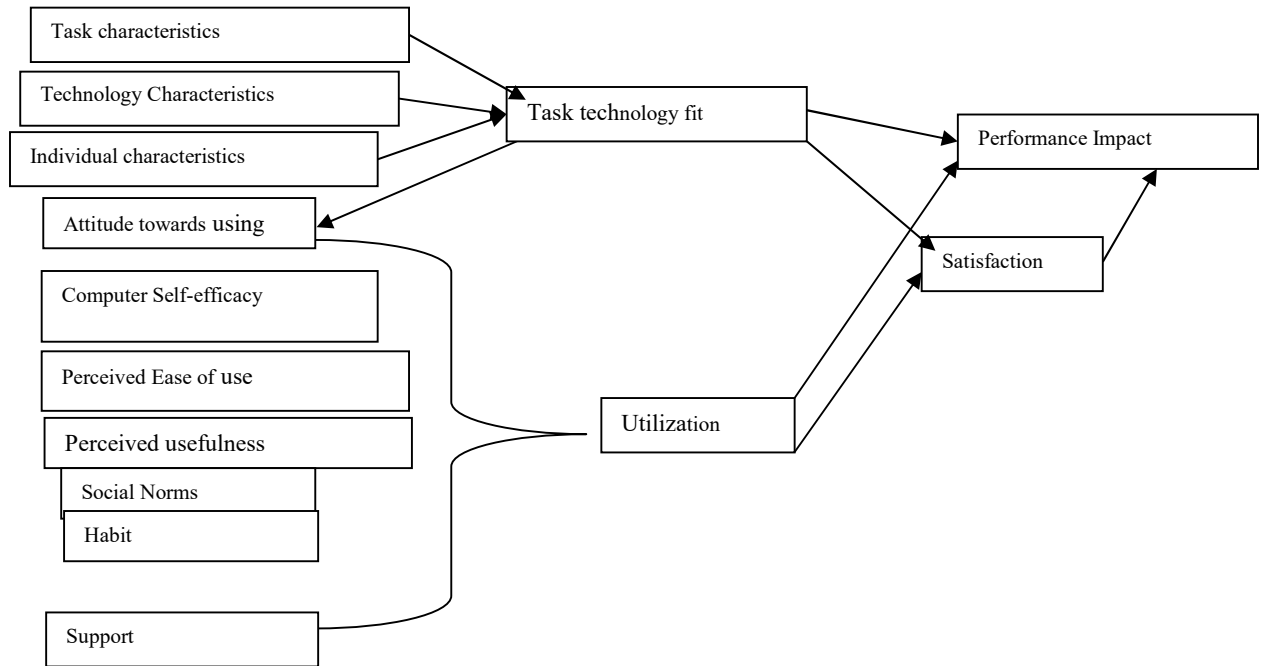
Figure 1: The Technology Utilization, Satisfaction and Performance Model (TUSPEM)

2.1 The Research Model and Hypotheses
The model used in this research is shown in table 2 and hypotheses are explained further:
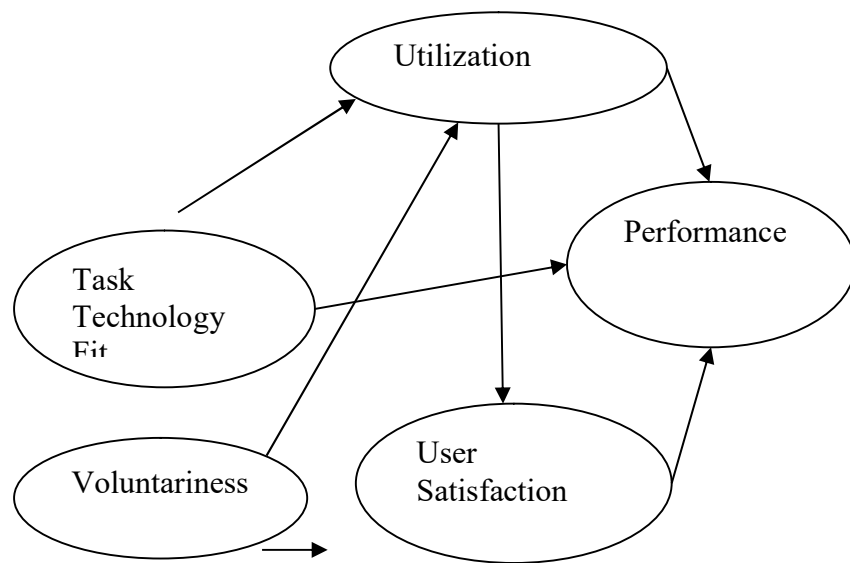

