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Product Model Compatibility and Smartphone Brand Patronage in South-South, Nigeria

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Article Info	ABSTRACT
	Smartphone model architecture is the mechanism that allows several aspects of similar brands hardware/software to seamlessly run on existing (family Central Processing Unit – CPU architecture such as; storage capacity, batter compartment, screen sizes, operating systems, internet facilities, multimedia facilities, and any other peripherals. The objective of this research is to examine product model compatibility and smartphone brans patronage in South-South, Nigeria. Outstanding compatibility issues considered include those that addresses; product adoption rate, values/beliefs, clients' need, and the naming of innovation. Exploratory research design was adopted, with in-dept interview, and focus group techniques used in collecting data from 237 respondents identified as smartphone adopters of the 2022 top ranking global smartphone brands in Nigeria, data collected was analyzed using Pearson's Correlations Technique. The findings of the study revealed the effect of product compatibility on smartphone brand patronage in Nigeria. The study recommended the need for smartphone manufacturers to integrate key variables of the study such as; product adoption rate, values/beliefs, clients' need, and the naming of innovation in their production processes, as a means of enhancing smartphone brand patronage in South-South, Nigeria.

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INTRODUCTION

The task of diffusing innovative ideas is made complex based on firms' capability to diagnose the needs of customers, and replicate same in product development ideas. Product compatibility is a key element that determines the speed at which innovative ideas could diffuse amongst end users. Compatibility is a core adoption determinant for tech product brand based on diverse behavioral elements that influence consumer's decision process (Takahashi, et al., 2024). According to International Telecommunication Union-ITU, global smartphones(millions) is an affirmation that, at least one-person owns smartphone, (ITU, 2015). This does not exempt tech firms from adhering strictly to sustainability standards in the process of – procurement of raw materials, production, storage, distribution, and waste disposal (Eshiett & Eshiett, 2024a). The unique aspect of the speedy diffusion in smartphone adoption is the compatibility of new versions on: Apps downloads, games, Wi-Fi, Small Message System - SMS, Global Positioning System (GPS), Bluetooth, and Entertainment (Chang, et al., 2016; & Euromonitor, 2010).

Integrating customer's satisfaction into compatibility in smartphone adoption; Diffusion of Innovation theory (DIT), to explain the behavioral tendency of the consumer decision process that allows categories of adopters (Innovators, Early Adopters, Early Majority, late majority, and Laggard) to make purchase decisions within the process (Rogers 2003). Customer's satisfaction on smartphone compatibility is based on trends in innovation (Chang, et al., 2016), compatibility in adoption is also experienced in other areas of technological adoption similar to smartphone for instance; compatibility is acknowledged in cryptocurrency adoption (Chen, et al., 2022), crypto in digital finances (Singh, 2023), in social media advertorials of unsafe foods by targeting youthful population (Eshiett & Eshiett, 2023), also in Block chain technology adoption for supply chain management (Shahzad, et al., 2024), as well as 'job loss fears' exhibited by tech firms' personnel based on firm adoption of automation by integrating Artificial Intelligence – AI, and robotics in product and service delivery processes (Eshiett & Eshiett, 2024), and the introduction of automation and compatibility in healthcare management systems adoption (Ahn & Park, 2022 & Dadhich. et al., 2022).

Scanty research has been conducted so far, hence the need for this research to fill the huge literature gap on the need for innovation compatibility in product adoption; as key driver of the diffusion process for smartphones. The objective of the study is to examine smartphone model compatibility and customer brand patronage in Nigeria; also, additional objective include; evaluating how socio-cultural concerns affect brand patronage in Nigeria, and determining the effect of user need on brand patronage, and integrating adopters concerns in naming of adoption.

