

Choice Behaviour in Sustainable Property Features Adoption: A Tripartite Perspective

M. O. Komolafe¹ and J. T. Gbadegesin²

Abstract

Stakeholders' attitudes (demand and supply perspectives) on sustainable property features adoption vary, with implication on the sustainable property features market (SPFM). How do market players behave and make choices in the adoption of sustainable property features? This paper examines stakeholders' choice behaviour within six filtered themes, underpinned in the consumer research theoretical perspective including market information (awareness level), relevance/importance, social cost and benefits, economic cost and benefit, environmental cost and benefit and market feasibility. The study drew upon a sequential exploratory mixed method comprising semi-structured interviews and a questionnaire survey within the six thresholds unraveled. After a pilot study, ten key actors in the sustainable properties sectors, limited by saturation point were interviewed which resulted in a conceptual framework that guided the survey. The questionnaire survey respondents included 56 building contractors, 91 property developers/investors and 404 users randomly selected within the Lagos' market. The paper found divergent reactions from both demand (users) and supply (investors & contractors) sides. Investors downplayed the market feasibility, relevance and economic rewards of sustainable features. Sustainable building features are essential to contractors, yet their perceptions of economic worth and market feasibility are challenging. The supply side demonstrates lowered economic worth and market feasibility of sustainable structures. The demand side assessment demonstrates a lack of adequate awareness, relevance, market feasibility and economic benefits. On the supply side, there is a willingness to construct with sustainable features, but on the demand side, there is less enthusiasm. Policy directions and blueprint investment guideline on the SPFM for both local and international prospective investors in the developing market were subsequently recommended.

Keywords

Sustainable property features, Choice behaviour, Stakeholders' impression, Demand side, Supply side

Article History

Received 16 September 2023

Accepted 01 December 2023

Published online December 21, 2023

Contact

M. O. Komolafe
okpeyehme@yahoo.com

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

1. Background

Sustainable building and sustainable property features are embraced in Nigerian urban centres (Oyewole, Komolafe & Gbadegesin, 2023). The paradigm associates with the facts that human-related activities have continually posed a threat to the globe, and the continuation with the conventional activities in the usual way is no longer sustainable. In particular, buildings have contributed substantially to the threat, accounting for up to 40% of world CO₂ emission and substantial energy consumption (United States Green Building Council, 2009). Therefore, the drive towards sustainable or green buildings has become imperative, especially in countries with a high population, a relatively high quota of the

urban population and a high potential for these populations to increase quickly.

Being the seventh most populous country globally, Nigeria has a population of over 200 million and over 50% of this population lives in urban areas. Of more interest is the alarming rate at which the population is growing. The country only had a population of less than 123 million in 2000 (Worldometer, 2020). If Nigeria is left to grow at this pace without adequate control over its building-related activities, it may pose a higher threat to global sustainability very shortly. Lagos, being the largest and most densely populated city in Nigeria, and second largest city in Africa is a potential contributor to this threat.

¹ Department of Estate Management, University of Benin, Benin-City, Nigeria

² Department of Estate Management, Federal University, Oye-Ekiti, Nigeria

Presently, the rate of adoption of sustainable buildings in Nigeria is meagre. As of 2015, only 317,039 gross square meters of its built-up area is registered and certified as being built sustainably, based on the Leadership in Energy and Environmental Design (LEED) criteria (Onuoha *et al.*, 2017). There are no locally adapted sustainable building rating agencies, and a clear-cut framework for implementing sustainable building practices is not visible in the country. Several factors can be traced as being responsible for this, but very significant among these factors is the knowledge gap on sustainable buildings (Komolafe, Oyewole, & Kolawole, 2016). Apart from the unfamiliarity of the stakeholders with this concept, there are several uncertainties attached to its market acceptability. The market is the primary playing ground for sustainable building activities. It is the meeting point for both the demand and supply for sustainable buildings. The stakeholders whose decisions determine sustainable building proliferation in Nigeria interact directly or indirectly with the market. The decisions of these stakeholders guide demand and supply for sustainable building products, and their choice behaviour best explains these decisions in the face of certain peculiarities of the market (Kim, Lim, & Kim, 2017). Therefore, if the issues regarding the choice behaviour of the stakeholders in the market are addressed, sustainable buildings could naturally find their way to the mainstream in Nigeria.

Several issues are, however, still left unaddressed on the Nigerian sustainable property market. It is not clear, what the participants (in both the demand and supply side) understand by sustainable or green buildings, it is doubtful whether the market sees the benefits of sustainable buildings. The perceptions of the market participants on the operating and maintenance cost of sustainable buildings are unclear. It is unknown whether the participants see sustainable buildings as profitable. Some existing studies have attempted to provide answers to these questions but most of these studies focused on one side of the market (either the demand or the supply side). Most of the studies looked into the drivers and barriers of sustainable building adoption only, leaving out other basic themes that are tangential to analysing market penetration for sustainable buildings and features. Detailed analysis on stakeholder basis, featuring both market sides is very pertinent to better understanding of the market. This study begins to address these gaps

by examining the choice behaviour from the demand and supply side of Lagos' property market.

