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INFLUENCE OF GREEN PRODUCT KNOWLEDGE ON GREEN PURCHASE INTENTION OF SMARTPHONE USERS IN A B U ZARIA: GREEN CONSUMER BEHAVIOUR AS A MODERATOR

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ABSTRACT
The growing awareness about the implications of global warming, non-biodegradable solid waste, and harmful impact on pollutants has made both marketers and consumers to become increasingly sensitive to the need for switching to green products and services. This study sought to determine what accounts for consumers' ignorance about the influence green product knowledge has on the environment and its negative consequence on human beings and other animals in terms of pollution, theory of reason action (TRA) was used to underpin this study. The study used descriptive survey research design using primary data with instrument adapted. The population of the study was made up of 43,929 of A B U students, using Smartphone. The sample size for this study was (381) which are determined by using Krejcie and Morgan sample size table and simple random sampling was adopted for the selection. Partial Least Square- Structural Equation Modeling (PLS-SEM) was used version 3.0 to analyze the data and test the hypothesis formulated. The findings revealed that objective knowledge, and trust positively affects green purchase intention, while subjective knowledge was positive and insignificant and experience-based knowledge was negative and significant on green purchase intention. The study recommends that firms should increase their green product knowledge for Nigerian consumers through personal approach.

Keywords: Green Product Knowledge, Green Purchase Intention, Green Consumer Behaviour, Smartphone users.

1.0 INTRODUCTION
Consumers make purchase of verse varieties of product and services for use or consumption, before the purchase decision of such products and services intention to purchase may precede the decision to purchase which is known as purchase intention.

Purchase intention usually is related to the action towards the behaviour, perceptions and attitudes of consumers. Accordingly Pristl, Kilian and Mann, (2020) purchase intention is based on the practical benefits predicted to come from a brand and how the purchase will help consumer accomplish certain social goals, such as self-presentation and conformance of social norms. Purchase intention is viewed as the possibility that as individual will purchase a product or service in future (Arslan & Zaman, 2014).

Purchase intention is said to be green when there is probability and willingness of an individual to give preference to green product over conventional product in their purchase considerations (Nik,2009). Increase in the purchase of goods and services have negative impact on the environment as a result pollution of soil, water and air has seriously drawn the attention of business organizations, government and consumers on the effect of consumption on the environment which create global warming, consumers purchase product without understanding whether the product is green or non-green. This has sensitized the attention of marketers and consumers to purchase product that is green in nature and environmentally friendly for the sustainability of the environment. Therefore this lead to consumer buying behavior of product and services as it satisfy their needs and wants.

As consumers search for and purchase products to satisfy their needs and wants they exhibit some behaviours, which lead to consumer behavior. Green consumer behavior has become source of concern to marketer and scholars (Jaiswal & Kant, 2018).Due to increase on awareness of environmental sustainability, consumers are paying more attention and searching for companies that incorporate green marketing activities on their organizations product and services such as Smartphone. Marketers are making effort to produce products that will satisfy consumer needs through the production and sales of green products which is receiving a tremendous attention from both scholars and managers of business organizations. Therefore, persuading and encouraging consumers to buy products that is green in nature (Wang, Ma, & Bai, 2019).

Different marketing methods are potential ways of disseminating green product knowledge and features to consumers this is gradually changing their consumption concepts and increases the purchase of green products (Wang, Pacho, Liu & Kajungiro, 2019). While consumers green product knowledge improved through accidental and purposeful learning strategies (Wang, Pacho, Liu & Kajungiro, 2019; Gursoy, & Mccleary, 2004), hence consumers green product knowledge is improved gradually.

Product knowledge is seen as familiarity with the product label information, and trust in certification organization (Chen & Deng, 2016). Lin and Lin (2007) opined that product knowledge is a perception of consumers towards a particular product, including prior

experience of the product. Product knowledge is expected to play an important role on consumer purchase decision (Ateke, & Didia, 2018). Consumers' green product knowledge will guide purchase decision of product that is environmentally friendly such as Smartphone. As people purchase more Smartphone that are environmentally friendly, their positive contributions to the environment become higher (Friend, 2013). Smartphone is said to be eco-friendly when it is energy saver and charge more efficiently, minimum radiation emission, built using sustainable and recycled materials which their manufacturing has less negative impact on the environment (David, 2019).