Problem of the study

The key factors that hinder compatibility as a key determinant in the adoption process are; the rate at which product are adopted, the norms, values/beliefs system of end users, coopting clients' need into innovative ideas, and the naming of innovation by producers, these issues are explained as follows;

The core basis for the short life cycle of diffusion of innovation for products, or total extinction of innovation is due to the fact that innovators are not client-oriented while incubating the ideas, hence, such products do not fit into the exact mold that could

effectively satisfy end users. It is also necessary to state that besides products fitting into end users need, failed innovative ideas could hardly diffuse based on the facts that such innovation contradicted the socio-cultural norms, values and belief of end users. Drivers of innovation should be in sink with innovators ideas, in order to drive its diffusion amongst adopters. Hence, when such needs are met, it quickens the pace of diffusion, on the other hand, if innovative idea is contradictory to end users need, the pace of adoption and diffusion will also be affected.

Also, the rate of adoption is often affected by the perception of members within a social system perceive about the innovation, this factor could affect the rate of adoption and diffusion positively or negatively. Hence the product adoption based on compatibility will diffuse faster if the innovation is perceived as wholly accepted by members of the social system.

The incompatibility of innovation with the norms, values and belief system of the people is a key index why most innovative ideas cannot diffuse faster in other communities, but finds it difficult to diffuse in communities where the rate of innovation incompatibility with socio-cultural norms/values. It is quite difficult for innovation drivers to drive the diffusion process if the innovation is incompatible with the people's social belief.

The naming of innovation is another key index in determining the rate at which innovation diffuses, hence, the wordings, symbol in which an innovation is called, could attract a faster rate f diffusion to the product. For instance, each discipline has its peculiar terms that connotes certain ideas, hence the naming of business or marketing innovations based on its services quality perspective, could bet a determining factor for its rate of innovation diffusion amongst adopters.

Literature Review

Compatibility

This explains how well a specific innovation could blend with the values and norms of the society (Panigrahi, et al., 2018; & Auter, 2007). Smartphone model compatible when certain software/hardware is configured to run seamlessly on other models within the family. The differentiating factors are often; product features, product reliability and accomplishments. Free and Open-Source Software (FOSS), which are third party hardware/software created to smoothen the device interface with compatible models (Sery, 2007; & Fogel, 2005). Firms must ensure that innovations do not interfere with the socio-cultural system, norms, values and belief system of the adopters, using adoption as a means of co-creating mutual value between firm and customers (Wang, et al., 2016), since socio-cultural infringements could negatively affect the adoption process, the firm image and customer relationship (Auter 2007; & Strang; & Soule, 1998). Similar studies have been conducted on technology acceptance effect on compatibility (Wang, et al., 2016; Panigrahi, et al., 2018; & Venkatesh, et al., 2003).

Innovations in tech often need to fit into existing models, patterns, standards, norms and value system, hence it cannot be created in isolation, but configured to fit into existing smartphones architecture such as; storage system, battery life, screen sizes, hardware/software capabilities, operating systems, internet access, and multimedia capabilities

Brand Patronage

Brand is a distinguishable symbol, name, design, term, or anything that represents producers of goods or providers of services (John & Jobber, 2015). The essence of the distinguishing feature of a brand

is premised on the need for businesses to create value that are acknowledged by customers, and with expected rewards to business owners (Aaker, 1991). According to Kotler et al. (2018), distinguishing brand could address various issues before the audience such as; i) product attributes, i) product benefits, iii) product value added, and iv) personality. The essence of competitiveness new product development is to create products that are customer driven (Eshiett & Eshiett, 2022), as such; patronizing brand is a process that involves customer perceived evaluation of overall satisfaction based on firms' product offering (Reinders, et. al, 2008), resulting in patronage and consistent re-patronage of same brand in retail outlets (Eshiett & Eshiett, 2021; & Fernandez & Pedroso, 2017), and making provisions for uncertainties such as experienced during the COVID-19 pandemic (Eshiett et al., 2022a; & Eshiett & Eshiett, 2021a). Hence, this study notes that the smartphone firms' consistency in product compatibility could be a differentiating factor that could satisfy customers, increase brand loyalty, and enhance patronage for firms' product than industry rivals.

