Development of a Structural Model Based Upon the Theory of Planned Behavior to Assess Ghanaians' Intentions, Attitudes, and Knowledge Regarding Sustainability.

Augustine Kwabena Osei-Fosu
Cheryl A. Pensiero

Abstract: Many African countries, including Ghana, are grappling with problems associated with economic development such as deforestation, pollution, and unsustainable population growth.No previous study has systematically investigated relevant psychological factors.

The objective of my study was to understand the psychological barriers and enablers for sustainable development in Ghana. A causal path model was developed and tested, based upon the Theory of Planned Behavior (TPB) and relevant research on sustainability. The model included constructs that are typically included in TPB models (intentions, attitudes, subjective norm, personal norm, perceived behavioral control, and knowledge), as well as skepticism regarding sustainability, and individual financial situation. The primary dependent variable was intentions regarding sustainable behaviors. A questionnaire was developed to collect data with which totest the causal path model and 510 in Kumasi, Ghana completed the questionnaire. Data was analyzed using structural modeling to examine the goodness of fit of the causal path model and to test hypothesized relationships between model variables.

Goodness of fit of the structural model was adequate and model variables accounted for 29% of the variance in behavioral intentions, which was the primary dependent variable. With regard to intentions regarding sustainable behaviors, total effects of attitudes, perceived behavioral control, and personal norms were statistically significant and in the positive direction, as hypothesized. Knowledge concerning sustainability issues in Ghana had a positive total effect on attitudes towards sustainability, which was statistically significant, as hypothesized. Knowledge also had positive and significant total effects on perceived behavioral control and on personal norms, consistent with hypotheses.

The study findings highlight the importance of education to impact attitudes and knowledge regarding sustainability issues in Ghana. A transition to a truly sustainable society would require a major transformation of attitudes and knowledge, both on the individual level and on the societal level.

Keywords: Africa, Ghana, Sustainability, Theory of Planned Behavior, Sustainable Behavior, Structural Equation Model

Introduction

The world is constantly or intermittently faced with the problems of pollution, erosion, sexism, acid rain, global warming, ozone depletion, climate chaos, desertification, mass poverty, pandemics and epidemics, tornados, hurricanes, wars, resource shortage and scarcity, mass migration, fundamentalism, terrorism, financial oligarchies and all sorts of unthinkable disasters as a result of human activities [1,2].

A few years prior to the Brundtland report and after, the world seemed to agree that the only antidote to these problems is sustainability and sustainable development [3,4,5]. This is supported by Kofi Annan's claim that the biggest challenge in this century is to transform sustainable development from the abstract to reality for all the people in the planet [6]. The fact that 150 of the 196 countries in the world acknowledged by the UN are in constant contact with the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) in relation to sustainability and sustainable development goals [7] gives further support to this claim. So, more than three-fourths of the countries in the world acknowledge sustainability and sustainable development as a major solution to world troubles, andthis is further justified by the number of countries (over 190) agreeing to the COP21 [8].

The importance of implementation of sustainability and sustainable development has never been more convincing, even though the world seems to acknowledge the capabilities and importance of it in its current situation [9,10]. United Nations Development Programme [7] documented the progress countries have made towards environmental sustainability, but according to their analysis, most counties are not yet on track toward their set goals (P. 3). Of the 196 countries in the world, 150 are constantly in contact with UNDP and UNEP in relation to sustainability and sustainable development, but most of these are still not meeting the needed effort to achieve the goals set before them [7]. The Organization for Economic Co-operation and Development (OECD) (which is a unique forum where the governments of 30 democracies work together to address the economic,

social, and environmental challenges of globalization.) concurred that this lack of implementation of sustainability and sustainable development policies is the greatest problem of member states [11 12]. However,scholars [13, 14] suggest that the lack of holistic acceptance is the reason why countries and individuals are not making headway in the world's quest towards sustainability.

Even though the world seems to appreciate Sustainabilityas the remedy, the quest to understand why thelack of proper implementation [9,10] or holistic acceptance[13, 14] has led to considerable sustainability and sustainable development studies [15,16, 17, 18,19]. Most of these studies have made and are making use of behavioral theories to ascertain population behavior, perception, and acceptance of the concept, as well as to why the concept is not making headway. These studies have helped and are helping in the understanding and acceptance of the concept in some parts of the world [20]. However, the same cannot be said about developing countries like in Africa, and more specifically, Ghana [see 21, 22].

This claim is backed by the United Nations Department of Economic and Social Affairs Division for Sustainable Development 21st Century 2012 report of regional ranking where Africa is ranked asleast among the sister regions. Also, according to UNDP, among all the continents, Africa was the only one not on course to accomplish most of the Millennium Development Goals (MDGs) by the set period 2015. To add salt to the wounds of Ghana, the World Bank [23] established that the yearly cost of natural resource and environmental degradation in Ghana is commensurate with 9.6 percent of the GDP, a result of unsustainable management of the country's fisheries, forests, the health influence of environmental issues like air, land and water pollution, water supply and sanitation, land resources, and wildlife. Also, the African Development Bank / Organization for Economic Co-operation and Development [24] ascertained that Ghana has experienced massive deforestation in contemporary years. The ramifications of this are extremely detrimental for biodiversity and for the economic and cultural beneficiaries of the ecosystem services and forest resources [25].

To the best of the knowledge of the author, unlike other continents, there has been no study conducted that has used behavioral theories to ascertain or understand lack of sustainability development in Africa, and more specifically, Ghana. Theuse of similar studies performed inother continents to explain situations in Africa would be dangerously presumptive, as they could not account for variables that are peculiar to Africa and more specifically to the research location, Ghana. Given that a study of this nature has never been performed in the demographic and psychographic representation of Africa, and given the presence of very unique variables specific to Africa alone, a current study has important relevance, significance, and a commitment to fill this gap in the literature. With the use of data collected in Kumasi, Ghana, regarding intention, attitude, subjective norms, perceived behavioral control, personal norms, knowledge, skepticism regarding sustainability, and financial situation of that population, and evaluation of that data using standard statistical procedures, information regarding sustainability development in Africa was gathered.

It is extremely important to investigate the predictor variables that impact sustainable behavior or behavioral intention in an African country for the following reasons:

First, the present study can contribute to already existing literature that seems to lack information about the opinions, attitudes, behavioral intentions, and behaviors regarding sustainability in African countries. It will also enrich and give the future literature a new dimension of the study, since it aims to tread on a never-used theoretical framework in the study of this African phenomenon.

Second, the attitudes, behavioral intentions, and behaviors in African countries toward issues of sustainability will be a critical factor influencing the development and management of "curse" resources (Paradox of Plenty) [26] in the future. "The resource curse, also known as the paradox of plenty, refers to the paradox that countries and regions with an abundance of natural resources, specifically point-source non-renewable resources like minerals and fuels, tend to have less economic growth and worse development outcomes than countries with fewer natural resources" [27] (p. 241).

Third, the advanced world has modified its perception concerning the meaning of corporate social responsibility (CSR) from satisfying economic and legal prerequisites to stabilizing or improving environmental and social impacts without sabotaging economic performance. Getting Africans to think along these lines will be vital to their progress and survival.

Finally sustainability is on the programs of many business leaders in the society, consumers, educators, governments, and investors [28, 29]), so exploring behavioral intention in relation to sustainability will help these leaders and administrators in their planning and activities going forward.

This study aims to use the theory of planned behavior (TPB), which uses intention toward behavior, attitude, subjective norm, and perceived behavior control constructs to predict certain behaviors. The theory is extensively used and is a popular conceptual framework for human action [30]. It has been used in several studies and many areas, including agriculture, biology, business, chemistry, ecology, finance, management, human resources, psychology, and sociology.

The remainder of the paper is structured as follows: Section 2 reviews the relevant literature; Section 3 presents the methodology including data sources and variable descriptions, statistical procedures for identification, and estimations;Section 4 is devoted to the presentation of the empirical results;Section 5 concludes with discussion, summary of key findings, and policy implications thereof.

Literature Review

Ajzen's Theory of Planned Behavior (TPB) was developed in 1985 as seen in his article "From intentions to actions: A theory of planned behavior" [31]. It evolved as an improvement over theory of Reasoned Action [30], which was developed by Martin Fishbein and Icek Ajzen as an advancement over Information Integration theory [32,33]. TBP has been used to research and explain the voluntary behavior and behavior not perceived to be under a person's control in almost all disciplines (agricultural, business, education, sports, management, social network, health related areas etc) [34,35,36,37,38,39,40,41,42]. Empirical findings from most of these studies suggest that a particular behavior can be explained by analyzing the relative factors and the influence each factor has on the behavior [41,42]. Additionally, the theory is an empirical framework that can be used to investigate the relative influences of factors that may affect behaviors, in addition to its predictive powers of the behavior in question [20].