A report has shown that Smartphone life expectancy of 4.7 years with most customers replacing their Smartphone much sooner than that in the world (David, 2019), consequently, increase in electronic waste which will contribute to environmental pollution. Smartphone constitute 30% of the mobile penetration in Nigeria (Nigerian Communication Commission, 2021). The population of Smartphone users in Nigeria, is forecast to grow to more than 140 million by 2025 (O'Dea, 2020), this has shown that a strong growth outlook for the Nigerian Smartphone market with user numbers to increase rapidly.

From statistics it is evidence that Smartphone usage contribute to the environmental pollution, consequently, there is still little research conducted in the area of green product knowledge with green consumer behavior as a moderator in the measurement of green purchase intention of Smartphone in Africa and Nigeria in particular using student of A B U Zaria who uses Smartphone. Therefore, there is need to fill the gap of the Nigerian context of study.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

For better understanding of this study concept of green product knowledge, green consumer behavior and green purchase intention is review for better understanding of the study with the theory of reasoned action (TRA) as underpinning theory that explain behavioural intention of consumers.

2.1 Green Purchase Intention

Purchase intention is one of the main concepts studied in the marketing literature, where the interest of marketing scholars on purchase intention comes from its relation to buying behaviour (Arminda, Chris, & Helen, 2018). A study revealed that green purchase intention showed that intention is an influential predictor of green purchase behavior because purchase intention strongly affects the likelihood of decision to buy product (Chen, 2010). In theory purchase behavior is determines by behavioural intention and subsequent behavioural action take place (Ajzen, 2020). It is observed that consumers who have concern for the environment and confidence on green product will tend to portray high

degree of perceived behavioural controls, positive attitude and norms (Albayrak, Aksoy & Caber, 2013). This implies that consumer with positive intention is most likely to go for green product compared to consumer with low intentions (Ali, Khan, Ahmad & Shahzad, 2011). This confirmed that consumer with positive intention will go for green product with the knowledge acquired on their memory about the product, hence green product knowledge.

2.2 Green Consumer Behaviour and Green Purchase Intention

Rapid economic growth and resulting overconsumption have accelerated environmental deterioration worldwide, prompting escalated consumption-related environmental concerns (Khan, & Sridhar, 2018; Jaiswal & Kant, 2018). Today, consumers are paying more attention to the environmental efforts of businesses and support companies that excel with their green marketing. While studies on pro-environmental consumer behaviour are considerable in the context of developed markets, such studies are still at the infant stage in many emerging markets including Nigeria. Like many other emerging markets, the scarcity of research on understanding pro-environmental consumer behaviour and impact on the purchase among Nigerian consumers has been documented **(**Ayodele, Panama, & Akemu, 2017; Haruna, & Nik, 2015; Folasayo, 2019; & Ojiaku, Achi & Aghara, 2018).

According to Kaur and Bahtia (2018), valuable knowledge of environmental and social issues positively affects purchase intention and buying behavior. To be green" is defined by Polonsky (2011) as engaging in environmentally friendly activities, including purchasing or using green products. But, attitude towards a brand is allied to the consumers' preference and overall evaluation of a brand, which epitomizes their likes and dislikes (Solomon, 2014). More so, a study by Lim, Chye, Sulaiman, Suki, and Lee, (2016) on food safety knowledge, attitude, and behaviour, noted that attitude as predisposition ability had an impact on consumer behaviour. Consequently, the phenomenon of green consumer behaviour has been evolved as a new paradigm of marketing discipline for marketers and researchers in the realm of contemporary consumer research (Peattie & Belz, 2009; Lai & Cheng, 2016; Jaiswal, & Kant, 2018).