2. Theoretical underpinning and conceptual framework on choice behaviour and the market for sustainable building features in developing property market

In Nigeria, sustainable property markets are yet at the growing stage. Most time, built environment actors and market players operate under uncertainties and mirages of the information, at times, seeking for required knowledge from the developed world. The contractors, investors and property users serve as the sources of information on the demand and supply parlance. In this context, the preceding actors' attitudes and behaviour can be viewed within reasoned action, planned behaviour, technology acceptance and buyer behaviours as described by Vallerand, Deshaies, Cuerrier, & Pelletier (1992); Lin & Huang (2012); Yousafzai, Foxall, & Pallister (2010) and Bagozzi, Wong, Abe, & Bergami (2000). The theories situate within the context of human behaviour, which explains transactional attributes and exchange processes involved in acquisition, consumption, and disposal of goods, services, experiences and ideas (Kalafatis, Pollard, East, & Tsogas, 1999).

How do market players decide and what are their reactions, attitudes and behaviour in the context? In the theory of reasoned action, behavioural intention determines the actual behaviour in the final action. Personal or "attitudinal" factor and a social or "normative" factor influence behavioural intention (Vallerand, Deshaies, Cuerrier, & Pelletier, 1992). Concerning sustainable building acceptance in sub-Saharan Africa, behavioural intention, attitudes, behavioural beliefs, outcome evaluation, subjective norms and normative beliefs are embedded in market players' dispositions. Motivation to comply with guidelines is the critical component of the theory of reasoned action, which is often measured through mathematical modelling (Yousafzai, Foxall, & Pallister, 2010). However, it is argued that the theory of reasoned action is a mere parsimonious approach that provides no broad perspectives of the contextual phenomenon. However, the theory of planned behaviour is another emerging theory that considered incorporating perceived behaviour, however, argued to be too challenging to be operationalised (Davies, Foxall, & Pallister, 2002). Technology acceptance theory is centred on the manifesting attitudes on human behaviour relating to utilisation and

consumption of technology and idea) (Yousafzai, Foxall, & Pallister, 2010). Perceived usefulness and perceived ease of use provide perceived security and privacy for users and emerge from voluntary intention, triggered by attitude (Davis, 1989).

Decision-making marks a step in overturning a dilemma (Bettman, Luce, & Payne, 1998). Decision-making is a critical concept that underpins preference, opinion motivation and quest to search for information, both written and word of mouth, on a particular product (Furse, Punj, & Stewart, 1984). Preference refers to choosing issues, while opinion has to do with problem-solving perception (Brennan, 2001). Motivation is connected with consumers or buyers or users' involvement experience (Zaichkowsky, 1994). Marketer dominated communication channels, consumer dominated channels and neutral sources of information are the main sources of information (Cox, 1967). For instance, ability to solicit data defines the consumers' self-competence to make a decision based on their level of awareness about the product involved in decision-making. Sets of related theories have aspired to underpin the stakeholders (consumers, users, buyers, contractors) behaviour.

Making a choice is also based on self-perception and objectivity, capacity and capabilities. In an institutional setting, the steps originate from perceived institutional characteristics affected by external factors (Chapman, 1986; Chapman, 1981 and Litten, 1982). Timing, cost, fashion buying cycle are critical factors in buyer behaviour concerning a product (Bruce & Daly, 2006). Initial trust, familiarity and intention to purchase, entail perceived usefulness, reputation, security, privacy and willingness to customise (Chen & Barnes, 2007). Concerning the choice of green products utilisation, Lin and Huang (2012) premised on consumer choice behaviour theory to conclude that psychological benefit, desire for knowledge, novelty-seeking and specific conditions mainly influence choices decision, based on functional value, social value, emotional value, conditional value, epistemic value and choice behaviour. This paper examines tripartite reactions to sustainable building features in a developing market.

To analyse the market for sustainable properties, we embarked on a pilot study (series of interview). Additional virtual interview was done by referral on two experienced professionals during COVID-19

panemics. The emphasis and points of concern were centred on awareness, importance, economic value, social value, environment values and market feasibility, as shown in Figure 1.