Intention. According to Ajzen [30], intention is the cognitive representation of a person's readiness to perform a certain behavior. It is considered to be the immediate antecedent of behavior as showed in [30] (p. 182). The theory also postulates that intentions are predicted by three constructs: attitude, subjective norm, and perceived behavioral control (PBC). This theoretical claim is justified in several empirical studies, including[43] who found that attitude, subjective norms, and PBC explained 81% of the variance in ecological behavioral intention, and that intention determined almost 52% of peoples' ecological behavior.

Attitudes. Ajzen [44](p. 5)defines attitude toward a behavior "as a person's overall positive or negative evaluation of performing the behavior in question". The relationship between attitude and intention has been empirically investigated and established by several scholars such as [45,46, 47, 48, 49].Some have established a strong relationship between environmental attitude and intention leading to ecological behavior [50], or a moderate relationship [51, 52], or a weak relationship [53]. The above discussion offers the study theoretical and empirical confidence to:

Hypothesis 1: Ghanaians' attitude toward sustainability will have a positive relationship with their intention to adopt sustainability.

Subjective Norm. Subjective Norm refers to the perceptions of the communal judgments of executing certain behaviors, and the motivations to adhere to this social pressure [32]. Thus, a subjective norm aims to influence or apply social pressure on a person to perform or to not perform a certain behavior. Previous empirical research has established the relationship between subjective norms and intention in relation to behavior, as well as ecological behavior [54, 55,56,57]. Based on TPB and related theoretical and previous empirical studies, the study hypothesized that:

Hypothesis 2: Ghanaians' subjective norm will have a positive relationship with their intention to adopt sustainability

Perceived Behavioral Control:The opportunities or means (be they easy or difficult) to perform a certain behavior is all about perception by the person [44,58,59]. Findings in the literature on this subject range from inconsistent and nonexistent [60,61] to positive [62] to strong [63,64]). There are several empirical findings [65,66] that establish the relationship between PBC and intention in relation to ecological behavioral. Based on TPB and related theoretical and previous empirical studies discussed, the study:

Hypothesis 3: Ghanaians' perceived behavior control will have a positive relationship with their intention to adopt sustainability

Extended TPB Model. The aim of this section is to present additional constructs that hold and support the theoretical framework of the research study, given the original theory. It introduces, describes, reviews, and analyzes the individual constructs to be added to the original theory, explain their need, and propose hypotheses. According to Ajzen [30], in order to better improve the proportion of the explained variance and to allow

generalization of other research contexts, the TPB model is a flexible model that is open to the inclusion (exclusion) of variables.

Personal Norm. Personal Norm is defined as feelings of strong obligations experienced by individuals prompting performance of a certain behavior [20,67]. Researchers and scholars continue to examine the impact of personal norm on behavioral intentions. [20, 68] acknowledged a relationship between a feeling of moral obligation to care for the environment and pro-environmental behavior. Hence, a personal norm can be seen as an important predisposition to perform behavior. Several empirical findings [69,70,68] established a relationship between personal norm and intention in relation to ecological behavioral.This study included personal norm because society, community, country, or the world is made up of collective individuals, and it is their actions and inactions that are representative of the whole society, community, country, or the world. Therefore the study aims to suggest the following hypothesis:

Hypothesis 4: Ghanaians' personal norm will have a positive relationship with their intention to adopt sustainability

Knowledge. According to Stehr [71], knowledge is the capacity for action and inaction. Existence of a knowledge-behavior relationship is evidenced by [72, 73] by highlighting that people will not act with proper behaviors without proper knowledge. There are also empirical findings that establish a knowledge-intention [74,75,76] and knowledge-attitude [77,75] relationship.Previous empirical researchers [78,79,80] have established the relationship between knowledge and other determinants of TPB to ecological behavior, making knowledge an important inclusion to the study:

Hypothesis 5(i): Ghanaians' knowledge in relation to sustainability will have a positive relationship with their intention to adopt sustainability
Hypothesis 5(ii): Ghanaians' knowledge in relation to sustainability will have a positive relationship with their attitude towards sustainability
Hypothesis 5(iii): Ghanaians' knowledge in relation to sustainability will have a positive relationship with their PBC towards sustainability
Hypothesis 5(iv): Ghanaians' knowledge in relation to sustainability will have a negative relationship with their subjective norms towards sustainability
Hypothesis 5(v): Ghanaians' knowledge in relation to sustainability will have a positive relationship with their personal norms towards sustainability

Skepticism regarding sustainability. This variable is to eliminate any possible problem of confounds or alternative explanation due to skepticism from past experience. According to Merriam-Webster Dictionary, skepticism is "an attitude of doubt or a disposition to incredulity either in general or toward a particular object". Several authors have established empirically or theoretically the link between skepticism and experience [81,82]. Importance of apossible confound by experience has been established by scholars like [83, 84] in their studies that report experience affects acceptance of new ideas. Previous empirical research [20,44,85] has established the relationship between experience and other determinants of TPB including ecological behavior. Several authors have established empirically or theoretically the link between skepticism and behavior [86,87,88,89], attitude [90,91], and intention [92,93]. Based on these and other reviewed studies:

Hypothesis 6(i): Ghanaians' skepticism will have a negative relationship with their intention to adopt sustainability
Hypothesis 6(ii): Ghanaians' skepticism will have a negative relationship with their attitude towards sustainability
Hypothesis 6(iii): Ghanaians' skepticism will have a negative relationship with their subjective norm towards sustainability
Hypothesis 6(iv): Ghanaians' skepticism will have a negative relationship with their perceived behavior control towards sustainability
Hypothesis 6(v): Ghanaians' skepticism will have a negative relationship with their personal norm towards sustainability

Financial situation. Lele [94] and the UNDP [7] have highlighted a causality between poverty and environmental degradation.According to Watts [95], (p. 2-3), poverty can be defined in two ways: "narrow economic" and "culture of poverty". Narrow economic refers to the condition of poverty in which the individual

lives, and culture of poverty is seen in the person's character. "The economic concept is defined in terms of the external circumstances that condition a person's behavior--especially the behavior he or she displays in economic transactions, buying consumption items, selling productive services, securing professional advice, etc. The cultural concept focuses on the internal attitudes and behavior patterns which a person brings to any particular set of circumstances" [95](p. 3).

Several researchers [96, 97,98,99,100] have established, in one way or another, that poverty has a strong relationship with environmental behavior. Ecological attitude and behavioral intention are inversely related to poverty with regard to norms [101,103] have highlighted poverty to be a single factor that influences active participation, or the lack of participation, with regard to environmental issues.

Both definitions of poverty as described above make reference to some of the important constructs that are embedded in TPB. The embodiment of poverty in TPB, the outcomes of the aforementioned studies with regard to poverty, and the fact that poverty with regard to sustainability has not been included in prior research settings in demographic Africa [104,105,106,107] give credence to the study aims and the following:

Hypothesis 7(i): Ghanaians' financial situation will have a negative relationship with their intention to adopt sustainability
Hypothesis 7(ii): Ghanaians' financial situation will have a negative relationship with their attitude towards sustainability
Hypothesis 7(iii): Ghanaians' financial situation will have a negative relationship with their subjective norm towards sustainability
Hypothesis 7(iv): Ghanaians' financial situation will have a negative relationship with their perceived behavior control towards sustainability
Hypothesis 7(v): Ghanaians' financial situation will have a negative relationship with their personal norm towards sustainability

Method

The study used a cross-sectional, survey research design with a well-structured questionnaire to collect data on intention, attitudes, subjective norms (SN), PBC, personal norms (PN), knowledge, skepticism, and financial situation towards sustainability from Ghanaians using systematic sampling with a period of five. The target population of this study was both male and female inhabitants of Kumasi, the second largest city in Ghana [108]. According to Ghana Statistical Service[108](p. 5), Kumasi has a diverse population on tribal and ethnic grounds. The number of study participants of 510 was determined based on a-priori sample size calculation for structural models [109,110].

A well-structured questionnaire was developed based on a literature review and input from an expert panel of six with specialties in sustainability, behavioral science, education, economics, statistics, and business. Two pilot tests were conducted to seek clarity and relevance of the questions and their direction, and the length of time needed to complete the questionnaire. Major revisions such as dropping and reconstruction were made to the questionnaire prior to distribution to the study sample. The study was reviewed and approved by the Institutional Review Board of the university prior to data collection.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 22 and that of Analysis of Moment Structures (AMOS) statistical software version 22 were used for data analyses. Descriptive statistics were computed for means, frequencies, and standard deviations. Other statistical techniques such as plots, regression, Pearson correlational analysis, and Cronbach's alpha test of reliability and consistency were applied.