Consumer behaviour for green purchasing is generally evaluated in terms of their consumers' willingness or intention to purchase green products and that conscious behaviour or intention eventually transformed into their purchase decision for such products in order to be for environmental sustainability (Joshi & Rahman, 2015). Consumers' attention and support toward green product and services remains unclear. However, most studies **(**Folasayo, 2019; Ayodele, & Ifeanyichukwu, 2016) have exposed the limited value of green consumer behavior particularly from Nigerian context and its

antecedent's characteristics for segmenting with particular attention focused on green purchasing behaviours and targeting purchase intention. Some of the findings of the studies are inconsistent, some have significant relationship and some have insignificant relationship. Thus, the current study aims to focus on Nigeria as an emerging market, and explore how green consumers' behaviours are toward the environment, specifically, on green purchase intention. Subsequently, how the Theory of Reason Action assumptions affects consumers' green purchase intention toward green products.

2.3 Green Product Knowledge and Green Purchase Intention

Consumer knowledge and awareness can be viewed as important factor that can influence consumer purchase intention of green products. Kaur and Bhatia (2018) posited that valuable knowledge of environmental and social issues positively affect purchase intention and buying behavior. Most of the manufacturing companies for example Smartphone have taken responsibility towards the deteriorating environment faced consumers (Rizos, Bryhn, Alessi, & Campmas, 2019). The more knowledge consumers have about green products, the more they understand the environmental protection functions and attributes of green products (Wang et al., 2019). According to Shirin and Kambiz (2011), product knowledge is based on memories or known knowledge from consumers. From the literature product knowledge can be categorize into: subjective knowledge, objective knowledge, experience-base knowledge, and trust.

Subjective knowledge is known as self-perceived knowledge, is what an individual perceived about a particular product or service based on the knowledge acquired and known to be correct (Edirippulige, Samanta, & Armfield, 2018). From this literature, familiarity and experience play a significant role in purchase intention of product or services.

Objective knowledge**:** This conveys the actual information about a particular product or services that is retrieved from the consumer memory. For a consumer to be able to communicate accurately information about a particular product such as Smartphone base on the knowledge possessed, the consumer has objectively demonstrated its knowledge. Objective knowledge is defined as 'current, accurate information stored by individuals in their long term memory' (Veale & Quester as cited in Robertson et al., 2018).

Experienced-based knowledge**:** This is the previous experience of purchasing or using the product by the consumer. The degree of green product knowledge also affects consumers' green purchase intention. Consumers with higher green product knowledge have better memory, logic ability, and recognition than those with lower green product knowledge.

Trust**:** Knowledge possessed by the consumers and conclusion about the product for example Smartphone, its benefits and attributes determines the level of trust (Zulfika & Mayvita, 2018). Increasing consumers' preference for a particular green product depends on increasing consumers' knowledge on environmental issues and increasing consumers' trust will also increase their green purchase intention of green products (Nekmahmud, & Farkas, 2020).

One of the conceptualized antecedents of green purchase intention is green product knowledge (Wang et al., 2019). Green Smartphone knowledge by the consumers can be a determinant for purchase intention. Consumers with more product knowledge have a better pro-environmental attitude with a stronger intent to purchase green products (Suki, 2016). For the purpose of this study the following hypotheses were raised to address the research objectives and categorized into the following perspectives;

H0i: There is no significant relationship between objective knowledge and green purchase intention of Smartphone users.

H0ii: There is no significant relationship between subjective knowledge and green purchase intention of Smartphone users.

H0iii: There is no significant relationship between experience-based knowledge and green purchase intention of Smartphone users.

H0iv: There is no significant relationship between trust and green purchase intention of Smartphone users.

H0v: There is no significant relationship between green consumer behaviour and green purchase intention of Smartphone users.

H0vi: Green consumer behavior does not moderate relationship between experience-based knowledge and green purchase intention of Smartphone users.

H0vii: Green consumer behavior does not moderate relationship between objective knowledge and green purchase intention of Smartphone users.

H0viii: Green consumer behavior does not moderate relationship between subjective knowledge and green purchase intention of Smartphone users.

H0ix: Green consumer behavior does not moderate relationship between trust and green purchase intention of Smartphone users.