Hypotheses Development

This research focuses on product compatibility as driver of customer patronage for smartphones in South-South, Nigeria, previous research has adopted the Technology Acceptance Model (TAM), Product Brand Innovation, Customer Satisfaction, and Brand Loyalty of Using Smartphones Among University Students (Panigrahi, et. al, 2021), Customers' Satisfaction on Smartphone with Smartphone Trend, customer disconfirmation on adopted product value chain (Eshiett, et. al, 2022), and in the service sector Adoption elements (Suki, 2011). The model is illustration in figure1, with detailed explanation as follows;

Adoption Rate: This explains the speed at which an innovation is adopted by end users based on outstanding differentiating factor such as; features, reliability, and accomplishments of general interfacing with family models. These features are the ingredients that enhances customers consistent patronage, that is the ease at which product integrates with other models, based on its configured capability to run seamlessly. Similar studies have been conducted on technology acceptance effect on compatibility (Wang, et. al, 2016; & Venkatesh, et. al, 2003). This shows a wide departure from the current research which examines product compatibility and customer patronage for smartphones in South-South, Nigeria.

Therefore, establishing a link between smartphone adoption in South-South, Nigeria; this research therefore uses figure, to hypothesize the relationship between compatibility and brand patronage thus;

Proposition 1; adoption rate has no significant relationship with brand patronage of smartphones in South-South Nigeria.
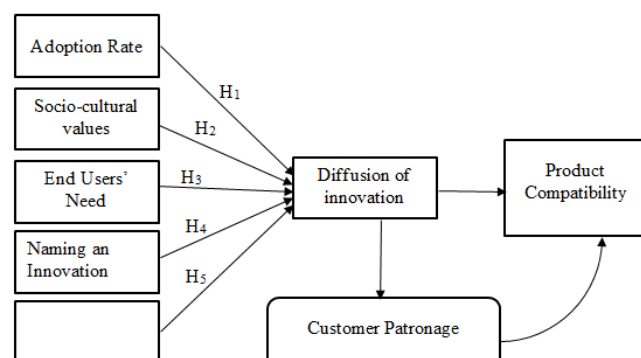

Figure 1: Research Model

Socio-cultural Values: This explains how well a specific innovation could blend with the values and norms of the society (Auter, 2007). Firms must ensure that innovations do not interfere with the socio-cultural system, norms, values and belief system of the adopters (Vanno, &, Palvia 2010), using adoption as a means of co-creating mutual value between firm and customers (Wang, et. al, 2016), since socio-cultural infringements could negatively affect the Adoption elements, the firm image and customer relationship (Auter 2007; & Strang; & Soule, 1998).

Compatibility must be driven by adopted product capacity to enhance customer patronage by strictly adhering to socio-cultural norms (Panigrahi, et. al, 2021). Hence, dysfunctional innovations with contradiction to socio-cultural norms may not be adopted, likewise, innovations that blend with socio-cultural norms has a higher tendency of being adopted. Hence, this research examines the significant relationship between socio-cultural norms and brand patronage of smartphones, the hypothetical proposition was formulated thus;

Proposition 2; Socio-cultural values has no significant relationship with brand patronage of smartphones in South-South Nigeria.

End Users Need: The bane of new product failures, shortened product life cycle, and new product extinction is specifically due to 'innovative product ideas that are not customer driven' (Eshiett & Eshiett, 2022). In addressing these challenges, firms with innovative ideas should coopt the 'need factor' through effective interpersonal relationship with end users (Eshiett & Eshiett, 2021), sometime, effective market survey becomes essential, in order to determine such critical need required in the 'build up' of an innovation.

Other researchers have argued that, the integration of end users need in product compatibility is one required element in the process of adopting tech devices (Oliveira; & Martins (2011), but Geissler, argued that, increased compatibility in tech devices, could hasten the process of adoption and diffusion, and vice-versa specifically for ubiquitous tech devices such as smartphones (Geissler, 2006; & Rogers, 2003), also, compatibility could result in a higher learning curve for smartphones, as such affecting brand patronage on smartphone adoption and diffusion. This research therefore proposes that, there is a hypothetical relationship between end users need and brand patronage for smartphones in South-South, Nigeria

Proposition 3; End user need has no relationship with brand patronage of smartphones in South-South Nigeria.