Path analysis: Structural modeling. Finally, the study constructed the Path analysis based on Meyers, Gamst, and Guarino [111](p. 904) suggestion of a six-step modeling approach, since itprovides a basis for making meaningful inferences about theoretical constructs and their interrelations, as well as avoiding some specious inferences [111]. As suggested by Meyers et al. [111]: the first step--draw out the interrelationships of the variables in the form of a path diagram;second step--indicate the hypothesized strength and direction of variable's presumed effect on each other in each of the paths;third step--perform the analysis yielding the path coefficients for each path;fourth step--compare the obtained path coefficient with the hypothesized path strengths and direction;fifth step--evaluate how well the causal model fit the data based on the results of the analysis;and sixth step--respecify the model if it is appropriate. To avoid the possibility of superfluous interpretation due to a problem of alpha inflation as a result of multiple testing, stringent significant alpha level of 0.01 or less was used. Bonferroni approach was considered;however,it was too conservative.

Model comparison was used to verify as to whether extending the original model to include personal norm, financial situation, skepticism regarding sustainability, and knowledge as predictor variables could help to

explain variance in behavioral intention towards sustainability. The maximum-likelihood estimation procedure was used to analyze the model.

Model Evaluation Statistics. The overall fit of the model to data was determined through chi-square. Chi-square measures the difference between the theorized model covariance matrix and observed covariance matrix [111]. A greater chi-square result indicates a poor model fit. But it must be stated that it has been criticized for its sensitivity to sample size, assumptions, and distribution [111], making it an insufficient test alone to assess model fit. Hence, comparative fit index (CFI) and root mean square error of approximation (RMSEA) were also considered. According to Meyers et al. [111], models with fit statistics below 0.05 for RMSEA and above 0.95 for CFI have a good fit.

Result

Table 1: Demographic Characteristics of the Survey Participants in Comparison with Population

Demographic Attributes	Sample Frequency	Sample Percentage	Population Percentage		
			GP	ARP	KP
Gender:					
Male	252	49.4	48.8	48.5	47.8
Female	258	50.6	51.2	51.5	52.2
Age:					
15 - 25	178	34.9	35.2	35.7	36.3
26 - 30	100	19.6	14.6	14.9	15.7
31 - 35	55	10.8	12.0	12.1	12.5
36 - 40	48	9.4	10.1	10.3	10.1
41 - 45	49	9.6	8.5	8.4	8.1
46 - 50	30	5.9	6.7	6.5	6.1
51 - Above	49	9.6	13.1	12.3	11.2
Educational Levels:					
None	21	4.1	28.5	19.9	----
Primary	25	4.9	11.6	10.5	----
Middle School/ JSS/JHS	92	18	36.1	43	----
Form Five/ SSS/SHS	117	22.9	15.4	20	----
Tertiary	218	42.7	2.5	2.7	----
Masters	31	6.1	0.5	0.5	----
PhD	0	0			
Other	6	1.2	3.2	3.4	----
Occupation:					
Government	140	27.5	9.9	19.8	----
Private	144	28.3	------	-----	----
Self Employed	101	19.8	35.1	37	----
Student	115	22.6	30.5	16.3	----
Other	9	1.8	24.5	26.9	----

Note: Sample data comprised of people18 years and above and all data reported under comparison are from Ghana Statistical Service [108](p. 21-80) GP = Ghana population, ARP = Ashanti Reginal population and KP =Kumasi population

Demographic Characteristics

Table 1compares the demographic and socioeconomic characteristics of the sample with the population census data from Ghana Statistical Service. Of the 510 study participants, 258 were females representing 50.6% of the total sample. In comparison, females represent 51.2% of the national population, 51.5% of the regional population, and 52.2% of Kumasi population [108]. The proportion of people age 25 or under is 35.2%, 35.7%, and 36.3% for national, regional, and Kumasi, respectively, while that of the study sample was 34.9%. The data in Table 1 suggest that in terms of gender and age, the sample was an adequate representation of the three populations under consideration.

In terms of occupation and level of education, there were considerable differences between the sample and the comparison population. For example, the sample representation of people without any formal education was 4.1% while the population reported 28.5% for the country and 19.9% for the region. Also, the sample representation of the people who work in the government sector was 27.5%, while that of the population was

9.9% and 19.8% for country and region, respectively. Unfortunately, data on occupation and educational level for Kumasi were not available for the study. However, it seems likely that if such data were available for the city under consideration, the sample would have conformed to the population, as justified in Osei-Fosu [112] (p. 110).

Descriptive Statistics

Descriptive statistics of variables reported in

Table 2 are consistent with normal distribution (The distribution of all the study variables are also shown graphically in Appendix D of Osei-Fosu) [112](p. 260). All variables had approximately equal mean and median (almost all the difference between mean and median was < 0.1), indicating normal distribution and lack of skewness [113]. None of the variables had a skewness value greater than 0.85. Financial Situation, Skepticism, and Subjective Norm showed mild positive skewness; all other variables showed mild negative skewness. Values of kurtosis for all variables were within the acceptable range for normal distribution (kurtosis $= \pm 2.0$) [114].

Table 2: Descriptive Statistics (n = 510)

Variable	Mean	Median	Standard Deviation	Variance	Skewness	Kurtosis	Min.	Max.
Attitude	3.590	3.600	0.5840	0.341	-0.845	1.167	1.2	5
Intention	3.538	3.600	0.5862	0.344	-0.294	0.139	1.2	5
PBC	3.608	3.800	0.7666	0.588	-0.698	-0.060	1	5
Sub-Norm	3.057	3.000	0.6797	0.462	0.356	-0.101	1	5
Per-Norm	3.809	3.800	0.6183	0.382	-0.511	0.161	1.6	5
Skepticism	2.949	3.000	0.8161	0.666	0.123	-0.501	1	5
Fin-sit	2.869	2.800	0.6399	0.410	0.106	-0.225	1.2	4.6
Knowledge	11.235	12.000	2.5431	6.467	-0.550	-.0172	2	16

NB: Sub-Norm is Subjective Norm; PBC is Perceived Behavioral Control; Per-Norm is Personal Norm; Fin-sit is financial situation.

Construction of the Path Model

For the purpose of building and validating the path model, the dataset from the 510 respondents was randomly divided into two equal parts. One part was used for building the path model. The other was retained as a holdout sample to be used to replicate the modelindependently.

Correlation Matrix. With the exception of PBC,all othervariables had unacceptable Cronbach alpha values. Excepting for financial situation which is significantly correlated with Subjective Norm, and Skepticism which is not significantly correlated with Attitude and Personal Norm, most of the other variables are correlated significantly with one another. Most of the correlations were consistent with the study hypotheses, with the exception of Knowledge and Intention. The expectation was that Ghanaians' sustainable knowledge would have a positive relationship with their sustainable behavioral intention. Knowledge and intention, however, demonstrate a significant negative correlation (-.159). Also, the study posited a negative relation between Skepticism and Behavioral Intention, but that too was significantly positive (.320). The same outcome is seen for financial situation and intention (.117). Apart from these, all the rest did conform to the expected, but correlations were far lower than anticipated, ranging from .043 to .418. Some of these were theoretically and logically justifiable to be small. For example, Subjective norm and Personal norm have insignificant correlation of .088. Logically,a person with strong personal normsshould not be significantly impacted by social influence, which is subjective norm. A higher significant correlation coefficient between variables like Attitude and Intention would be expected. And even though it was significant, the coefficient was small (.233).

Table 3: Correlations between Model Variables (n = 255)

	α	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Attitude	**.110**	1							
(2) Intention	**.225**	.233[**]	1						
(3) PBC	**.612**	.184[**]	.182[**]	1					
(4) Sub-Norm	**.245**	.102	.306[**]	-.094	1				
(5) Per-Norm	**.111**	.413[**]	.272[**]	.418[**]	.088	1			

(6) Skepticism	**.239**	.063	.320[**]	-.183[**]	.371[**]	-.046	1	
(7) Fin-sit	**.245**	.043	.117	-.073	.209[**]	.110	.336[**]	1
(8) Knowledge	**.371**	.233[**]	-.159[*]	.294[**]	-.141[*]	.334[**]	-279[**]	-.226[**]	1

α = Cronbach's Alpha [**] & [*] mean correlation is significant at the 0.01 and 0.05 level (2-tailed) respectively.