Therefore, this study examines moderating role of green consumer behavior on the relationship between green product knowledge and green purchase intention of Smartphone users in Ahmadu Bello University, Zaria with the model of this study; green product knowledge as independent variable, green consumer behavior as the moderator and green purchase intention as the dependent variable

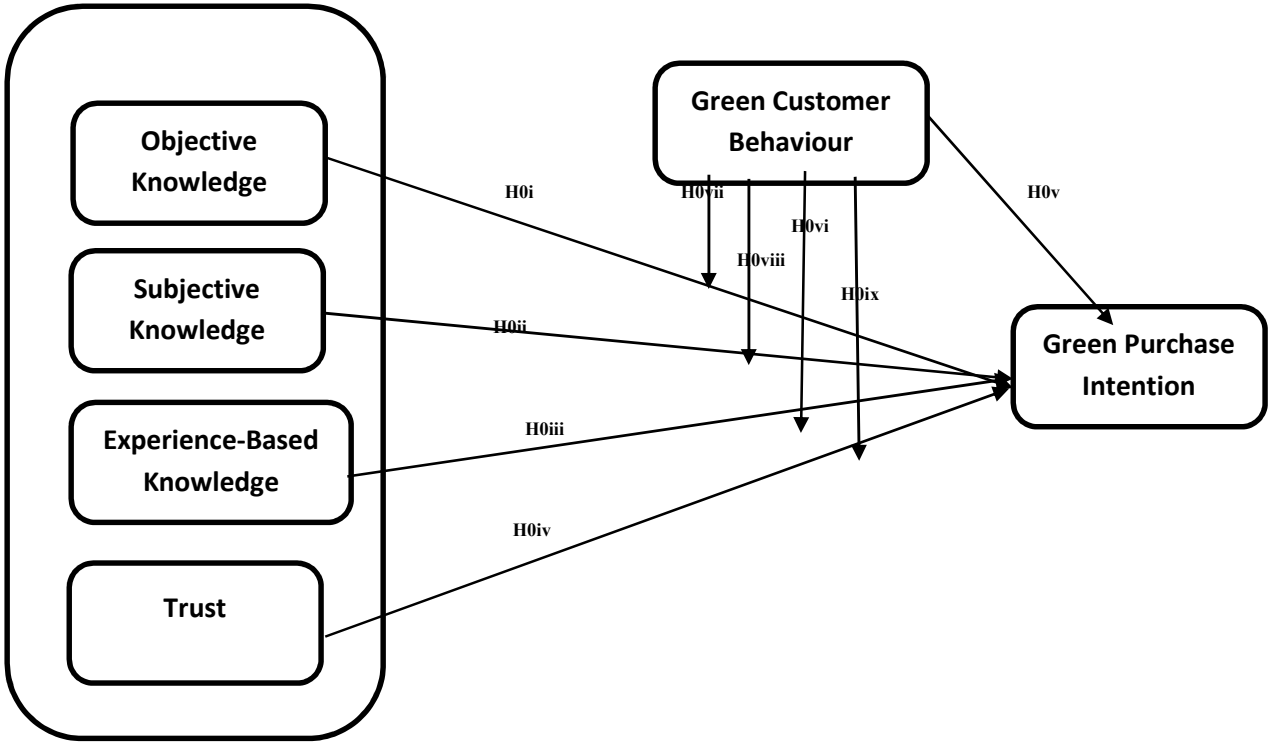


Figure 1. Conceptual framework

3.0 METHODOLOGY

The study used descriptive survey research design. The population for this study consists of 43,929 students of Ahmadu Bello University, Zaria of Kaduna State, using Smartphone (A B U MIS, 2020). The sample size for this study is determined by using Krejcie and Morgan (1970) table see appendix A. To come up with the sample size of population for the study Krejcie and Morgan table is used. Therefore the sample size for this study is 381, out of the total population of A B U students. Descriptive survey research design was employed and data was obtained through the use of questionnaire from the users (Students) of Smartphone in A B U Zaria, Kaduna State (Zikmund, 1999; Mcphail 1999; Perry, 1998). 5 point of Likert scale is used to measure dimension. 1 stand for Strongly Disagree (SD), 2 Disagree (D), 3 undecided (U), 4 Agree (A) and 5 Strongly Agree (SA).