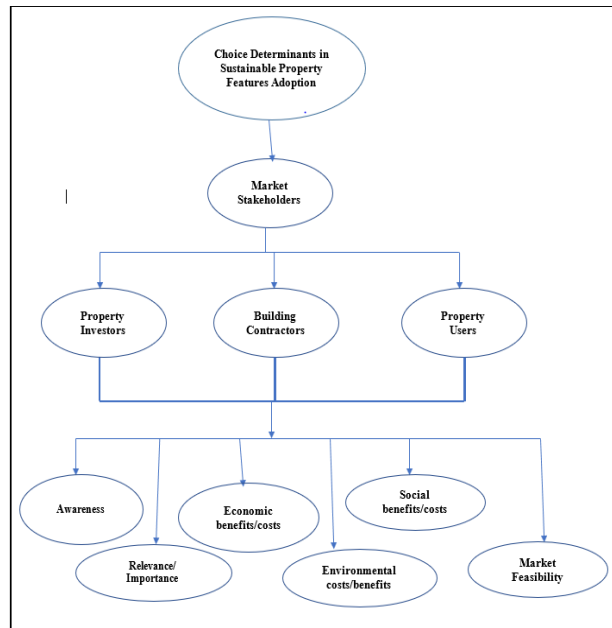


Figure 1: Emerged conceptual framework from the pilot study

Source: Authors' Field Survey

For scientific and analytical illustration to portray a more explicit explanation in the purposive approach, *Atlas*. to generated a visualisation network that connects and explains the respondents' perceptions, as shown in Figure 2.

Implicit in Figure 2 are the six distinct themes which triangulate the outcomes of the pilot study in Figure 1. The key themes are coloured with the connected neighbours, memo, quotations and codes numbers. The central navigating theme is the green products' consumers' opinions which connect the six coloured emphases on values in Lagos, the largest property market in sub-Saharan Africa. These themes include *importance/relevance*, *awareness*, *economic benefits/costs*, *social benefits/costs*, *environmental benefits/costs* and *market feasibility*.

Thematically, the themes are simplified to reflect the list of constructs, emanated from the qualitative interview. It is important to state that the constructs are carefully carved to avoid bias among the three categories of respondents. The use of "perceived" does not translate to usage or non-usage of sustainable building features. It does not reduce the responses to imaginative answers neither.

The researchers chose to use the term “perceived” because individual response is subjective irrespective of their experience. Perceptions could be as a result of experience on the use of or information got on a product. Thematically, the themes are then simplified to reflect the list of constructs, emanated from the qualitative interview. It is important to state that the constructs are carefully carved to avoid bias among the three categories of respondents. The themes and the listed constructs are listed as follows:

▪ **Importance/relevance**

Sustainability assessment is an essential issue in a building project

Construction activities contribute to adverse environmental impact

It is important to include sustainability issues at the conceptual stage of a building project

It is essential to understand the environmental impacts of design decision

It is essential to be conscious that some building methods have negative impacts on the environment

It is essential to consider the full range of impacts of construction details by assessing their entire life cycle

Conventional buildings methods can negatively affect human health

The sustainability performance of buildings is essential in my opinion

Sustainability considerations are much more helpful than only satisfying mandatory requirements

Investing in sustainable residential property is my social responsibility

I see sustainable residential property investment/adoption as more desirable than conventional ones

▪ **Awareness & exposure**

I have a clear understanding of sustainable development practices.

The health benefits of sustainable buildings are clear to me.

I am aware of the impact of decisions and advocacy on sustainable building adoption in Nigeria.

It would be helpful to know more about the social or environmental merits of our activities and investments.

Sustainability is getting more recognition among my colleagues and co-workers.

Lagos citizens take the environmental impacts of the building activities important.

I know that green product will serve a good purpose for our degrading environment.

I am aware of the values derivable from green products.

I think we are getting to know that green products are much more valuable to our communities.

Greening should safeguard environment and cost when the need arises.

Yes, we need to consider the ways things change vis-à-vis economy, environment, social and other related matter.

▪ **Economic benefits/costs**

Sustainable homes are not expensive.

People are willing to pay more for sustainable features.

Occupancy rates are more significant and the probability of lease renewals is higher for more sustainable properties.

The property value of sustainable buildings/features are higher than conventional ones.

There will exist a rent premium for sustainable (green) buildings in Lagos residential real estate market in the future.

Incorporating sustainable features into buildings will reduce construction cost and time.

Incorporating sustainability in buildings could make them more marketable.

Incorporating sustainability could attract better values.

Some of the features and products are affordable and maintainable.

It has to be cheaper, otherwise, there is no need.

The price is cheaper than conventional building components.

▪ **Social benefits/costs**

Sustainable buildings offer more convenient living conditions.

Sustainable buildings are easier to maintain.

Sustainable buildings could foster positive behavioural change towards sustainability in the community at large.

Sustainable buildings are essential to urban development and the social environment.

Buildings that are considered sustainable will be owned for a more extended period by the same owner than a conventional building.