Path Analysis. The variables were theorized into the hypothesized model and analysed using IBM SPSS Amos 22 based on Meyers et al. [111] suggestion. The outcome model, however, was unidentified. This could be a result of misspecifications of the model, limitations in the data, or complications in the nature of the model [111].Therefore, the predictor variableswere configured into the hypothesized model shown in Figure 2 of [112], but as the statistical parameters reported in the column labeled "original" suggest, the model does not appear to be a good fit for the data. This prompted respecification of the model in order to improve the fit, and so the following paths were added based on consideration of their correlation coefficients: (a) from attitude to PBC, Subjective Norm and Personal Norm, and (b) from Personal Norm to PBC. These links were created based on theoretical or empirical reasons, and exploration of the model was guided by variables correlation coefficients and modification indices.

The result of the respecified model achieved an insignificant chi-square of 3.42 (2, n = 255) and p = .181. Hence, given an adequate model fit, the null hypothesis could not be rejected. The respecified model appeared to be a good fit for the data; and, as shown in

Table 4, acceptable values on the IFI, TLI, NFI and CFI were achieved.

Table 4: Model-Fit Statistics for Hypothesized Structural Model

MODEL FIT INDICES AND TARGETS		MODEL FIT STATISTICS	
FIT INDEX	**TARGET VALUES**	**ORIGINAL**	**RESPECIFIED**
χ^2	SMALLER (p < .05)	77.78 (p < .001)	3.42 (p = .181)
df	SMALLER	6	2
GFI	GFI ≥ .90	.93	1.0
AGFI	AGFI ≥ .90	.58	.94
NFI	NFI ≥ .90	.78	.99
CFI	CFI ≥ .95	.78	1.0
IFI	IFI ≥ .90	.79	1.0
TLI	TLI ≥ .90	-.03	.94
RMSEA	RMSEA ≤ .08	.22	.00
	90% CI	(.17 to .26)	(.00 to .14)
RMSR	RMSR ≤ .05	.04	.006
AIC	SMALLER	136.78	71.42
BCC	SMALLER	138.980	73.91
BIC	SMALLER	243.01	191.82
ECVI	SMALLER	.538	.281
	90% CI	(.442 to .665)	(.276 to .318)

Standardized estimates of the direct, indirect, and total path coefficients are reported in Table 5, with asterisks showing those that were statistically significant (two-tailed). Total effect of variable is the sum of its direct and indirect effects, and their significance is determined through a non-parametric bootstrap procedure [115]. Path coefficients are interpreted the same way as multivariate regression coefficient. For example, standardized path coefficient estimatingdirect effect of Knowledge on Attitude is .284. This indicates on average, one standard deviation increase in knowledge will lead to .284 standard deviation increase in Attitude, provided all other variables impacting Attitude remain constant.
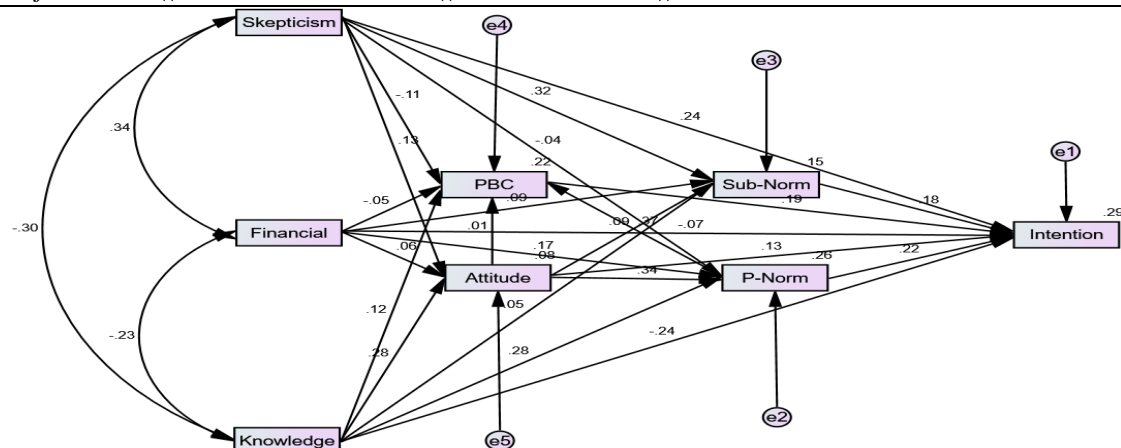
Figure 1: Standardized estimates for sustainable behavioral intention respecified structural model

The results from SEM estimation (Figure 1 and Table 5) revealed the following findings regarding the postulated hypotheses: H1 positing positive relationship between attitude and intention, supported (β = .250, p < .001);H2, positing negative relationship between subjective norm and intention, not supported;H3, proposed a positive relationship between PBC and intention, supported (β = .193, p < .005);H4, personal norm will have a positive relationship with intention, supported (β = .292, p < .001);H5 (i) knowledge – intention, not supported;H5 (ii)Knowledge on Attitude, supported (β = .284, p < .001);H5 (iii and v) knowledge on PBC (β = .267, p < .001) and personal norm (β = .387, p < .001), both supported. Aside from these, none of the remaining hypotheses were supported based on a stringent significant alpha level of 0.01 or less, adopted to avoid the possibility of superfluous interpretation due to a problem of alpha inflation as a result of multiple testing.

Table 5: Summary of Causal Effect of the Hypothesized Structural Model

Variables		Causal Effects		
Outcome	**Determinant**	Direct	Indirect	Total
Attitude	Knowledge[**]	.284	---	.284
	Skepticism	.126	---	.126
	Financial	.065	---	.065
P-Norm	Knowledge[**]	.280	.098	.378
	Skepticism	-.042	.043	.001
	Financial[*]	.172	.022	.195
	Attitude[**]	.343	---	.343
S-Norm	Knowledge	-.046	.025	-.021
	Skepticism[**]	.322	.011	.333
	Financial	.086	.006	.092
	Attitude	.089	---	.089
PBC	Knowledge[**]	.123	.144	.267
	Skepticism	-.114	.002	-.112
	Financial	-.048	.073	.025
	Attitude	.010	.128	.138
	P-Norm[**]	373	---	.373
Intention	Knowledge	-.239	.169	-.070
	Skepticism[**]	.244	.056	.300
	Financial	-.073	.073	.000
	Attitude[**]	.132	.119	.250
	P-Norm[**]	.221	.072	.292
	S-Norm[*]	.182	---	.182
	PBC[*]	.193	---	.193

Note: To avoid the possibility of superfluous interpretation due to problem of alpha inflation as result of multiple testing, the study opted for stringent significant alpha level of 0.01 or less. Bonferroni approach was considered, but it was too conservative, hence 0.01. * = p $\leq$ 0.01 and ** = p $\leq$ 0.001.

Three additional models were created to test and verify whether the added variables to the original theory were empirically justified. The estimated model (Default M), with all the study variables, was able to account for 29% of the variance. This model was also able to explain 15% of the variance in subjective norms, 22% of the variance in perceived sustainable control, and 26% of the variance in personal norms.

In the second model where impact of Personal Norm, Knowledge, Skepticism, and Financial to behavioral intention were restricted, this model was only able to explain 17% of the variance. Meanwhile, this same model was also able to explain 15% of the variance in subjective norms and 22% of the variance in perceived behavior control. The third model eliminated all the additional variables, having only variables of the original theory. This model was only able to explain 18% of the variance.

Ajzen [30] stated that in order to better improve the proportion of the explained variance and to allow generalization of other research contexts, the TPB model is a flexible model that is open to the inclusion (exclusion) of variables. Just as it was theoretically justified in the literature review section to include those additional variables, it is now empirically justified, per Ajzen'[30] claim, by the variances explained in the individual models as compared above. The model fit indices clearly show that the best model is the estimated model (Default M), buttressing the empirical justification of the additional construct included in the original theory.

As noted earlier in this section, the full dataset (n =510) was randomly divided into two equal halves. The first half of the dataset was used to construct the path model. This was done to see if a common model could fit the data; in other words, to seeif the results for the path model could be replicated with an independent dataset. A model Invariance analysis was performed in Amos to test whether the respecified path model applied equally well to both the first half and the second half of the full dataset. For the comparison involving only the respective path coefficients, the chi-square value was not statistically significant, χ^2 (21, N = 510) = 29.775, p = .097. Furthermore, pairwise comparisons of the path coefficients for the two datasets yielded no significant differences. In the second comparison configuration which examined the combined respective path coefficients and the variance/covariance of the exogenous variables, the chi-square value was not statistically significant, χ^2 (35, N = 510) = 36.979, p = .378. Therefore, it is inferred that the two halves of the randomly divided dataset can both be described by the same structural model.