To ensure the validity of the items on the questionnaire, the study adapted some items such as green consumer behaviour, green product knowledge, and green purchase intention from the work of (Abdulsahib, Eneizan & Alabboodi, 2019; Kumar, Aminin, Vania, & Oktaviani, 2016; and Zhang, Li, Cao, & Huang, 2018). Adapting some of the items from their scales into the study's instrument was justified by the fact that these scales have been tested and proven to be valid over the period of time of testing various dimensions of work green consumer behavior, green product knowledge and green purchase intention of Smartphone. Hence, the need for the study to further conduct validity tests for the instrument is not necessary since the items have been previously validated.

To establish the reliability of the instrument, the reliability test recommended by Cronbach (1951) was conducted on the items constituting the dependent and independent variables. The independent variable (green consumer behavior, objective knowledge, experience-based knowledge, subjective knowledge, and trust), the dependent variable (green purchase intention). According to Sekaran (2005), a Cronbach Alpha value of 0.6 or higher is generally required to achieve reliability of constructs or variables. Therefore, the items utilized for the instrument can be said to have passed the test of reliability. The study used PLS-SEM path modeling version 3.0 to analyze the data.

4.0 FINDINGS AND DISCUSSION

In the measurement model the study explains the outer loading of the model. It is part of the SEM model, which describes the relationships among the latent variables and their indicators (Becker et al. 2012). On the other hand, the outer model parameter estimates consist of the loadings (Ringle et al. 2012). figure 1 and table 1 represent the path model

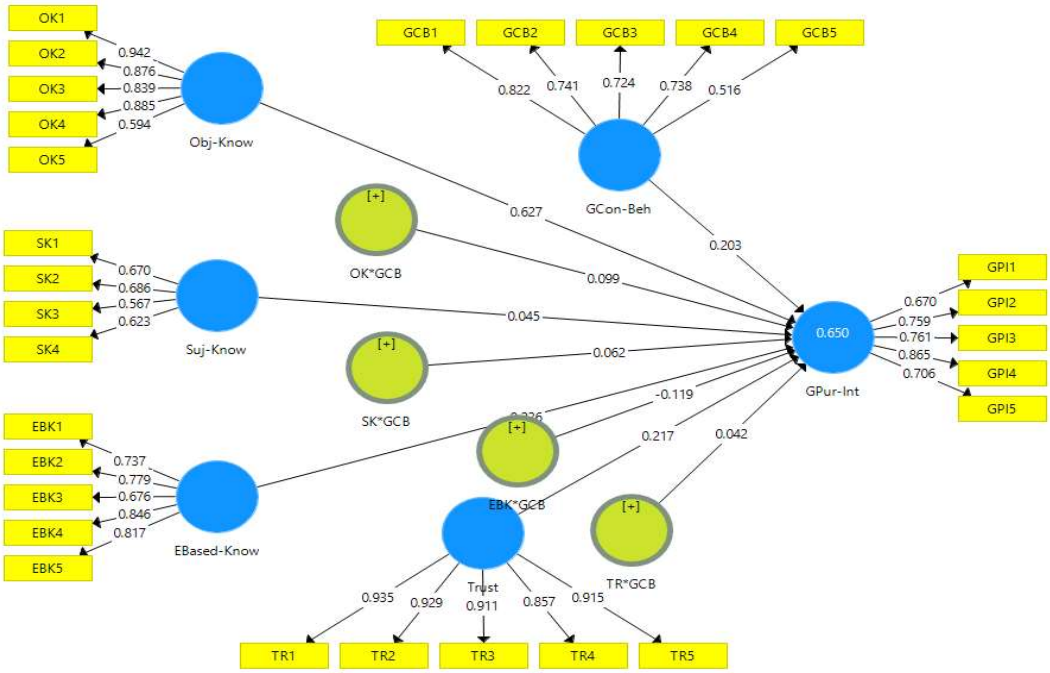


Figure 1 The Path Model

Table 1 The Measurement Model

Items	Loadings	CR	AVE
EBK1	0.737	0.881	0.598
EBK2	0.779		
EBK3	0.676		
EBK4	0.846		
EBK5	0.817		
GCB1	0.822	0.837	0.512
GCB2	0.741		
GCB3	0.724		
GCB4	0.738		
GCB5	0.516		