Sustainable buildings could lead to improved health due to lower pollution loads and reduced infrastructure needs.

Sustainable buildings could enhance intergenerational equity and reduce cost for the future generations.

Cultural diversity in property development and collective planning could be achieved through sustainable buildings.

The citizens value the improved image/reputation that could accrue as a result of adopting sustainable buildings.

It is a simple concept of using what we have for ourselves.

I see our values and norms are in this aide.

▪ **Environmental benefits/costs**

The use of environmentally friendly materials and sustainable construction methods will help to preserve natural resources.

Sustainable buildings have substantial benefits on the environment.

Sustainable buildings are easier to operate and environmentally friendly in our society.

Sustainable buildings could reduce noise, land and water pollution and the public nuisance associated with them in Lagos.

People value the protection and enhancement of sensitive landscapes, including scenic, cultural, historical and architectural values offered by sustainable buildings.

Degeneration of environment and reality of degradation upon children health need to be addressed through green products.

Climate change reality is evident, and green features and products will protect lives a great deal.

Our environment stands to be better off with sustainable buildings.

Greenhouse emission (carbon emission) and associated risk are curbed through adoption of sustainable buildings.

Climate change is real. I think we should uphold the concept that safeguards our generation.

The rate at which weather change in term of rainfall and sunshine calls for an alternative natural way forward.

▪ **Market feasibility**

Sustainable building construction has passed infancy stage in Lagos.

Sustainable buildings have a high growth potential in Lagos.

There is a market for sustainable homes in Lagos. People are aware of the benefits of sustainable homes in Lagos.

There is sufficient information available on the added costs of building sustainable homes.

Clients are interested in sustainable buildings.

I can grow my business by adding sustainable homes.

Sustainable building is not just a temporary market trend in Lagos

There is sufficient proof of the benefits of sustainable building in Lagos.

I believe people, especially low-income groups will patronise.

With policy support, great investment potentials are there.

Relevant constructs (66 in number) are subsequently made based on the visual network emanated from qualitative data of the necessary questions that are important to be answered under these themes to provide a detailed choice analysis of the green products (sustainable features) market.

3. Research Method

The selected stakeholders included contractors, property investors and residential property users. In earlier studies such as Cadman (2000) and Komolafe *et al.* (2020), these three stakeholders are identified as being the major players in the demand and supply side of the market. The focus is on the contribution of residential property to the sustainability agenda. The building contractors and the property investors constitute the market's supply side, while the users constitute the demand side. This classification is also supported by earlier studies like Onuoha *et al.* (2017) and Warren-Myers & Heywood (2018). Recourse was made to the federation of the construction industry (FOCI) in Nigeria, which holds a register of certified building contractors in Nigeria to reach the building contractors. The Lagos directory of the institution indicates that there are 56 fully registered building contracting firms in Lagos. The property investors were selected from the real estate developers' Association of Nigeria (REDAN)

which holds a list of property investors. The directory of the association indicates a total of 91 members in Lagos. A total enumeration of the 56 and 91 firms was made on the membership list of FOCI and REDAN, respectively. The managers or heads of the firms were targeted for the study; however, any other staff members provided the relevant information when the heads could not be assessed.

Multistage sampling technique was utilised to access the users. The first stage involves identifying members of REDAN that have a recognisable number of residential properties in their portfolio. Members that deal primarily with site and services scheme were excluded during identification. Only members that still have a stake in the properties they invest in (either as the facility manager or as the landlords) were selected. Twenty members were found to meet these criteria based on pilot study prior to the field survey. The second stage involves enumeration of the number of housing schemes invested in by the 20 identified firms. Ninety-seven housing schemes were identified on the 20 firms, out of which 49 (50%) were randomly selected. In the third stage, the total number of residential housing units in the 49 selected housing schemes was identified. A total of 2,829 housing units were realised, out of which 2019 were occupied. Twenty per cent of the 2019 occupied housing units, amounting to 404 housing units, were selected systematically for the survey. The heads of the housing units were targeted for the study. Where the heads were not available, any other adult occupants found were surveyed. Occupants on short stay/visit were not included.