Discussion

The results of the SEM analysis indicated that as participants attitude score increased (more positive stance towards sustainability), sustainable behavioral intention tended to increase. This is consistent with findings from previous studies [116,117,20,118]. The total effect of Perceived Behavior Control on Behavioral Intention was positive and statistically significant. In other words, as perceived control over sustainability improves, sustainable behavioral intention also improves. This finding is consistent with several previous studies [119, 117,120]. The study found that subjective norm is positively associated with intention and consistent with previous research [117,119,120,121]. The SEM analysis indicated that as stronger feelings of obligations are experienced prompting engagement in sustainable practices, then sustainable behavioral intention improves. This result is consistent with previous research across multiple contexts using various research designs and statistical methods[16,20, 122].

In the present study, knowledge of sustainability issues in Ghana was predicted to be positively related with sustainable behavioral intention. However, the total effect of knowledge on intention was not statistically significant (in actuality, the total effect was negative, but because it was statistically not significant, it is statistically no different than zero). A large number of sustainable behavior studies have included knowledge as a key variable within a TPB framework. Of these, most of them found that knowledge positively influenced participant intention or actual behavior [123, 124,125,79]. However, some of them found no relationship between knowledge and intention or actual behavior [126,127,128,129]; while a few reported a negative relationship [130,131].

Although previous studies of sustainability have not examined the role of skepticism, it was included in the TPB model ofthe current study. The total effects of skepticism on subjective norm and on intention were statistically significant but in the opposite direction to that predicted by the study hypothesis. The total effects of skepticism were not significant on PBC, personal norm, and attitude. Given the lack of previous research on skepticism, further research is needed to shed light on the above findings regarding the impact of skepticism.

The total effect of Financial Situation was not statistically significant for Intention, Attitude, Subjective Norm, and PBC. The total effect of financial situation for Personal Norm was significant but in the negative direction; however, this is opposite to the direction predicted. It is plausible that individuals in less dire financial need may feel more economically disposed and obligated to support sustainable actions. Since previous studies have not examined this variable, further research is warranted.

Limitations

Several methodological limitations of the study must be acknowledged. Questionnaire scales were developed for the purpose of the study, and although a pilot study was performed to refine the questionnaire, the questionnaire scales were not cross-validated using other instruments.

The causal path model that was tested using SEM did not include multiple indicators of latent variables, but rather each construct in the model was represented by single variables. Therefore, an implicit assumption was made that each constant was measured without error by the questionnaire scale. However, it is probable that measurement error is present in the data [132].

The internal consistency of the questionnaire scale as indicated by Cronbach alpha coefficients was low (See

Table 3: Correlations between Model Variables (n = 255)

	α	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) **Attitude**	**.110**	1							
(2) **Intention**	**.225**	.233**	1						
(3) **PBC**	**.612**	.184**	.182**	1					
(4) **Sub-Norm**	**.245**	.102	.306**	-.094	1				
(5) **Per-Norm**	**.111**	.413**	.272**	.418**	.088	1			
(6) **Skepticism**	**.239**	.063	.320**	-.183**	.371**	-.046	1		
(7) **Fin-sit**	**.245**	.043	.117	-.073	.209**	.110	.336**	1	
(8) **Knowledge**	**.371**	.233**	-.159*	.294**	-.141*	.334**	-279**	-.226**	1

α = Cronbach's Alpha ** & * mean correlation is significant at the 0.01 and 0.05 level (2-tailed) respectively.). This may reflect the fact that this study investigated a broad range of sustainability scales that would be expected to be multidimensional rather than focused on a single construct. It is worth noting that social scientists have recognized two categories of psychological scales: 1) Reflective scales, whose items are expected to be highly correlated but items on the scale are a sample from a larger domain of possible items [133] 2) Formative scales, whose components are not necessarily correlated, however all components of the underlying construct must be identified and measured by the scale items [133]. In the case of the present study, the questionnaire scales may be viewed as formative rather than reflective. However,there would need to be further development of the scale so that all relevant constructs are taken into account.

The ability to generalize the findings to the entire country is to some extentlimited, since the research location was purposely chosen. However, the use of systematic sampling technique in data collection, and the fact that the chosen research location is established and historically representative of the entire Ghana population strengthen the external validity of the study.

Conclusion

This study was motivated by the need to understand why African countries seem to be performing poorly in relation to sustainable development as compared to the rest of the world or the past state of the continent(see background of the study). The TPB was applied as a theoretical framework to explain attitudes and intention regarding sustainable behaviors.

The TPB model has not previously been tested in relation to sustainable behavior in the demographic representation of Africa. The results of this study indicated that Attitude, Subjective Norm, PBC, Personal Norm, and Skepticism were all statistically significant in predicting intention. However effects of skepticism were in the opposite direction to the effects predicted in the study hypotheses.

According to theliterature review, if Africa,ormore specifically Ghana,isgoing to deal with the problems facing the effectiveness of sustainability, then the country or continent should first see sustainability as a new value. Second, to achieve sustainability, we should work on attitudes and personal norms towards sustainability of the Ghanaian population, as the total effects of these variables on sustainable behavioral intention were positive with bigger total effects comparatively. Additionally, they significantly mediated relationships between other variables. Attitudes toward sustainability are worthy of attention, not only because of the impact of behavioral intentions regarding sustainability, but also because attitudes have a positive and significant relationship with stronger self-prompting feelings of obligations toward sustainability. Additionally, attitudes mediate both perceived sustainable social pressure from significant others and perceived behavioral control, as shown in Table 5. Personal norm also has a positive and significant relationship with sustainable behavioral intention, and mediates the relationship between perceived sustainable control and sustainable behavioral intention. In addition to the attention called to these variables, this study also suggests equal attention

be paid to sustainable knowledge and skepticism regarding sustainability, since they also had significant impacts on other variables.

Reference

[1]. Scharmer, C. O., & Kaufer, K. Leading from the emerging future: From ego-system to eco-system economies; Berrett-Koehler Publishers.: Cambridge, MA,**2013**.

[2]. Wiek, A., Withycombe, L., & Redman, C. L. Key competencies in sustainability: A reference framework for academic program development. Sustainability Science. **2011**, 6(2), 203-218.

[3]. Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. Why sustainability is now the key driver of innovation. Harvard Business Review. **2009**, 87 (9), 56-64.

[4]. Perrings, C. Future challenges. Proceedings of the National Academy of Sciences. **2007**, 104(39), 15179-15180.

[5]. Scheirer, M. A. Is sustainability possible? A review and commentary on empirical studies of program sustainability. American Journal of Evaluation. **2005**, 26(3), 320-347.

[6]. Annan, K. Secretary-General calls for break in political stalemate over environmental issues. **2001**, Retrieved from: http://www.un.org/News/Press/docs/2001/sgsm7739.doc.htm. (accessed on 3 December 2013).

[7]. United Nations Development Programme. Making progress on environmental sustainability: Lessons and recommendations in over 150 MDG country experiences. **2006**, Available online: http://www.droughtmanagement.info/literature/UNDP_making_progress_environmental_sustainability_2006.pdf(accessed on 19 May 2014).

[8]. Flôres Jr, R., G. Towards COP21: Time to get back to basics? Economic Policy Forum. **2015**Available online: https://www.economic-policy-forum.org/wp-content/uploads/2015/06/FGV-2015-Towards-COP21-Time-to-Get-Back-to-Basics.pdf(accessed on 10 November 2016).

[9]. Zeng, S. X., Tian, P., & Tam, C. M. Overcoming barriers to sustainable implementation of the ISO 9001 system. Managerial Auditing Journal. **2007**, 22(3), 244-254.

[10]. Curkovic, S., & Sroufe, R. Using ISO 14001 to promote a sustainable supply chain strategy. Business Strategy and the Environment. **2011**, 20(2), 71-93.

[11]. Organization for Economic Co-operation and Development. Promoting sustainable consumption: Good practices in OECD countries. **2008**, Available online: http://www.oecd.org/greengrowth/40317373.pdf(accessed on 12 July 2014).

[12]. Organization for Economic Co-operation and Development. Good practices in the national sustainable development strategies of OECD countries. **2006**, Available online:http://www.oecd.org/greengrowth/36655769.pdf(accessed on 12 July 2014).

[13]. Boyle, C. Considerations on educating engineers in sustainability. International Journal of Sustainability in Higher Education. **2004**, 5(2), 147-155.

[14]. Phillis, Y. A., & Andriantiatsaholiniaina, L. A. Sustainability: An ill-defined concept and its assessment using fuzzy logic. Ecological Economics. **2001**, 37(3), 435-456.

[15]. Chan, L. & Bishop, B. A moral basis for recycling: Extending the theory of planned behavior. Journal of Environmental Psychology. **2013**, 36, 96-102

[16]. Park, J., & Ha, S. Understanding consumer recycling behavior: Combining the theory of planned behavior and the norm activation model. Family and Consumer Sciences Research Journal. **2014**, 42(3), 278-291.