GPI1		0.67	0.868	0.57
GPI2	0.759			
GPI3	0.761			
GPI4	0.865			
GPI5	0.706			
OK1	0.942		0.919	0.699
OK2	0.876			
OK3	0.839			
OK4	0.885			
OK5	0.594			
SK1		0.67	0.732	0.566
SK2	0.686			
SK3	0.567			
SK4	0.623			
TR1	0.935		0.96	0.828
TR2	0.929			
TR3	0.911			
TR4	0.857			
TR5	0.915			

The table shows the item loadings for the respective latent variables and looking at the output the loadings are above the threshold of 0.5 as indicates by Hair et al., (2014). The composite reliability was also above the threshold of 0.7 while the Average Variance Extracted (AVE) is above 0.5. Thus with this the study test the discriminants validity using HTMT and the result show that the latent variables are distinct from each other's as the value show no latent construct was above the threshold of 0.85 by Kline (2015).

Table 2 HTMT

	EBK*GCB	EBased-Know	GCon-Beh	GPur-Int	OK*GCB	Obj-Know	SK*GCB	Suj-Know	TR*GCB	Trust
EBK*GCB										

EBased-Know	0.537								
GCon-Beh	0.181	0.329							
GPur-Int	0.116	0.286	0.72						
OK*GCB	0.168	0.107	0.779	0.433					
Obj-Know	0.127	0.501	0.77	0.857	0.587				
SK*GCB	0.335	0.127	0.489	0.245	0.604	0.356			
Suj-Know	0.234	0.785	0.751	0.753	0.467	0.677	0.615		
TR*GCB	0.208	0.17	0.803	0.448	0.741	0.498	0.487	0.448	
Trust	0.198	0.528	0.815	0.748	0.512	0.833	0.318	0.784	0.676

Structural Model

This study test the hypotheses using structural equation model by bootstrapping (5000) and the result was tabulated in table 3 and reported by figure 2