Naming an innovation: Product compatibility if often affected by the, and by extension its diffusion and adoption by end users. Unpardonable error is often committed in this regard, where a particular name/symbol representing an innovation has a different meaning to other languages/culture. Hence, sufficient survey should be conducted by tech firms during product pretests; to ascertain the perception of the innovation 'word symbol' to prospective product adopters, and by extension diffusion of the innovation.

Hence, this research examines the significant relationship between naming of an innovation and brand patronage of smartphones, the hypothetical proposition was formulated thus;

Proposition 4; Naming an innovation has no relationship with brand patronage of Smartphones in South-South Nigeria.

Research Methodology

He descriptive survey method was in examining product compatibility and brand patronage for smartphones in South-South, Nigeria, this technique was used in developing administering structured questionnaire to 187 respondents in all the metropolitan capital of the six (6) state in the South-South region, Nigeria, Nigeria. According to Kotler & Armstrong, 2018, administering research instrument using descriptive survey technique; aids the process of evaluating the relationship between the independent and the dependent variable.

Population. Sample Size and Sampling Method

A total of 209 questionnaire were administered to respondents) smartphone users) from the six (6) metropolitan capital of each of the states, in determining the sample of the study, questionnaires were administered to respondents at 5% level of significance, by adopting the determination of sample for a given population size of about 1,500 (Krejcie & Morgan, 1970). A 5-point Likert scale was developed and itemized as follows; 'Strongly Agree' = 5, 'Agree' = 4, 'Undecided' = 3, 'Disagree' = 2, and 'Strongly Disagree' = 1. The random sampling technique was adopted as a means of reducing biasness in the process of data collection, analysis and reporting (Saunders, et. al. 2016).

Table 1: Questionnaire schedule

Categories	Frequency	Percentage	Cumulative
Unreturned questionnaire	10	5	5
Unusable questionnaires	17	8	13
Usable Questionnaires	182	87	100
Total	**209**	**100**	

Table 1 shows total questionnaire administered as 209, in which 10 questionnaires representing 5% were not returned at all, 17 questionnaires representing 8% were returned, but unusable due to error, mutilation and cancellation by the respondents, while 182 questionnaires representing 87% was returned by respondents,

valid and usable as sample for the study. The descriptive statistics was a representation of; age, gender, marital status, income level occupation, and educational qualification.

Table 2: Descriptive Statistics

Demography	Classification	Relative Frequency	Percentage	Cumulative Percentage
Gender	Male	78	43	43
	Female	95	52	95
	Anonymous	9	5	100
Age	Below 20	51	28	28
	21 - 29	44	24	52
	31 - 39	46	25	77
	41 - 49	37	21	98

	50 and above	4	2	100
Marital Status	Single	87	48	48
	Married	75	41	89
	Divorced	16	9	98
	Anonymous	4	2	100
Occupation	Unemployed	18	10	10
	Self Employed	96	53	63
	Employed	55	30	93
	Anonymous	13	7	100
Educational Qualification				
	Below High School	56	31	31
	Diploma	51	28	59
	Bachelors	62	34	93
	Masters and above	13	7	100

The demographic analysis for respondents as shown in Table 2 were thus; gender shows that male was 78(43%), female 95(52%), while anonymous was 9(5%); the age distribution was as follows; respondents below 20years 51(28%), respondents between 21-29years, were 44(24%), between 31-39years were 46(25%), between 41-49years were 37(21%), and above 50years were 4(2%). The analyses for marital status were as follows; single 87(48%), married 75(41%), divorced were 16(9%), and anonymous 4(2%). For occupation, respondents categorized as unemployed were 18(10%), self-employed were 96(53%), employed respondents were 55(30%), and anonymous represented 13(7%). The distribution for educational qualification was as follows; respondents below high school were 56(31%), diploma was 51(28%), Bachelors' degree 62(34%), and those with masters' degree and above were 13(7%).