[17]. Wan, C., Cheung, R., & Shen, G. Q. Recycling attitude and behaviour in university campus: a case study in Hong Kong. Facilities. **2012**, 630-646.

[18]. Tikir, A., & Lehmann, B. Climate change, theory of planned behavior and values: a structural equation model with mediation analysis. Climatic Change. **2011**, 104(2), 389-402.

[19]. Wells, V. K., Ponting, C. A., & Peattie, K. Behaviour and climate change: Consumer perceptions of responsibility. Journal of Marketing Management. **2011**, 27(7-8), 808-833.

[20]. Chen, C. J. R., Gregoire, M. B., Arendt, S., & Shelley, M. C. College and university dining services administrators' intention to adopt sustainable practices: Results from US institutions. International Journal of Sustainability in Higher Education. **2011**, 12(2), 145-162.

[21]. United Nations Department of Economic and Social Affairs, Division for Sustainable Development. Sustainable Development in the 21st Century (SD21): National Institutions for Sustainable Development A preliminary review of the institutional literature. **2012a,** Available online: https://sustainabledevelopment.un.org/content/documents/1372Study2_final.pdf (accessed on 11 February 2014).

[22]. United Nations Department of Economic and Social Affairs, Division for Sustainable Development. National institutions for sustainable development a preliminary review of the institutional literature. Sustainable Development in the 21st Century (SD21). New York City, NY: United Nations Department of Economic and Social Affairs Division for Sustainable Development. **2012b**, Available online: http://sustainabledevelopment.un.org/content/documents/1372Study2_final%20draft.pdf(accessed on 11 February 2014).

[23]. World Bank. World development report 2007 Development and the Next Generation. World Bank,Washington, DC, **2007**. Available online: http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2006/09/13/000112742_200609131 11024/Rendered/PDF/359990WDR0complete.pdf(accessed on 29 July 2014).

[24]. African Development Bank / Organization for Economic Co-operation and Development. African economic outlook **2010**. Available online: http://www.un.org/esa/dsd/resources/res_pdfs/publications/sdt_afri/AEO2010_part1_p76.pdf(accessed on 6 June 2014).

[25]. African Economic Outlook. Ghana 2012. Available online:http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/PDF/Ghana%20Full%20PDF%20Country%20Note.pdf(accessed on 10 June 2014).

[26]. Karl T. L. The paradox of plenty: Oil booms and Petro-States; University of California Press.: Berkeley, CA, **1997**.

[27]. Ross, M., L. "What Have We Learned about the Resource Curse?" Annual Review of Political Science. 2015, 18: 239–259. doi:10.1146/annurev-polisci-052213-040359.

[28]. Carroll, A. B. Corporate social responsibility evolution of a definitional construct. Business & Society. **1999**, 38(3), 268-295.

[29]. Palazzi, M., & Starcher, G. Corporate social responsibility and business success. Paris, France: European Baha'i Business Forum. Revised 2006. **1997**, Available online: http://www.centreonphilanthropy.com/files/kb_articles/1269270655EBBF%20Corporate%20Responsibility%20and%20Business%20Success.pdf(accessed on 16 October 2014).

[30]. Ajzen, I. The theory of planned behavior. Organizational Behavior and Human Decision Processes. **1991**, 50(2), 179-211.

[31]. Ajzen, I. From intentions to actions: A theory of planned behavior; Springer Berlin Heidelberg Publisher.: Heidelberg, Germany:**1985**, 11-39.

[32]. Fishbein, M., & Ajzen, I. Belief, attitude, intention and behavior: An introduction to theory and research; Addison-Wesley.:Reading, MA, **1975**.

[33]. Anderson, N. H. Integration theory and attitude change. Psychological Review. **1971**, 78, 171-206.

[34]. Orr, M. G., Thrush, R., & Plaut, D. C. The theory of reasoned action as parallel constraint satisfaction: Towards a dynamic computational model of health behavior. PloS One. **2013**, 8(5), e62490. doi:10.1371/journal.pone.0062490.

[35]. Rueda Sampedro, I., Fernández-Laviada, A., & Herrero Crespo, Á. Applying the theory of reasoned action to entrepreneurship within a university setting. Investigaciones Regionales. **2013**, (26), 141-158.

[36]. Ortega, J., Huang, S., & Prado, G. Applying ecodevelopmental theory and the theory of reasoned action to understand HIV risk behaviors among Hispanic adolescents. Hispanic Health Care International: The Official Journal of the National Association of Hispanic Nurses. **2012**, 10(1), 42-52. doi:10.1891/1540- 4153.10.1.42.

[37]. Roberto, A. J., Krieger, J. L., Katz, M. L., Goei, R., & Jain, P. Predicting pediatricians' communication with parents about the human papillomavirus (HPV) vaccine: An application of the theory of reasoned action. Health Communication. 2011, 26(4), 303-312.

[38]. Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. Explaining internet banking behavior: theory of reasoned action, theory of planned behavior, or technology acceptance model? Journal of Applied Social Psychology. **2010**, 40(5), 1172-1202.

[39]. Lada, S., Tanakinjal, G. H., & Amin, H. Predicting intention to choose halal products using theory of reasoned action. International Journal of Islamic and Middle Eastern Finance and Management. **2009**, 2(1), 66-76.

[40]. Montano, D. E., &Kasprzyk, D. The theory of reasoned action and the theory of planned behavior. Glanz, K. Lewis, F., M. &Rimer, B., K. (eds). Health Behavior and Health Education, Theory, Research and Practice Jossy Bass San Francisco, CA. **2002**, 85–112.

[41]. Ajzen, I. The theory of planned behavior is alive and well, and not ready to retire: A commentary on Sniehotta, Presseau, and Araújo-Soares. Health Psychology Review. **2014**, 1-14.

[42]. Conner, M. Extending not retiring the theory of planned behaviour: A commentary on Sniehotta, Presseau and Araújo-Soares. Health Psychology Review. **2015**, 9(2)141-145.

[43]. Kaiser, F. G., & Gutscher, H. The proposition of a general version of the theory of planned behavior: Predicting ecological behavior1. Journal of Applied Social Psychology. **2003**, 33(3), 586-603.

[44]. Ajzen, I. Residual effects of past on later behavior: Habituation and reasoned action perspectives. Personality and Social Psychology Review. **2002**, 6(2), 107-122.

[45]. Abroud, A.; Choong, Y. V.; Muthaiyah, S. A conceptual framework for online stock trading service adoption. International Journal of E-Adoption (IJEA)**2013,** 5(1), 52-67.

[46]. Abroud, A.; Choong, Y. V.; Muthaiyah, S.; Fie, D. Y. G. Adopting e-finance: Decomposing the technology acceptance model for investors. Service Business. **2015**, 9(1), 161-182.

[47]. Fang, J., Shao, P., & Wan, J. Intention to participate in web surveys: An extended TPB model. In Wireless Communications, Networking and Mobile Computing, **2007**. WiCom 2007. International Conference on, 3581-3584 IEEE.

[48]. An, J. Theory development in health care informatics: Information and communication technology acceptance model (ICTAM) improves the explanatory and predictive power of technology acceptance models. Studies in Health Technology and Informatics. Amsterdam: IOS Press. **2006** 122, 63-67.

[49]. Shepherd, R., Sparks, P., Bellier, S., & Raats, M. M. Attitudes and choice of flavoured milks: Extensions of Fishbein and Ajzen's theory of reasoned action. Food Quality and Preference. **1992**, 3(3), 157-164.

[50]. Mohs, A., & Hübner, G. Organ donation: the role of gender in the attitude–behavior relationship. Journal of Applied Social Psychology. **2013**, 43 (1), 64 -70.

[51]. Ahmed, A.; Rehman, U.; Rizwan, M.; Rafiq, M. Q.; Nawaz, M.; Mumtaz, A. Moderating role of perceived risk and innovativeness between online shopping attitude and intention. Journal of Basic and Applied Scientific Research. **2013,** 3(11), 310-323.

[52]. Cai, Y., & Shannon, R. Personal values and mall shopping behavior: The mediating role of attitude and intention among Chinese and Thai consumers. Australasian Marketing Journal (AMJ). **2012**, 20(1), 37-47.

[53]. Andreassen, T. W., & Streukens, S. Online complaining: Understanding the adoption process and the role of individual and situational characteristics. Managing Service Quality. **2013**, 23(1), 4-24.

[54]. Cavallo, D. N., Brown, J. D., Tate, D. F., DeVellis, R. F., Zimmer, C., & Ammerman, A. S. The role of companionship, esteem, and informational support in explaining physical activity among young women in an online social network intervention. Journal of Behavioral Medicine. **2014**, 7(5), 955-966.