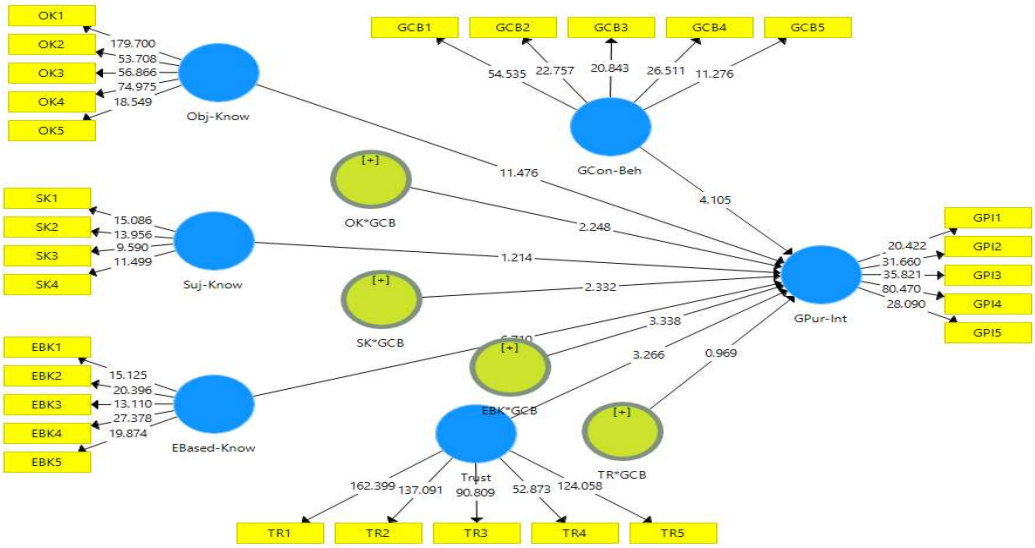


Figure 2

Table 3 Test of Hypotheses

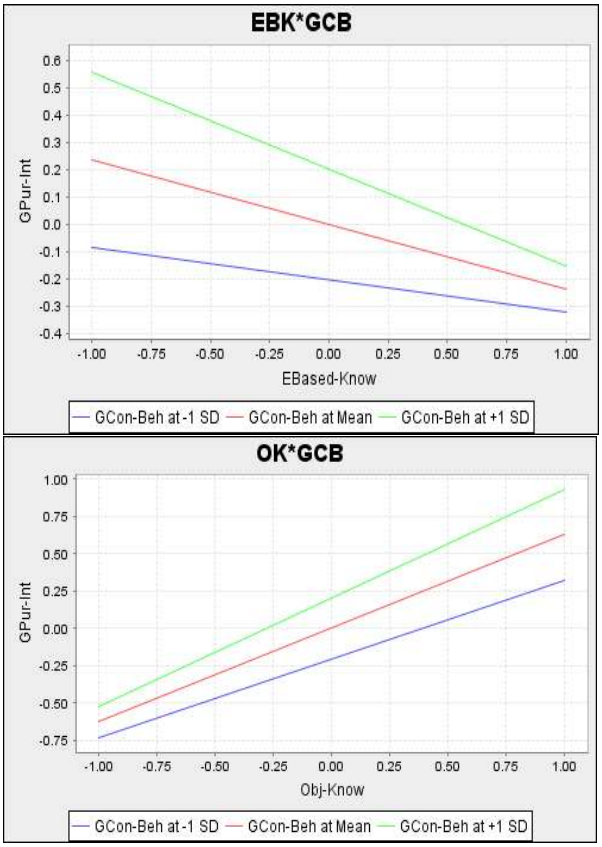
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Decision
EBK*GCB -> GPur-Int	-0.119	-0.118	0.036	3.338	0.001	Rejected
EBased-Know -> GPur-Int	-0.236	-0.23	0.035	6.71	0	Rejected
GCon-Beh -> GPur-Int	0.203	0.2	0.05	4.105	0	Rejected
OK*GCB -> GPur-Int	0.099	0.097	0.044	2.248	0.025	Rejected
Obj-Know -> GPur-Int	0.627	0.627	0.055	11.476	0	Rejected
SK*GCB -> GPur-Int	0.062	0.062	0.027	2.332	0.02	Rejected

Suj-Know -> GPur-Int	0.045	0.044	0.037	1.214	0.225	Accepted
TR*GCB -> GPur-Int	0.042	0.043	0.043	0.969	0.333	Accepted
Trust -> GPur-Int	0.217	0.22	0.067	3.266	0.001	Rejected

Table 3 shows the test hypotheses. The result revealed that objective knowledge was positive and significant to green purchase intention (β=0.627, t-value=11.476, p-value=0.000) signifying that objective knowledge predicts the green purchase Smartphone user in the study area. Hence, H01: is rejected. Also the result shows that subjective knowledge was positive and insignificant to green purchase intention (β=0.045, t-value=1.214, p-value=0.225) signifying that subjective knowledge was unable to predict the green purchase Smartphone user in the study area. Hence, H02: is accepted. Experience-based knowledge was negative and having a significant effect and (β= -0.236, t-value=6.710, p-value=0.000) signifying that Experience-based knowledge was having an inverse relationship in predict the green purchase Smartphone user in the study area. Hence, H03: is rejected. Trust was found to be positive and significant (β=0.217, t-value=3.266, p-value=0.001), signifying that trust predict the green purchase Smartphone user in the study area. Hence, H04 rejected.

Similarly, the result show that the moderating role of green consumer behaviour was positive and significant for objective knowledge and green purchase intention (β=0.099, t-value=2.248, p-value=0.025). This indicates that there is moderation hence H05 is rejected. Subject knowledge and green purchase intention was moderated by green consumer behaviour, with a positive significant (β=0.062, t-value=2.332, p-value=0.02), hence the H06 is rejected. Further, the moderation between experience-based knowledge and green consumer behaviour was negative and significant (β=-0.119, t-value=3.338, p-value=0.001). Meaning the moderation was able to reduce the negative value from (-0.236 to -0.119), and indicate that green consumer behaviour moderate the relationship hence, H07 was rejected. Also, the moderation between trust and green purchase intention was positive and insignificant with a (β=0.042, t-value=0.969, p-value=0.333) and the hypothesis was accepted.