Figure 2: The Research Model

2.2 The Task Technology Fit Dimension

This is majorly concerned with critical analysis of the suitability of specific technologies for given tasks. It presupposes that for a technology to perform any given task effectively, it must fit that given task otherwise. It concluded that task characteristics, technology characteristics and individual characteristics are the major determinants of task technology fit which in turns affect performance Goodhue and Thompson (1995). Several studies have investigated the TTF construct with mixed results. On investigating TTF and performance, Abbas (2018) investigated the activities of mobile banking customers using a survey instrument. The result of the study showed that TTF positively impacted on the performance of individuals. Wu and Chen (2017) while investigating students' continuance intention to use massive open online course (MOOCS) found that TTF has a positive impact on students' satisfaction. Similarly, while investigating TTF of MIS and its impact on MIS user acceptance and satisfaction at UNRWA relief and social services area offices – Gaza, Khaled (2016) concluded that Task-Technology fit has a strong positive impact on utilization and user satisfaction.

In a similar study, Isaac, Abdullah and Ramayah (2017) also confirmed that TTF has a strong impact on user satisfaction and performance among public sector employees in Yemen. Luarn and Huang (2009) found moderate support for the linkage between TTF and performance maintaining that TTF will positively affect the performance of employees to collaborate. Job satisfaction and task performance were not found to be related in Montgomery (2017) study that determined whether job characteristics and resources indeed influenced job fit perceptions of current employees. Luarn (2009) findings however, indicated that utilization has a greater effect on performance than TTF in a mandatory usage environment. Hence, the hypotheses were stated thus:

H_1: TTF has a positive relationship with utilization such that as TTF increases level of utilization increases. H_2: TTF has a significant relationship with staff satisfaction such that as TTF increases level of staff satisfaction increases.

2.3 Voluntariness

This work used TTF and voluntariness as determinants of utilization. In their work, Xiu et al (2017) investigated Chinese users switching behaviour of cloud storage services and concluded that voluntariness influences user satisfaction. Venkatesh, Morris, Davis, & Davis (2003) included moderating variables like voluntariness and experience in their study and found the explanatory power of their TAM model increased from 35% without moderators to 53% with moderators. Hence, the hypotheses are stated thus:

H_3: There is a significant relationship between voluntariness and utilization such that as the level of voluntariness for employees' decreases, usage increases

H_4: There is a significant relationship between voluntariness and utilization such that as the level of voluntariness for employees decreases, level of satisfaction increases.

2.4 System Utilization Dimension

The concept of system utilization is critical in the information system field. Research on users' belief and behaviour and its impact on utilization of information systems are basically categorized into theories of users' attitude and behaviour. Prominent theories classified under the utilization based models include the work of Ajzen and Fishbein, 1980; Davis 1985, 1989; Averweg, 2008; Shrier, 2009. This study viewed utilization as it affects satisfaction and performance. Results from researches in the information system field have been characterized by mixed findings depending on the tools, system and context. For example, Andrew et al (2017) agreed that utilization has both positive and negative effect on user satisfaction. Parameswaran and Kishore (2017) investigated 80 previous works using meta- analysis. Their study confirmed that utilization has a positive impact on user satisfaction. While investigating the use of mobile information systems by nurses in a healthcare setting Hsiao and Chen (2012) confirmed that utilization is positively related to work Performance. On the contrary, technology utilization had a non-significant relationship with user satisfaction Osang (2015).

Also, while investigating students virtual learning systems usage, Lin (2012) concluded that level of utilization is either not associated with performance impact or is associated with performance impact in ways that are not readily captured by simple linear modeling. Hence, the hypotheses are stated thus:

H_5:   System utilization is significantly correlated with satisfaction such that as utilization increases, employee satisfaction increases.

H_6:   System utilization is significantly correlated with performance such that as utilization increases, employee performance increases.

2.5 User Satisfaction Dimension

Viewed as an important variable in information system success, satisfaction construct was investigated in this study from the post usage perspective. While other models did not capture satisfaction (TTF, TAM), DeLone and McLean (2003) model found it to be critical in information system success. In mandatory and voluntary usage context, it is viewed from differently and may affect performance differently. Satisfaction is conceived to play a more critical role in information system performance as individuals are not under any form of compulsion in non-mandatory context Osang et al (2015).