[55]. Pierce, B. K. Female genital cutting in Burkina Faso: The theory of reasoned action as a tool to predict intention. **2008**, Available online: https://www.researchgate.net/publication/254672803_Female_Genital_Cutting_in_Burkina_Faso_The_Theory_of_Reasoned_Action_as_a_Tool_to_Predict_Intention(accessed on 18 January 2015).

[56]. Boer, H., & Tshilidzi Mashamba, M. Gender power imbalance and differential psychosocial correlates of intended condom use among male and female adolescents from Venda, South Africa. British Journal of Health Psychology. **2007**, 12(1), 51-63.

[57]. Bosompra, K. Determinants of condom use intentions of university students in Ghana: An application of the theory of reasoned action. Social Science & Medicine. **2001**, 52(7), 1057-1069.

[58]. Armitage, C. J., & Connor, M. Efficacy of the theory of planned behavior: A Meta analytic review. British Journal of Social Psychology. **2001**, 40, 471–499.

[59]. Krueger Jr, N. F., Reilly, M. D., & Carsrud, A. L. Competing models of entrepreneurial intentions. Journal of Business Venturing. **2000**, 15(5), 411-432.

[60]. Shaw, D., Shiu, E., Hassan, L., Bekin, C., & Hogg, G. "Intending to Be Ethical: an Examination of Consumer Choice in Sweatshop Avoidance", in NA - Advances in Consumer Research Volume 34, eds. Gavan Fitzsimons and Vicki Morwitz; Association for Consumer Research.: Duluth, MN, **2007**, 31-38. Available online: http://www.acrwebsite.org/volumes/v34/500240_101176_v2.pdf(accessed on 7 March 2016).

[61]. Keener, M. S., & Grossman, A. H. Attitudinal, social, and practical correlates to fitness behavior: A test of the theory of planned behavior. Perceptual and Motor Skills. **1998**, 87(3f), 1139-1154.

[62]. Thyroff, A. E. Thinking too small? Predicting intentions to consume nanofoods: A pilot study. In Robert Mittelstaedt doctoral symposium (145). **2011**, Available online: http://cbatest40.unl.edu/departments/marketing/about/events/rmds/docs/2011_SymposiumProceedings.pdf#page=163(accessed on 8 December 2014).

[63]. France, J. L., Kowalsky, J. M., France, C. R., McGlone, S. T., Himawan, L. K., Kessler, D. A., & Shaz, B. H. Development of common metrics for donation attitude, subjective norm, perceived behavioral control, and intention for the blood donation context. Transfusion. **2014**, 54(3pt2), 839-847.

[64]. Eng, J. J., & Martin Ginis, K. A. Using the theory of planned behavior to predict leisure time physical activity among people with chronic kidney disease. Rehabilitation Psychology. **2007**, 52(4), 435-442.

[65]. Cooke, R., Dahdah, M., Norman, P., & French, D. P. How well does the theory of planned behaviour predict alcohol consumption? A systematic review and meta-analysis. Health Psychology Review. **2014**, 1-20. doi: 10.1080/17437199.2014.947547.

[66]. De Bruijn, G. J., & Rhodes, R. E. Exploring exercise behavior, intention and habit strength relationships. Scandinavian Journal of Medicine & Science in Sports. **2011**, 21(3), 482-491.

[67]. Schwartz, S. H. Normative influences on altruism. In L. Berkowitz (Ed.), Advances in experimental social psychology; Academic.: San Diego, CA, **1977**,10, 221-279.

[68]. Harland, P., Staats, H., & Wilke, H. A. Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior1. Journal of Applied Social Psychology.**1999**, 29(12), 2505-2528.

[69]. Bamberg, S., Hunecke, M., & Blöbaum, A. Social context, personal norms and the use of public transportation: Two field studies. Journal of Environmental Psychology. **2007**, 27(3), 190-203.

[70]. Bamberg, S., & Schmidt, P. Incentives, morality, or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis. Environment and Behavior. **2003**, 35(2), 264-285.

[71]. Stehr, N. The knowledge society; Sage.: Cambridge, UK, **1994**.

[72]. Hsu, M. H., Ju, T. L., Yen, C. H., & Chang, C. M. Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. International Journal of Human-Computer Studies. **2007**. 65(2), 153-169.

[73]. Brucks, M. The effects of product class knowledge on information search behavior. Journal of Consumer Research. **1985**, 12(6), 1-16.

[74]. Baxter, C. E., & Barata, P. C. The paradox of HPV vaccines: How to reach sexually inexperienced women for protection against a sexually transmitted infection. Women's Health Issues. **2011**, 21(3), 239-245.

[75]. Bock, G. W., & Kim, Y. G. Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. Information Resource Management Journal. **2002**, 15 (2), 14–21.

[76]. Lin, H. F., & Lee, G. G. Effects of socio-technical factors on organizational intention to encourage knowledge sharing. Management Decision. **2006**, 44(1), 74-88.

[77]. Furnham, A., & Goletto-Tankel, M. P. Understanding savings, pensions and life assurance in 16-21-year-olds. Human Relations. **2002**, 55(5), 603-628.

[78]. Pickett-Baker, J., & Ozaki, R. Pro-environmental products: marketing influence on consumer purchase decision. Journal of consumer marketing. **2008**, 25(5), 281-293.

[79]. Tanner, C., & Kast, S. W. Promoting sustainable consumption: Determinants of green purchases by Swiss consumer. Psychology & Marketing, **2003**, 20(10), 883-902.

[80]. Mainieri, T., Barnett, E. G., Valdero, T. R., Unipan, J. B., & Oskamp, S. Green buying: The influence of environmental concern on consumer behavior. The Journal of Social Psychology. **1997**, 137(2), 189-204.

[81]. Carpenter, T., Durtschi, C., & Gaynor, L. M. The role of experience in professional skepticism, knowledge acquisition, and fraud detection. **2002,** Available online:https://www.researchgate.net/profile/Cindy_Durtschi/publication/228755218_The_role_of_experience_in_professional_skepticism_knowledge_acquisition_and_fraud_detection/links/54982f4b0cf2519f5a1dca83.pdf(accessed on 6 May 2015).

[82]. Payne, E. A., & Ramsay, R. J. Fraud risk assessments and auditors' professional skepticism. Managerial Auditing Journal. **2005**, 20(3), 321-330.

[83]. Du, J. & Adams, J. Racial and Cultural Awareness Affecting African American Female Students' Experiences in E-Collaboration. In T. Bastiaens & S. Carliner (Eds.), Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education. **2007**. 6766-6780). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

[84]. Ammenwerth, E., Mansmann, U., Iller, C., & Eichstädter, R. Factors affecting and affected by user acceptance of computer-based nursing documentation: Results of a two-year study. Journal of the American Medical Informatics Association. **2003**, 10(1), 69-84.

[85]. Sönmez, S. F., & Graefe, A. R. Determining future travel behavior from past travel experience and perceptions of risk and safety. Journal of Travel Research. **1998**, 37(2), 171-177.

[86]. Ford, G. T., Smith, D. B., & Swasy, J. L. Consumer skepticism of advertising claims: Testing hypotheses from economics of information. Journal of Consumer Research. **1990**, 16(4), 433-441.

[87]. Albayrak, T., Caber, M., Moutinho, L., & Herstein, R. The influence of skepticism on green purchase behavior. International Journal of Business and Social Science. **2011**, 2(13), 189-197. Available online:http://www.ijbssnet.com/journals/Vol._2_No._13_Special_Issue_July_2011/20.pdf(accessed on 22 May 2015).

[88]. Hurtt, K., Eining, M. M., & Plumlee, D. An experimental examination of professional skepticism. Available at SSRN 1140267. **2008**, Available online: https://www.researchgate.net/profile/Martha_Eining/publication/228307269_An_Experimental_Examination_of_Professional_Skepticism/links/0c960530b47ff97d91000000.pdf(accessed on 20 April 2015).

[89]. Mohr, L. A., Ero□lu, D., & Ellen, P. S. The development and testing of a measure of skepticism toward environmental claims in marketers' communications. Journal of Consumer Affairs. **1998**, 32(1), 30-55.

[90]. Taber, C. S., & Lodge, M. Motivated skepticism in the evaluation of political beliefs. American Journal of Political Science. **2006**, 50(3), 755-769.

[91]. Galdies, C., Said, A., Camilleri, L., & Caruana, M. Climate change trends in Malta and related beliefs, concerns and attitudes toward adaptation among Gozitan farmers. European Journal of Agronomy, **2016**, 74, 18-28.

[92]. Chung, E. J. Examining the Effectiveness of using CSR Communications in Apology Statements after Negative Publicity. **2015.**

[93]. Rahman, I., Park, J., & Chi, C. G. Q. Consequences of "greenwashing" Consumers' reactions to hotels' green initiatives. International Journal of Contemporary Hospitality Management. **2015**, 27(6), 1054-1081.