It was confirmed that the respondents have experience on either sustainable building or sustainable property features. For instance, the pilot study revealed that many of the respondents utilised one or more sustainable features in their house and residential properties they managed. The questionnaire was employed as the instrument of data collection for the study. Thus 56, 91 and 404 questionnaires were distributed to the selected building contracting firms, property investing firms and users, respectively. Only 37, 63 and 284 questionnaires were retrieved from the building contractors, property investors and users. This amounts to retrieval rates of 66.07%, 69.23% and 70.30 from the building contractors, property

investors and users respectively. Information gathered from the respondents bordered on the 66 constructs in the six themes identified in the literature review (see Table 1). The themes include importance/relevance, awareness, economic benefits, social benefits, environmental benefits, and market feasibility. The constructs contain questions that are relevant and applicable to the three categories of stakeholders sampled. Similar questions were thus elicited from the three respondent categories. Earlier studies such as Aghimien *et al.* (2018), Chan and Leung (2019) and Ramboll (2021) also adopted similar approach as this, apart from providing adequate basis for comparative analysis, also affords wider applicability of relevant analytical tools. The data collected were analysed using the mean item score, one-sample t-test and independent-sample t-test. Respondents were asked to rank the concerned variables on a five-point Likert-type scale, with weight 1 representing "don't agree", 2 "slightly agree", 3 "neutral", 4 "agree to a considerable extent" and 5 "agree to a very large extent" to arrive at the mean item score. The weights assigned to each attribute were multiplied by the frequency of response to the attributes. It is, in turn, summed together to get the total weight value (TWV) for each variable. The TWV, when divided by the total frequency of response on each variable, gives the mean item score for the variables:

$$\text{Mean Item Score (MIS)} = \frac{TWV}{\sum_i^5 Fi}$$

Where TWV is the total weight value and F is the total frequency of response.

One sample t-test was also conducted on the mean of responses on the six basic themes adopted for assessment. The suitability of one sample t test for studies of this nature is demonstrated in earlier studies such as Gbadegesin *et al.* (2021) as it enables meaningful inferences to be drawn based on some hypothesised test value. A test value of 3 was adopted. This value represents neutral in the measuring scale. The t-test measured the direction and significance of variation from the neutral scale of 3 at 95% confidence level. It was used to assess market preparedness based on the six identified themes. A p-value of 0.05 and below signifies a significant variation and vice versa.

Independent sample t-tests were also conducted on the two sides of the market (Demand and supply sides). It was used to detect significant gaps in market assessments/preparedness from the supply relative to the demand side. This statistical tool is appropriate when there is need to compare means (Pallant, 2010). Carifio and Perla (2007) and Wigley (2013) also provides sufficient ground for the suitability of t test for nature of data collected, as the categories adopted in the Likert scales are symmetrical in nature. The mean of responses from both sides was compared. The quantum and significance of gaps were detected at a confidence level of 95%. Equality of variances of scores on the two values compared is an underlying assumption for independent sample tests. Using the SPSS package, Levene's test for equality of variances was therefore conducted first to test whether the variance of scores for the two sides (demand and supply) is the same. Equal variances are assumed when the p-value is more than 0.05 and vice versa. The decision rule, therefore, is to adopt the values presented against "equal variances assumed" in the independent t-test result when the p-value realised in the Levene's test is more than 0.05 and adopt values presented against "equal variances not assumed" when the p-value is less than or equal to 0.05 (Pallant, 2010). The t-test for equality of mean is subsequently conducted to present the mean difference (gap) and the level of significance in differences given a confidence level of 95%. A p-value of 0.05 and below indicates a significant difference and vice versa.

On the sample size for interview, it is important to note that qualitative study requires no sampling technique as quantitative. The most important thing to take note of in a qualitative study is the point of saturation in the course of probing (*See* Guest, Bunce & Johnson, 2006). In the course of the interview, the ideas of Saunders *et al.* (2018); Hennink, Kaiser, & Marconi (2017) and Marshall *et al.* (2013) as demonstrated in Gbadegesin *et al.* (2021) and Ogunba *et al.* (2023) were adopted to envisage about 15 interviewees within the respondents. However, at the point of 10 respondents, constant repetitions of the same responses were observed. According to Fusch & Ness (2015) and Hennink, Kaiser, & Marconi (2017), continuation with the interview was no longer scientifically necessary. On this note, the total

interview conducted was 10, which can be confirmed by looking at the visualisation network emanated from the CAQDAS (*Atlas.ti*). In Figure 2, the highest code number is 10.

4. Result and Discussion

The result is sectionalised into two main aspects: assessment of the choice behaviour of the market players for sustainable residential property from the demand and supply side and analysis of the market behaviour based on the assessment of the two sides of the market. Section 4.1 presents the result of the market assessment, while section 4.2 shows the result of the market analysis based on the assessment.

4.1 Assessments of the choice behaviour of market players for sustainable residential property

The choice behaviour of market players was assessed based on the demand and the supply side of the market on the elements contained in the six themes identified in Table 1. One sample t-test was employed as the instrument of data analysis. The responses of the market participants were assessed based on a benchmark of 3, which represents "neutral" in the rating scale. Scores below the test value of 3 were adjudged inadequate, while scores more than 3 were adjudged passable. The degrees of deviation from the test value were also assessed to determine whether they are significant or not.