In workplace environment, employee's emotional satisfaction is influenced by what is considered as ones important job values. As reported by Bednarska & Szczyt (2017), dissatisfaction with the system may eventually sets in, when these values are not met. This may eventually culminate to a display of negative attitude, poor job quality and low job performance Tuna, Ghazzawi, Yesiltas, Tuna & Arslan (2016). Hence, the hypothesis is stated thus:
H_7: Employee satisfaction is correlated with performance such that as the level of satisfaction with an information system increases, both individual and organizational performance increases.

3. METHODOLOGY

3.1 Research Design

A survey design was used as the basis of conducting this study. The study was conducted in Coscharis motors Limited, Abuja. It was centered mainly on the after sales department. During a staff meeting, the questionnaires were distributed to the respondents and given a five day period to respond to the questionnaire. Their names or any form of information used to identify them was not included on the data collection form to protect their identity.

3.1 Sampling

The sampling method chosen is the stratified sampling method, here the population is divided in groups in this case departments. In each group a probability sample (often a simple random sample) is selected in stratified sampling the groups are called **STRATA.**

3.2 Development of the Instrument

Based on the decision to use the Task Technology Fit Model to ascertain the effectiveness of MOTADATA used by the members of staff of Coscharis Motors Limited Abuja. The questionnaire used the 7 point Likert scale to measure the constructs included in the TTF Model.

Items on Task Technology Fit coded as TTF were adapted from the works of [McGill and Klobas (2008), Goodhue and Thompson (1995), Osang (2014)]. Performance were coded as (PERF) and adapted from [(Delone and Mclean, 1992; Goodhue and Thompson, 1995; Osang, 2014)]. Utilization (USE) [(Davis et al, 1989; Thompson et al, 1991, Osang 2014). Satisfaction (SAT) [McLane and DeLonen (2002), Roca et al (2006), Osang 2014). Voluntariness (Yu-Lung Wu et al 2008). Table 1 shows the various codes used for all the constructs and the number of items per construct.

Table 1: Constructs Codes

PERFORMANCE OUTCOME	PERF	PERF1…….PERF7
SATISFACTION	SAT	SAT1…..SAT6
TASK TECHNOLOGY FIT	TTF	TTF1……....TTF10
UTILIZATION	USE	USE1…..USE5
VOLUNTARINESS	VOL	VOL1….VOL5

3.3 Collection of Data

Out of the 150 questionnaires distributed, 136 results were collected by the researcher and recorded in an excel format and stored in a flash drive. Items in the returned questionnaire not filled by respondents were filled with -1.

3.4 Data Analysis

Structural equation modeling (SEM) was adopted for the analysis of data. SEM as a statistical method combines factor analysis and path analysis. Popularly used for theory construction, it is a powerful tool in analyzing causal relationships among variables. Larsen, Sørebø, and Sørebø (2009) reported that PLS is a second version of the regression method that combines both confirmatory factor analysis and linear regression with the capacity to handle both measurement and structural model analysis at the same time. It is suitable for analyses with small or medium sample sizes (Lee, Cheung & Chen, 2007) and suitable for handling research work in information technology field (Burton-Jones & Hubona, 2006; Turel et al., 2007).

4. RESULTS AND DISCUSSION ON FINDINGS

4.1 Respondents Demographics

This section presents the data collected from the respondents.

Table 2: Demographic information

Gender	Male (86.5%)			Female (13.5%)			
Age	Below 30 (24%)	31-40 (54%)	41-50 (12%)	51 and above (8%)	No Response (2%)		
Job Title	Service Advisor (25%)	Customer Care (8%	Warranty Personnel(4%)	Workshop Controller (1%)	Technician (42%)	Spare Parts Dept. (13%)	Accounting Dept. (7%)
Practice Location	Front Desk (40%)	Warranty Dept. (7%)	Spare Parts Dept. (30%)	Accountin g Dept. (13%)	Workshop (10%)		

4.2 Measurement Model Evaluation

The main purpose of the measurement model evaluation is to evaluate the reliability and validity of the indicators/manifest variables associated with the model constructs. This test includes the evaluation of item reliability, internal consistency (construct reliability), convergent validity, and discriminates validity.

i. Uni-dimensionality

Based on the item loadings on variables, seven out of the thirty three items failed to load significantly on the latent variables. These include perf 7, vol1 and 6, use 5, TTF1, 3 and 5. All the twenty six other items loaded significantly the item loadings for each latent variable ranging from 0.80 to 0.95.