The internal consistency of the data was ascertained that the Cronbach's alpha value was reliable (Hair et al. 2016). For reliability, the coefficient of reliability must lie between 0 and 1, with a superb reliability = 1, but on the average, the general rule is that reliability higher than 0.8 is acceptable as high. Hence, the Cronbach's alpha for the data ranged between 0.60 and 0.80. The validity measures the extent to which the dataset fits-into the construct variables (Chin et al., 2003). Test for validity, specifically the content validity which measured how well the research instrument is represented by the scale used in the measurement, methodology and analysis.

Data Analysis and Interpretation

Data collected were analyzed based on the tested null hypotheses, to affirm the relationship between the independent and dependent variables, Pearson Correlation Technique was adopted in analyzing the relationship between the variables as shown thus.

Hypothesis One; Adoption rate has no significant relationship with brand patronage of smartphones in South-South Nigeria.

Table 3   **Correlations**

			Product adoption rate	Brand patronage
Spearman's rho	Product adoption Rate	Correlation Coefficient	1.000	.745**
		Sig. (2-tailed)	.	.000
		N	182	182
	Brand patronage	Correlation Coefficient	745**	1.000
		Sig. (2-tailed)	.000	.
		N	182	182

***. Correlation is significant at the 0.01 level (2-tailed). Df=112*

Table 3 shows the result on the significant relationship between product adoption rate and brand adoption for smartphones in South-South, Nigeria. The analyzed correlation index r is 0.745, which shows a high level of response, the sample N used for the study was 182 and the level of significance is lower than the 0.05 alpha level. Therefore, the null hypothesis is hereby rejected.

Hypothesis Two

Socio-cultural value has no significant relationship with brand patronage of smartphones in South-South Nigeria.

Table 4   **Correlations**

			Socio-cultural values	Brand patronage
Spearman's rho	Socio-cultural values	Correlation Coefficient	1.000	.726**
		Sig. (2-tailed)	.	.000
		N	182	182
	Brand patronage	Correlation Coefficient	.726**	1.000
		Sig. (2-tailed)	.000	.
		N	182	182

***. Correlation is significant at the 0.01 level (2-tailed). Df=112*

The Outcome of the analysis in Table 4 shows that the Correlation statistics between socio-cultural values and brand adoption for smartphones in South-South, Nigeria. The correlation index r level is 0.726, the sample for the study N was 182, and the level of significance is lower than the 0.05 alpha level. Therefore, the null hypothesis is hereby rejected. This implies that socio-cultural value has significant relationship with brand adoption of smartphones.

Hypothesis Three

End user need has no relationship with brand patronage of smartphones in South-South Nigeria.

Table 5   **Correlations**

			End user need	Brand patronage
Spearman's rho	End user need	Correlation Coefficient	1.000	.902**
		Sig. (2-tailed)	.	.000
		N	182	182
	Brand patronage	Correlation Coefficient	902**	1.000
		Sig. (2-tailed)	.000	.
		N	182	182

***. Correlation is significant at the 0.01 level (2-tailed). Df=112*

Table 5 shows the relationship between end user need and brand patronage for smartphones in South-South, Nigeria. The correlation index r level is 0.902, which shows the highest level of response amongst the four hypotheses, the sample N was 182, and the level of significance is lower than the 0.05 alpha level. Therefore, the null hypothesis is hereby rejected

Hypothesis Four

Naming an innovation has no relationship with brand patronage of Smartphones in South-South Nigeria.