[94]. Lele, S. M. Sustainable development: a critical review. World Development. **1991**, 19(6), 607-621.

[95]. Watts, H. W. An economic definition of poverty. Institute for Research on Poverty. University of Wisconsin–Madison. **1968**, Madison, Wisconsin, United; Available online: http://www.irp.wisc.edu/publications/dps/pdfs/dp568.pdf. (accessed on 4 August 2015).

[96]. Petersen, C. Maternal health status and early childbearing: A test of the weathering. Applied Demography and Public Health, (3) Applied Demography Series. **2013**,169-188.

[97]. Lee, F. A. Applying the theory of planned behavior to educational goals and intentions: understanding the challenges and views of low income African American adolescents using a mixed methods approach. **2012**, Available online: http://soar.wichita.edu/xmlui/bitstream/handle/10057/5586/d12035_Lee.pdf?sequence=1(accessed on 27 September 2016).

[98]. Widayati, A., Suryawati, S., de Crespigny, C., & Hiller, J. E. Beliefs about the use of nonprescribed antibiotics among people in Yogyakarta city, Indonesia a qualitative study based on the theory of planned behavior. Asia-Pacific Journal of Public Health. **2015**, 27(2), NP402-NP413.

[99]. Fishbein, M., & Middlestadt, S. E. Using behavioral theory to transform consumers and their environments to prevent the spread of sexually transmitted infections. Transformative Consumer Research for Personal and Collective Well-Being; Routledge.: New York, N.Y **2011**, 391-410.

[100]. Dyson, L., Green, J. M., Renfrew, M. J., McMillan, B., & Woolridge, M. Factors influencing the infant feeding decision for socioeconomically deprived pregnant teenagers: The Moral Dimension. Birth. **2010**, 37(2), 141-149.

[101]. Schuman, H., & Johnson, M. P. Attitudes and behavior. Annual Review of Sociology. **1976**, 161-207.

[102]. Protogerou, C., Flisher, A. J., Wild, L. G., & Aarø, L. E. Predictors of condom use in South African university students: a prospective application of the theory of planned behavior. Journal of Applied Social Psychology. **2013**, 43(S1), E23-E36.

[103]. Kiene, S. M., Hopwood, S., Lule, H., & Wanyenze, R. K. An empirical test of the theory of planned behaviour applied to contraceptive use in rural Uganda. Journal of Health Psychology. **2013**, 19(12), 1564-1575.

[104]. Morán, M. D., & Ferguson, M. Sustainability: The dream of international development projects. Sustainable Development and Planning. **2013**, VI, 173, 431-442.

[105]. Onyeiwu, S., & Liu, J. Determinants of income poverty in rural Kenya: An empirical analysis. African Journal of Economic and Sustainable Development. **2013**, 2(1), 53-71.

[106]. Moyo, D. Dead aid: Why aid is not working and how there is a better way for Africa; Macmillan.: York, NY, **2009**.

[107]. Nin Pratt, A., & Fan, S. R&D Investment in national and international agricultural research: An ex ante analysis of productivity and poverty impact. **2009**, Washington, DC: IFPRI. Available online: https://www.researchgate.net/profile/Alejandro_Pratt/publication/265044480_RD_Investment_in_Nati onal_and_International_Agricultural_Research_An_Ex-ante_Analysis_of_Productivity_and_Poverty_Impact/links/54eb299b0cf25ba91c862b9d.pdf(accessed on 23 February 2016).

[108]. Ghana Statistical Service. 2010 population and housing census, district analytical report; Kumasi metropolitan. **2014**, Available online: http://www.statsghana.gov.gh/docfiles/2010_District_Report/Ashanti/KMA.pdf(accessed on 17 August 2014).

[109]. Soper, D.S. A-priori sample size calculator for structural equation models [software]. **2015**, Available online: http://www.danielsoper.com/statcalc3/calc.aspx?id=89(accessed on 14 April 2016).

[110]. Cohen, J. Statistical power analysis for the behavioral sciences: Routledge Academic. Statistical power analysis for the behavioral sciences. Florence, Kentucky: Routledge Academic. **2013.**

[111]. Meyers, L., Gamst, G. & Guarino, A.J. Applied multivariate research design and interpretation (2nd Ed.); Sage.: Newbury Park, CA, **2013**.

[112]. Osei-Fosu, A. K. Development of a Structural Model Based Upon the Theory of Planned Behavior to Assess Ghanaians' Intentions, Attitudes, and Knowledge Regarding Sustainability (Doctoral dissertation, Maharishi University of Management). **2017.**

[113]. von Hippel, P.T. Mean, median, and skew: Correcting a textbook rule. Journal of Statistics Education. **2005**, 13(2). Available online: www.amstat.org/publications/jse/v13n2/vonhippel.html(accessed on 24 March 2016).

[114]. George, D., & Mallery, M. SPSS for windows step by step: A simple guide and reference, 17.0 update (10a ed.); Pearson**.:** Boston, MA, **2010.**

[115]. Byrne, B. M. Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming; Routledge.: New York, NY, **2010.**

[116]. Vassallo, M., & Saba, A. Does money for grocery expenditure sway Italian consumers' motivational values in predicting attitude towards eco-sustainable food products? Contemporary Management Research. **2015**, 11(1), 3-24. doi:10.7903/cmr.13840.

[117]. Rex, J., Lobo, A., & Leckie, C. Evaluating the drivers of sustainable behavioral intentions: An application and extension of the theory of planned behavior. Journal of Nonprofit & Public Sector Marketing, **2015**, 27(3), 263-284.

[118]. Vermeir, I., & Verbeke, W. Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. Ecological Economic. **2008**, 64(3), 542-553.

[119]. Ham, M., Jeger, M., & Frajman Ivković, A. The role of subjective norms in forming the intention to purchase green food. Economic Research-Ekonomska Istraživanja. **2015**, 28(1), 738-748.

[120]. Chen, M. F., & Tung, P. J. Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. International Journal of Hospitality Management. **2014**, 36, 221-230.

[121]. Wang, Y., Wiegerinck, V., Krikke, H., & Zhang, H. Understanding the purchase intention towards remanufactured product in closed-loop supply chains: An empirical study in China. International Journal of Physical Distribution & Logistics Management. **2013**, 43(10), 866-888.

[122]. Corral-Verdugo, V., & Frías-Armenta, M. Personal normative beliefs, antisocial behavior, and residential water conservation. Environment and Behavior. **2006**, 38(3), 406-421.

[123]. Kong, H. M., Ko, E., Chae, H., & Mattila, P. Understanding fashion consumers' attitude and behavioral intention toward sustainable fashion products: Focus on sustainable knowledge sources and knowledge types. Journal of Global Fashion Marketing. **2016**, 7(2), 103-119.

[124]. Eze, U. C., & Ndubisi, N. O. Green buyer behavior: Evidence from Asia consumers. Journal of Asian and African Studies. **2013**, 48(4), 413-426.

[125]. Shariff, A. H. M., Amran, A., & Goh, Y. N. Determinants of behavioural intention on sustainable food consumption among consumers' of low income group: Empirical evidence from Malaysia. Journal of WEI Business and Economics. **2012**, 1(1), 29-38.

[126]. Ramayah, T., & Rahbar, E. Greening the environment through recycling: an empirical study. Management of Environmental Quality: An International Journal. **2013**, 24(6), 782-801.

[127]. Wolsink, M. Wind power implementation: the nature of public attitudes: equity and fairness instead of 'backyard motives'. Renewable and Sustainable Energy Reviews. **2007**, 11(6), 1188-1207.

[128]. Chan, R. Y., & Lau, L. B. Antecedents of green purchases: a survey in China. Journal of Consumer Marketing. **2000**. 17(4), 338-357.

[129]. Bang, H. K., Ellinger, A. E., Hadjimarcou, J., & Traichal, P. A. Consumer concern, knowledge, belief, and attitude toward renewable energy: An application of the reasoned action theory. Psychology & Marketing. **2000**, 17(6), 449-468.

[130]. Connell, K. Y. H. Internal and external barriers to eco-conscious apparel acquisition. International Journal of Consumer Studies. **2010**, 34(3), 279-286.

[131]. Padel, S., & Foster, C. Exploring the gap between attitudes and behaviour: Understanding why consumers buy or do not buy organic food. British Food Journal. **2005**, 107(8), 606-625.

[132]. Keith, T. Z. Multiple regression and beyond; Pearson.:Boston**, MA, 2006**.

[133]. Diamantopoulos, A., & Siguaw, J. A. Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. British Journal of Management. **2006**, 17(4), 263-282.