Hence, there was high evidence of uni-dimensionality with the other constructs indicator loadings used in the model as all items loaded above the 0.7 upper thresholds as recommended by Gefen and Straub (2005).

ii. Internal Consistency Reliability
Second parameter for reliability evaluations is the internal consistency (construct) reliability. Construct reliability measures the internal consistency of the manifest variables (indicators) associated with a latent construct, which means the degree to which the indicators are measuring the same concept (Hussein, 2009, p. 224).Internal consistency is evaluated by two measures that are, Composite Reliability (CR) and Cronbach's alpha. CR and Cronbach's alpha indicate how well a set of manifest variables appraises a single latent construct. However, compared to Cronbach alpha, composite reliability is considered a better measure of internal consistency because it employs the standardized loadings of the manifest variables.

Composite reliability measurement criteria were used in this study to assess internal consistency reliability. All constructs in the model exceeded the minimum threshold of 0.6 (Nunally and Berstein, 1994) and 0.70 (Hair et al, 2006) threshold except 7 indicators. Hence, there was also sufficient evidence of internal consistency reliability among the items of the variables in the model.

iii. Convergent Validity
Convergent validity is the degree to which multiple items to measure the same concept are in agreement. All constructs met the threshold of AVE greater than 0.50 except four items from voluntariness (2) and TTF (2).

iv. Discriminant Validity
Discriminant validity represents the extent to which the construct measures what it is intended to measure. A construct is considered to be discriminant valid if it shares more variance with its indicators than with any other construct. To test this requirement, the AVE of each construct should be higher than the highest squared correlation with any other construct (Hair, Sarstedt, et al., 2014, p. 112). If the AVE for a given latent variable exceeds the squared correlation with the other latent variables, then the variable can be said to display discriminant validity. Also, to measure the discriminant validity, the AVE square root could be used and should be greater than the correlations among the latent variables. Consequently, all items loaded highest on their targeted constructs as showed in table 3 column 7 to 11.

Table 3: Showing outer model

Construct	Crom-bach Alfa	CR	Items no.	AVE	Rho-A	1	2	3	4	5
Motadata Technology Fit	-0.059	0.005	10	0.146	0.332	0.399				
Performance	0.831	0.874	7	0.504	0.849	0.383	0.858			
Satisfaction	0.911	0.913	6	0.693	0.913	0.382	0.851	0.858		
Utilization	0.859	0.890	5	0.659	0.890	0.382	0.710	0.833	0.812	
Voluntariness	0.426	0.807	5	0.449	0.807	0.399	0.426	0.426	0.407	0.670

4.3 The Structural Model
Ability of the model to explain the variance in the dependent model and the statistical significance of the estimated model coefficient are the assessors of the inner model.

4.4 The Predictive Ability of the Model
The predictive power of the model showed 81% (performance), 74% satisfaction and 20% utilization. In other words, dataset represented by the R^2 value on the endogenous variables shows that 81% of the dependent variable (performance of Motadata software) was predicted by constructs such as utilization, staff satisfaction and TTF