Table 6   **Correlations**

			Naming an innovation	Brand patronage
Spearman's rho	Naming an innovation	Correlation Coefficient	1.000	.847**
		Sig. (2-tailed)	.	.000
		N	182	182
	Brand patronage	Correlation Coefficient	847**	1.000
		Sig. (2-tailed)	.000	.
		N	182	182

***. Correlation is significant at the 0.01 level (2-tailed). Df=112*

Table 5 is the result showing the significant relationship between naming of an innovation and brand patronage of smartphones in South-South, Nigeria. The correlation index r level is 0.847, which shows the level of response amongst the four hypotheses, the sample N was 182 and the level of significance is lower than the 0.05 alpha level. Therefore, the null hypothesis is hereby rejected

Discussion of Findings

The discussion of findings is based on the study objective which examines smartphone model compatibility and customer brand patronage in Nigeria.

The rate of innovation adoption is the interfacing capabilities of the product with family models (Rogers, 2010), the affirmation of product features, and system reliability enhances customers adoption of tech product innovation and diffusion; based on its integrative capabilities to run seamlessly with other tech models (Panigrahi, et. al, 2018). Previous studies in this field include; technology acceptance effect on compatibility (Wang, et. al, 2016; & Venkatesh, et. al, 2003). The current study is a wide departure from previous research, since it specifically examines the product compatibility and customer patronage for smartphones in South-South, Nigeria.

Also, product compatibility should consider the socio-cultural norms and values of the society as a key index in the adoption and diffusion process (Auter, 2007). It is quite obvious that firms should ensure that innovations do not interfere with the socio-cultural system, norms, values and belief system of the adopters, based on devastating effect of innovation clash with societal norms/values (Vanno, &, Palvia 2010), This variable showcases adoption as a means of co-creating mutual relationship between firm and adopters (Wang, et. al, 2016), since socio-cultural infringements could negatively affect product adoption and diffusion as well as firms' image and customer relationship (Auter 2007; & Strang; & Soule, 1998).

This study is quite unique since it examines compatibility and its capacity to enhance customer patronage by strictly adhering to socio-cultural norms. Hence, dysfunctional innovations with contradiction to socio-cultural norms may not be adopted, likewise, innovations that blend with socio-cultural norms has a higher tendency of being adopted.

Additionally, product compatibility should coopt end user need as a means of avoiding new product failures, reduced product life cycle, and product extinction (Eshiett & Eshiett, 2021). The ultimate requirement at this point is for firms to conduct effective market surveys as essential ingredient for identifying critical needs of end users' becomes essential, in order to determine such critical need of end users, and coopting them in any innovation (Eshiett & Eshiett, 2021).

Previous research has shown that integrating end users need in product compatibility is the key element in tech devices adoption process (Oliveira; & Martins 2011), but Geissler, argued that, increased compatibility in tech devices, could hasten the process of adoption and diffusion, and vice-versa (Geissler, 2006; & Rogers, 2003); while compatibility could result in higher learning curve for tech devices. Hence, the uniqueness of this research lies in examining brand patronage on smartphone adoption and diffusion.

Finally, the name given to any innovation has significant relationship with the adoption and diffusion process, product compatibility if often affected by the product name/symbol, and by extension its diffusion and adoption by end users (Rogers, 2010). Unpardonable error is often committed in this regard, where a particular name/symbol representing an innovation has contradictory interpretation in its proposed place of adoption (Rogers, 2010). Hence, the need to conduct sufficient market research by tech firms during product pretests; to ascertain adopters' perception of the innovations in order to enhance the innovations adoption and diffusion. This study is quite significant

because it examines brand patronage on smartphone adoption and diffusion in South-South, Nigeria.

Recommendations

This research was conducted to examine product compatibility and brand patronage for smartphones in South-South, Nigeria. The conclusion of the study is based on the study objectives and findings. Some of the issues revealed by the findings include the fact that; effective product compatibility should consider; the need for innovators to consider the rate of product adoption, the socio-cultural norms/values of the society, the need of adopters, and in the process of product naming. The itemized issues are pertinent since adopters depend on these elements as key determinants of product adoption, and diffusion.