Table 2 shows the result of the one-sample t-test conducted on the supply and demand side of the market. As presented in the table, the result shows that the mean responses of property investors on perceived importance/relevance are 2.7593, awareness, 3.4063, perceived economic benefits, 2.6720, perceived social benefits, 3.4952, perceived social benefits environmental benefits, 3.8175 and market feasibility, 2.772. The highest mean value was recorded on perceived environmental benefits, followed by social benefits and awareness of sustainable buildings. The mean values on these three themes were significantly higher than the test value (mean differences of 0.8175, 0.4952 and 0.4064 respectively and p values of 0.000 for the three themes). However, the lowest mean values were recorded on market feasibility, perceived importance/relevance and perceived economic benefits in descending order of magnitude (mean differences of -0.2275, -0.2407 and -0.3280 respectively and p values of 0.000 for the three

themes). These values are significantly lower than the test value. The result based on the responses of the property investors shows that they played down on the market feasibility, relevance and economic benefits of sustainable buildings. These are indices

that confer investment value and are primary factors to consider before committing to financing. Given this impression by the property investors about the market, they might not be willing to invest in sustainable buildings.

Table 1: Assessments of the Market for Sustainable Residential Property (T-Test)

Market analysis indices	Test Value = 3																			
	Property Investors					Building contractors					Supply-side					Demand Side (Users)				
	T	Df	Sig. (2-tailed)	Mean	Mean Diff.	T	df	Sig. (2-tailed)	Mean	Mean Diff.	T	df	Sig. (2-tailed)	Mean	Mean Diff.	t	df	Sig. (2-tailed)	Mean	Mean Diff.
Perceived importance/relevance	4.296	62	.000	2.7593	-.2407	4.882	36	.000	3.3559	.3559	-.379	99	.706	2.9800	-.0200	-9.397	283	.000	2.7294	-.2706
Awareness	5.455	62	.000	3.4063	.4064	4.853	36	.000	3.5568	.5568	7.292	99	.000	3.4620	.4620	-2.233	283	.026	2.9184	-.0816
Perceived economic benefits	-8.043	62	.000	2.6720	-.3280	3.830	36	.000	2.7342	-.2658	-8.416	99	.000	2.6950	-.3050	-25.040	283	.000	2.3288	-.6712
Perceived social benefits	6.309	62	.000	3.4952	.4952	6.310	36	.000	3.5459	.5459	8.758	99	.000	3.5140	.5140	5.994	283	.000	3.2248	.2248
Perceived environmental benefits	7.520	62	.000	3.8175	.8175	10.245	36	.000	4.2162	1.2162	11.590	99	.000	3.9650	.9650	9.103	283	.000	3.5704	.5704
Market feasibility	-3.893	62	.000	2.7725	-.2275	4.526	36	.000	2.6877	-.3123	-5.781	99	.000	2.7411	-.2589	-25.495	283	.000	2.3964	-.6036
Overall theme	3.343	62	.001	3.1537	.1537	5.257	36	.000	3.3495	.3495	5.803	99	.000	3.2261	.2261	-6.168	283	.000	2.8617	-.1383

Source: Authors' Field Survey

On the assessments of the building contractors, the result indicates significant positive deviation from the test value for indices related to perceived environmental benefits, awareness, perceived social benefits and perceived importance/relevance (mean difference of 1.2162, 0.5568, 0.5459 and 0.3559, respectively and p values of 0.000 for the four themes). These themes attracted the highest mean values (in descending order of ranking). However, indices related to perceived economic benefits and market feasibility attracted significantly negative deviations about the test value (mean difference of -0.2658 and -0.3123 respectively and p values of 0.000 for the two themes). This result also shows that the contractors' ratings on environmental and social values of sustainable buildings were higher than their ratings on economic values of sustainable buildings. Their assessments on perceived importance, however, slightly differ from that of the property investors. The result shows that the building contractors see sustainable buildings as significant, but the challenge lies in their perceptions of the economic value and market feasibility. A similar result was also found in Khalfan *et al.*'s 2015 Australian study where demand and cost of material/sustainable building practices were

identified as major barriers to sustainable building adoption based on the building contractors' responses. This suggests that ample effort is needed on instigating the demand side and sensitising them on the minimal running expenses and overall life cycle cost gain inherent in sustainable building adoption.

The general assessment on the supply side (combination of the property investors and the building contractors) reveals that three major indices have a negative deviation from the test value: perceived economic benefits, market feasibility and perceived importance. The mean differences are -0.3050, -0.2589 and -0.0200 respectively and p values, 0.000, 0.000 and 0.706 respectively. This result reveals that the major issue on the supply side of the market is their dampened impression on sustainable buildings' economic value and market feasibility. Earlier studies such as Myers *et al.*, (2008) and Zenios and Allen (2016) also corroborate this finding. Myers *et al.* (2008) however, points out a potential for green building adoption in the future as the evidences of its financial case is proven.