captured in this model. The result of this study shows system utilization with the highest contribution of 58% in the determination of performance using metadata software compared to that of satisfaction (35%) and TTF (2.4%) respectively. This showed that the model has a very high predictive value power suitable for the study. Similarly, 74% of the dependent variable (satisfaction) was predicted by system utilization and voluntariness with utilization contributing 82% while voluntariness contributes only 9% in the determination of the satisfaction. The result of this study shows that only 20% of utilization was explained by the constructs captured in this model. By implication, 80% of the dependent variable (utilization) was unexplained by the constructs in this model.
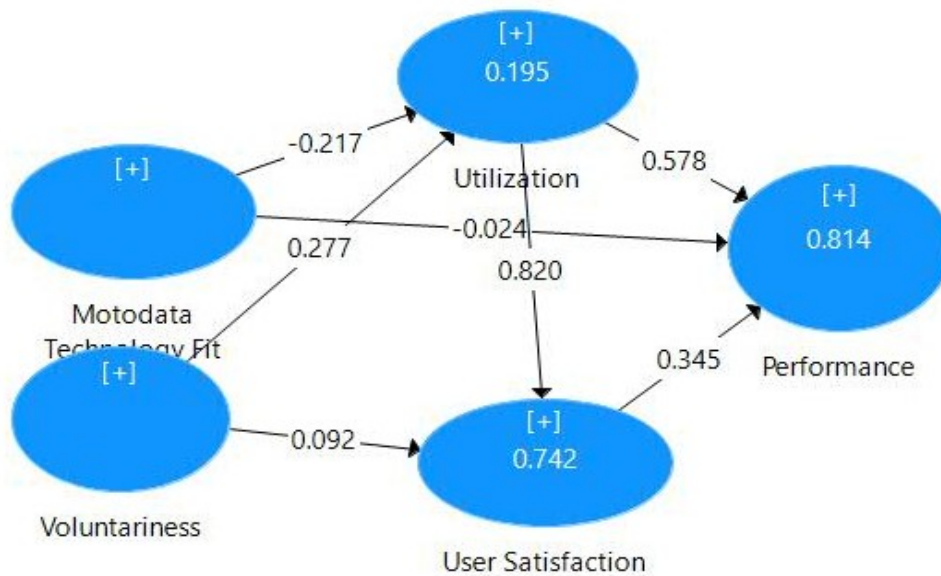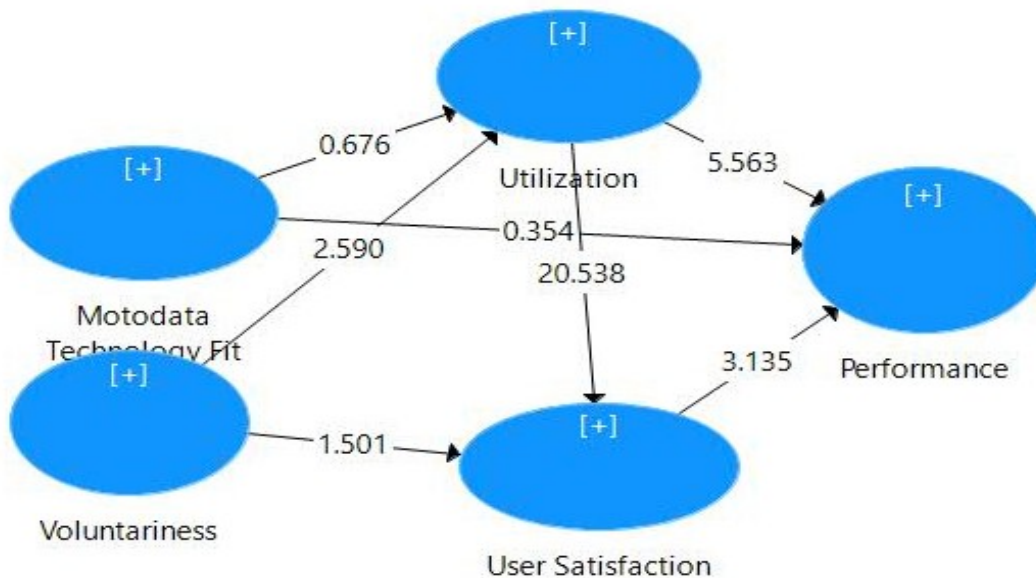

Figure 3: Structural equation modelling

Figure 4: Bootstrap Result

4.5 The Statistical Significance of the Estimated Model Coefficients

This aspect examined the path coefficients of the latent variables used in the model.

Table 4: Decision Table and Significance Level

Hypotheses	Paths	Original Sample	Sample Mean	Standard Deviation	T-Value	P-Value	Support For Hypothesis?
H_1	TTF to utilization	-0.02	-0.12	0.07	0.375	P< 0.70	No
H_2	TTF to performance	-0.21	-0.12	0.33	0.663	P<0.05	No
H_3	Voluntariness to utilization	0.35	0.34	0.11	3.27	P< 0.00	Yes
H_4	Voluntariness to satisfaction	0.58	0.58	0.10	5.76	P< 0.00	Yes
H_5	Satisfaction to performance	0.82	0.83	0.04	19.87	P<0.00	Yes
H_6	Utilization to satisfaction	0.09	0.89	0.06	1.50	P<0.15	No
H_7	Utilization to performance	0.28	0.26	0.09	2.90	P<0.00	Yes

In structural equation modelling, path coefficients focused on the correlations between variables. When the T value of the path is greater than 1.96, the two variables on the path are considered to be correlated. The analyses of the summarized conceptual model with their t and p-values are shown in Table 4. Based on the t-values, four out of the seven hypotheses were confirmed. H_3, H_4, H_5 and H_7 were statistically significant at the levels of $p<0.000$. H_1, H_2 and H_6 were rejected as showed in table 4 and diagram (bootstrap result).