The ubiquitous nature of smartphone shows that brand owners should carefully follow these processes during 'creative ideation for innovation', the essence is to ensure that these products fit seamlessly into existing family-built-in-models. Sometime, various firms are involved in the process of production, hence there should be strict adherence to standardized model configuration to ensure that such innovation are compatible with existing model standards; and by extension, its adoption and diffusion amongst end users; this will enhance end users' confidence on firms' smartphone brand.

References

1. Aaker, D. A. (1991). *Managing Brand Equity. The Free Press*

2. Ahn, H & Park, E, (2022), *Determinants of consumer acceptance of mobile healthcare devices: An application of the concepts of technology acceptance and coolness, Elsevier Telematics and Informatics, 70, 101810,* https://doi.org/10.1016/j.tele.2022.101810

3. Auter P. J, (2007). *Portable Social Groups: Willingness to Communicate, Interpersonal Communication Gratifications, and Cell Phone Use among Young Adults. International J. Mobile Communications.5 (2): 139-156.*

4. Dadhich, M; Poddar, S; & Hiran, K. K, (2022), *Antecedents and consequences of patients' adoption of the IoT 4.0 for e-health management system: A novel PLS-SEM approach, Smart Health 25(5):100300.* https://doi.org/10.1016/j.smhl.2022.100300

5. Eshiett, I. O., & Eshiett, O. E. (2024a), *Sustainable Waste Management and Service Quality Delivery in Nigeria: A Critical Review. Journal of Comprehensive Business Administration Research.* https://doi.org/10.47852/bonviewJCBAR42022589

6. Eshiett, I. O & Eshiett, O. E (2024), *Artificial intelligence marketing and customer satisfaction: An employee job security threat review, World Journal of Advanced Research and Reviews, (WJARR), 21(01), 446–456,* https://doi.org/10.30574/wjarr.2024.21.1.2655

7. Eshiett, I. O & Eshiett, O. E (2023). *"Social Media Food Ads Hype and Adolescent Obesity Upsurge in Nigeria," International Journal of Research and Innovation in Social Science, (IJRISS), 7(7), 1854-1868,* https://dx.doi.org/10.47772/IJRISS.2023.70844

8. Eshiett, I. O; & Eshiett, O. E, (2022). *New Product Development and Organizational Performance in Nigeria. Problems of Management in the 21st Century.*

17. 8-   24. https://doi.org:10.33225/pmc/22.17.08. E-ISSN 2538-712X

9. Eshiett, I. O, Eshiett O. E and Uwhubetine, G. O, (2022a), *COVID-19 Pandemic and Sustainable Supply Chain Management in Nigeria, Journal of Economics and Allied Research, University of Nigeria, Nsukka, Nigeria. 7(1), 204-218, ISSN: 2536-7447.*

10. Eshiett, I. O. and Eshiett, O. E, (2021a). *Post COVID-19: Sustainable E-learning Development and Resource Marketing in Nigerian University, "AKSU Journal of Social Sciences, Akwa Ibom State University, Nigeria (AJSS), 2(1), 132 –150; ISSN; 2504-933X*

11. Eshiett, I. O and Eshiett, O. E, (2021), *Customer Loyalty and Retail Outlets Patronage in Nigeria: European Business and Management Journal, 7(6): 168-175 ISSN: 2575-579X (Print); ISSN: 2575-5811(Online),* https://doi.org/10.11648/j.ebm.20210706.12

12. Euromonitor, (2010) *"Smartphone: not just iPhone, but a boomerang movement". Euromonitor International Database. Fernandes,T & Pedroso, R, (2017), The Effect of Self-Checkout Quality on Customer Satisfaction and Re-patronage in a Retail Context, 11, 69–92, Springer; https://doi.org/10.1007/s11628-016-0302-9*

13. Fogel, K, (2005). *Producing Open-Source Software: How to Run a Successful Free Software Project. O'Reilly Media, Inc. ISBN 9780596552992.*

14. Geissler, M. (2006). *Aligning technology with culture: Connecting information and communication technology adoption to cultural dimensions. ProQuest. Capella University.* https://doi.org/10.1108