The result on the demand side, as presented in Table 2, shows that means on indices relating to perceived environmental benefits and perceived

social benefits were significantly higher than the test value (mean differences of 0.5704 and 0.2248 respectively and p values of 0.000 for the two themes). Indices relating to awareness, perceived importance/relevance, market feasibility and perceived economic benefits negatively deviate significantly from the test value (mean differences of -0.0816, -0.2706, -0.6036 and -0.6712 respectively and p values of 0.000 for the four themes). Relatively, the users' assessments on market feasibility and perceived economic benefits

were lowest. This result reveals that the users' perceptions of sustainable buildings' environmental and social values were positive. However, their impressions on the awareness, importance, market feasibility and economic benefits were below average. Komolafe and Oyewole (2018)'s Lagos study also reveals that most users perceive green building as more of an environment-related method and they play down on other inherent benefits realizable therefrom. This could provide some explanation/basis for this result.

Table 2: Independent Samples T-Test on Assessments of Choice Behaviour

Market analysis Indices		Property Investors – Demand Side Gap						Building Contractors – Demand Side Gap						Supply-side – Demand-side Gap					
		Levene's Test for Equality of Variances		t-test for Equality of Means				Levene's Test for Equality of Variances		t-test for Equality of Means				Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	Sig. (2-tailed)	Mean difference	F	Sig.	T	Df	Sig. (2-tailed)	Mean difference	F	Sig.	T	Df	Sig. (2-tailed)	Mean difference
Perceived importance/ relevance	Equal variances assumed	.768	.381	.449	345	.654	.02988	.037	.848	7.455	319	.000	.62648	5.132	.024	4.338	382	.000	.25062
	Equal variances not assumed			.474	97.588	.636	.02988			7.993	47.967	.000	.62648			4.165	161.573	.000	.25062
Awareness	Equal variances assumed	.053	.817	5.731	345	.000	.48792	2.342	.127	5.839	319	.000	.63833	.591	.442	7.536	382	.000	.54357
	Equal variances not assumed			5.881	94.206	.000	.48792			5.302	43.613	.000	.63833			7.433	169.227	.000	.54357
Perceived economic benefits	Equal variances assumed	7.733	.006	5.710	345	.000	.34317	.530	.467	5.172	319	.000	.40545	6.022	.015	7.318	382	.000	.36621
	Equal variances not assumed			7.031	122.133	.000	.34317			5.450	47.411	.000	.40545			8.124	214.496	.000	.36621
Perceived social benefits	Equal variances assumed	.956	.329	3.081	345	.002	.27047	.476	.491	2.960	319	.003	.32118	.148	.701	4.008	382	.000	.28923
	Equal variances not assumed			3.109	92.468	.002	.27047			3.406	50.566	.001	.32118			4.153	185.508	.000	.28923
Market Analysis Indices		Property Investors – Demand Side Gap						Building Contractors – Demand Side Gap						Supply-side – Demand-side Gap					
		Levene's Test for Equality of Variances		t-test for Equality of Means				Levene's Test for Equality of Variances		t-test for Equality of Means				Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	Sig. (2-tailed)	Mean difference	F	Sig.	T	Df	Sig. (2-tailed)	Mean difference	F	Sig.	T	Df	Sig. (2-tailed)	Mean difference
Perceived environmental benefits	Equal variances assumed	4.732	.030	1.732	345	.084	.24704	9.530	.002	3.609	319	.000	.64579	9.332	.002	3.384	382	.001	.39458
	Equal variances not assumed			1.969	107.457	.052	.24704			4.811	58.282	.000	.64579			3.787	218.406	.000	.39458
Market feasibility	Equal variances assumed	11.957	.001	6.564	345	.000	.37611	.675	.412	4.152	319	.000	.29131	11.601	.001	7.192	382	.000	.34473
	Equal variances not assumed			5.964	83.523	.000	.37611			3.993	44.897	.000	.29131			6.806	157.769	.000	.34473
Overall theme	Equal variances assumed	.243	.623	5.583	345	.000	.29195	.234	.629	7.327	319	.000	.48778	.573	.449	8.227	382	.000	.36441
	Equal variances not assumed			5.709	93.846	.000	.29195			6.952	44.578	.000	.48778			8.106	168.904	.000	.36441

Source: Author's Field Survey

These results show that low level of sensitisation of the users on green/sustainable buildings is still a primary challenge in the study area and improved green building adoption is essentially hinged on increasing users' sensitisation and instigation towards the inherent extra-environmental benefits of green building.