4.6 Hypotheses Testing

Result from the analyzed dataset supported the causal relationship between voluntariness and utilization H_3 with a t-value of 3.27 ($p<0.00$). In a working environment, management may decide to make available to their workforce, softwares they consider as tools relevant in achieving organizational goals. Members of staff on their part would have to learn and use such platforms as work schedule. By implication, in a mandatory usage environment, voluntariness results to usage of information system. This position is supported by the earlier works of Anderson et al (2006) that concluded that voluntariness influences utilization while investigating academic staff acceptance of tablet PCs. Similarly, the works of Khan and Ahmad (2015) agreed with this position while investigating mobile-web application adoption in Pakistan.

The hypothesized causal relationship between voluntariness and satisfaction H_4 was supported at t-value 5.76 and p-value ($p< 0.00$). This implies that as the level of voluntariness increases, level of satisfaction increases as staff eventually learn to derive satisfaction from discharging their duties. Satisfaction may set in on realization of the fact that their job retention possibilities highly depends on their system usage capabilities and functionalities. This position is in line with the findings of Michele (2014) that found that perceived voluntariness has a significant relationship with students' usage of course website. Sharif and Hussain (2011) also concluded in their work that voluntariness played a significant role in determining internet acceptance.The hypothesized relationship between user satisfaction and performance H5 was also supported by the result of this study with a t-value (19.87) and p-value (<0.00). By implication, the more satisfied the staffs are with the motadata application, the higher their performance using the application. This position is supported by the previous findings of Osang and Mbarika (2019) that confirmed a statistically significant relationship between user satisfaction and performance. Similarly, Tam and Oliveira (2016) equally concluded that use and satisfaction are important precedents of m-banking individual performance.

The hypothesized relationship between utilization and performance was equally supported with t-value (2.90) and p-value (p<0.00). By implication, the more the staffs make use of the application, the more the performance impacts. In other words, the more the usage, the better the performance. This position is supported by the earlier works of [Khaled et al 2019; Osang and Mbarika in-print; Osang, 2015; Sun, Anol and Ma, 2009].

The anticipated hypothesized relationships between TTF and utilization H_1, and TTF to performance H_2 and between utilization to satisfaction H_6 were surprisingly not supported as anticipated. This is contrary to the previous works of [Abbas et al, 2018; Isaac, Abdullah and Ramayah (2017); Khaled, 2016; Oliveira et al, 2014] that TTF influenced performance. It is argued that in a mandatory usage environment, TTF does not play a significant role in determining usage and performance. Users of information systems may not be provided with options contrary to the non-mandatory usage environment where assessment of fit and utilization play critical in users' choices of information systems/technologies.

5. CONCLUSION

This study provides strong support on the determinant of technology usage, satisfaction and performance among employees in the automobile sector. Generally, this study offers several theoretical contributions. Firstly, with the 81% predictive power of the model used in predicting performance, the model shows a higher variance of suitability for such studies compared to previous related studies Osama et (2018), Shih and Chen (2013).

Secondly, from the inception of the TTF model, researchers have pointed out the fact that result on performance impacts depends heavily on whether usage is mandatory or voluntary. As argued by Goodhue and Thompson (1995), performance impact are a joint function of TTF and utilization, and that either of the construct alone is a good surrogate of the other when usage is mandatory. Luarn (2009) findings however, indicated that utilization has a greater effect on performance than TTF in a mandatory usage environment. This positioned was confirmed by the works of Osang and Mbarika (in-print) that investigated lecturers' usage of e-assessment tools in a government setting where usage was mandatory. This study stepped further from the result of the dataset to submit that utilization and satisfaction are the key determinants of performance impacts with voluntariness as a key precursor of both constructs in a private sector environment where usage is mandatory and that TTF may influence performance indirectly through utilization.

Thirdly, to the best of my knowledge, this is the first study that attempted to explore employee experiences with usage of applications in the Nigerian automobile industry. It therefore has critical implications for the Motadata implementation and sustenance in the automobile industry.

In practice, organizations adopting software applications could enhance their workforce experiences by encouraging interactions with the system in form of training to improve utilization and satisfaction that would in turn culminate into improved performance impacts in form of better quality of service and unique customer experiences.

6. FUTURE RESEARCH

Future research should attempt to apply this model in other technology applications in other sectors with a view to including other precursors of utilization. This will enhance the model in assessing other applications in the information system context. Additionally, since the result of this work emanated from a self-reported dimension, future research should also explore cross-cultural studies on the impact of TTF on utilization owing to the several works that reported a significant relationship with usage Khaled (2016), Lin (2012).

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