This moderation was also represented in the figure below


EBK*GCB
GPur-Int
EBased-Know
GCon-Beh at -1 SD
GCon-Beh at Mean
GCon-Beh at +1 SD
OK*GCB
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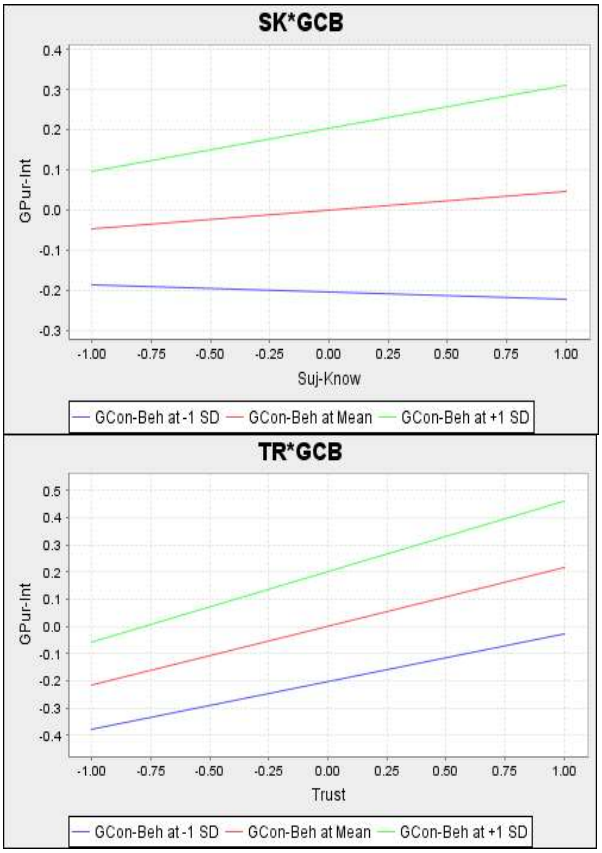

Figure 3 Moderation Analysis

5.0 CONCLUSION AND RECOMMENDATIONS

The present study examined the moderating effects of green consumer behaviour on the relationship between objective knowledge, subjective knowledge, experience-based knowledge and trust on green purchase intention. In line with the past studies, objective knowledge, and trust positively affects green purchase intention (Wang, Wong, & Alagas, 2020; Chen, Chen, and Tung, 2018), while subjective knowledge was positive and insignificant and experience-based knowledge was negative and significant on green purchase intention. This is in line with others studies (e.g., Chairy, & Alam, 2019) who find that environmental knowledge was insignificant. Moreover, the present study demonstrates that green consumer behaviour exhibit the moderation between the independent variables on the dependent variable. This conclude that green consumer

behaviour moderate the effect of objective knowledge, subjective knowledge, experience-based knowledge and trust and green purchase intention. These findings are impressive as it can shape the attention of companies to focus more on educating the customers about the environmental issues and problems, purpose driven customers who believe in sustainability and who are well educated about environmental issues and problems found to have positive intention towards buying green products and actual buying behavior that is not affected by green behaviour.

The study recommends that firms should increase their green product knowledge for Nigerian consumers as it's require more individual (personal) approaches. Thereby, when environmental knowledge of (objective, subjective and experience-based) level is high, the green purchase intention is improving. Also it was suggested that a marketing strategy that can raise the level of trust will be effective as environmental objective knowledge had a significant effect on the green purchase intention for Smartphone consumers while green consumer behavior strengthen the others relationship. Therefore, it may be a very useful marketing approach to highlight that consumer' efforts, such as green purchase dealing with their group members will be very effective.

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APPENDIX A
Krejcie and Morgan 1970 sample size table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970