15. ITU, *ICT Mobile Cellular Subscriptions (2015). https://www.itu.int/en/ITUD/Statistics/Documents/facts/ICTFactsFigures2014-e.pdf. .*

16. John, F & Jobber, D, (2015). *Foundations of Marketing. McGraw-Hill. Kotler, P, Armstrong, G& Opresnik, M. O. (2018). Principles of marketing 17th ed. (17th ed., Global Ed.). Harlow: Pearson*

17. Krejcie, R. V., & Morgan, D. W. (1970). *Determining Sample Size for Research Activities. Educational and Psychological Measurement, 30(3), 607-610.* https://doi.org/10.1177/001316447003000308

18. Panigrahi, S. K, Azizan, N. A. B; & Al-Shamzi, I. R, (2021), *Product Innovation, Customer Satisfaction, and Brand Loyalty of Using Smartphones Among University Students: PLS – SEM Approach, Indian Journal of Marketing, 8-25,* https://doi.org/10.17010/ijom/2021/v51/i1/156931

19. Panigrahi, R., Srivastava, P. R., & Sharma, D. (2018). *Online learning: Adoption, continuance, and learning outcome - A review of literature. International Journal of Information Management, 43, 114. doi:https://doi.org/10.1016/j.ijinfomgt.2018.05.005*

20. Reinders M, Dabholkar P, & Frambach R (2008) *Consequences of forcing consumers to use technology-based self-service. J Serv Res 11(2):107–123.* https://doi.org/:10.1177/1094670508324297

21. Rogers, E. M. (2010). *Diffusion of innovations. Simon and Schuster.*

22. *Sery, P. G. (2007). Ubuntu Linux For Dummies. John Wiley & Sons. ISBN 9780470125052.*

23. *Shahzad, K; Zhang, O; Ashfaq, M; Zafar, A. U; & Ahmad, B, , (2024), Pre- to post-adoption of blockchain technology in supply chain management: Influencing factors and the role of firm size, Technological Forecasting and Social Change, 198, 122989, https://doi.org/10.1016/j.techfore.2023.122989*

24. *Singh, K. S, (2023), Source Title: Mainstreaming Cryptocurrency and the Future of Digital Finance, 23, IGI Global Publishers, ISBN13: 9781668483688|ISBN10: 1668483688|E.*

25. *Strang, D.; & Soule, S, (1998). "Diffusion in Organizations and Social Movements: From Hybrid Corn to Poison Pills". Annual Review of Sociology. 24: 265290. https://doi.org/10.1146/annurev.soc.24.1.265.*

26. *Suki, N. M., (2011) "An empirical study of factors affecting the Internet banking adoption among Malaysian consumers", Journal of Internet Banking and Commerce, 15(1), 1-11.*

27. *Takahashi, C. K; de Figueiredo, J. C. B; & Scornavacca, E, (2024), Investigating the diffusion of innovation: A comprehensive study of successive diffusion processes through analysis of search trends, patent records, and academic publications, Technological Forecasting and Social Change, 198, 122991, https://doi.org/10.1016/j.techfore.2023.122991*

28. *Vannoy, S. A & Palvia, P. (2010) "The Social Influence Model of Technology Adoption." Communications of the ACM. 53(6), 149-153, http://doi.acm.org/10.1145/nnnnnn.nnnnnn*

29. *Venkatesh, V.; Morris, M. G.; Davis, G. B.; & Davis, F. D. (2003), "User acceptance of information technology: Toward a unified view" (PDF), MIS Quarterly, 27 (3): 425–478, https://doi.org/10.2307/30036540, JSTOR 30036540.*

30. *Wang, J. J., Li, J. J., & Chang, J. (2016). Product co-development in an emerging market: The role of buyer-supplier compatibility and institutional environment. Journal of Operations Management, 46 (1), 69 – 83. https://doi.org/10.1016/j.jom.2016.07.002*