Overall market assessment reveals a significant positive deviation from the test value for the supply side (mean difference of 0.2261 and p-value of 0.000) and a significantly negative deviation for the demand side (mean difference of 0.1383 and p-value of 0.000). Relatively, the result shows that ratings on market evaluation are higher from the supply side than the demand side (mean values of 3.2261 and 2.8617, respectively). On a stakeholder basis, the highest rating was realised on the building contractors (mean score of 3.3495), followed by property investors (mean score of 3.1537 and users (mean score of 2.8617).

Section 4.1 presents a further evaluation of the gaps between the supply and demand sides of the market.

4.2 Analysis of the Market: Supply-Demand Gap

In this section, the supply and demand ends' responses are further analysed to detect the availability and quantum of gaps between supply and demand-side assessments. It could inform the direction and quantum of efforts required for successful market interaction. The mean of responses on the themes evaluated was subjected to an independent sample t-test to determine whether there are significant differences in the mean of responses between stakeholders. The t-tests were carried out to compare means between responses of the property investors and users, building contractors and users, as well as the whole supply-side (cumulative responses from the property investors and the building contractors) and the demand side (users). The results are presented in Table 2. The result as presented in the table shows that between the property investors and the users, a mean difference of 0.02988 was realised on perceived importance, 0.4879 on awareness, 0.34317 on perceived economic benefits, 0.27047 on perceived social benefits, 0.24704 on perceived environmental benefits and 0.37611 on market feasibility. All mean differences were positive, and most of the

differences were significant at a 95% confidence level. The indices on which non-significant differences were realised are perceived importance and perceived environmental benefits. On an overall basis, a significantly positive difference was realised on means between the property investors and the users (mean difference of 0.29195 and p-value of 0.000).

These findings imply that the property investors are more poised to participate in the market than the users, and the users might require some more stimulation to bring about a better market interaction in the study area. The highest margin of a gap was realised on awareness and the lowest on perceived importance/relevance. More awareness is therefore required on the users to match up with the property investors' activities in the market.

Between the building contractors and the demand side, mean differences of 0.62648, 0.63833, 0.40545, 0.32118, 0.64579, and 0.29131 were realised on perceived importance/relevance, awareness, perceived economic benefits, perceived social benefits, perceived environmental benefits and market feasibility, respectively. All mean differences were significant at the 95% confidence level. Overall, a mean difference of 0.48778 and p-value of 0.000 were realised between the building contractors and the demand side. The highest margin of a gap was realised on perceived environmental benefits and the lowest, market feasibility. This result reveals a more expansive building contractor-demand side gap relative to the property investors-demand-side gap. The building contractors are more confident in the market than the other stakeholders (property investors and users). Thus, the implementation gap in the study area is further explained by the market confidence gap, especially between the contractors and the demand side. Therefore, more efforts should be tailored towards the users and the investors whose activities could further boost the confidence of the contractors in the market.

Based on the assessment from the overall supply and demand side, the result of the independent sample t-test on individual themes reveals mean differences of 0.2506, 0.5436, 0.3662, 0.2892, 0.3946 and 0.3447 for perceived importance/ relevance, awareness, perceived economic benefits, perceived social benefits,

perceived environmental benefits and market feasibility respectively. All differences were significant at the 95% confidence level. This result reveals that relatively, the highest market gap is recorded on awareness, followed by perceived environmental benefits, perceived economic benefits, market feasibility, perceived social benefits and perceived importance/relevance. It is, therefore, essential to address the awareness gap between the supply and demand side of the market. Every other aspect of the market may be improved upon if the awareness gap is bridged. Overall score on the supply-demand gap for all themes reveals a mean difference of 0.36441 and p-value of 0.000. It suggests a significant gap in market confidence between the supply and demand side of the market.

5. Conclusion

This study has examined the choice behaviour of stakeholders in the market for sustainable residential property in Lagos, the commercial hub of Nigeria. Based on assessments from the supply and the demand ends, the study has shown that the stakeholders played down on the economic value, market feasibility and importance of sustainable residential property in the study area. Sustainable building is believed to confer more environmental and social values than economic values. On the supply side, ratings on perceived economic benefits and market feasibility were significantly low, while attributes that attracted significantly low rating from the demand side are awareness, perceived importance/ relevance, market

feasibility and perceived economic benefits. Relatively, the highest market choice was realised on the building contractors, followed by the property investors and the property users.

The study also realised a significant gap in the level of desirability between the supply and demand side, with the highest market gap realised between the contractors and the users. Attribute wise, highest gap was realised on the level of awareness, followed by perceived environmental benefits, perceived economic benefits, market feasibility, perceived social benefits and perceived importance/relevance.

From the findings of this study, the need to intensify awareness efforts, especially on the users (demand side), is apparent. This is informed by the highest gap realised on awareness between the supply and demand side of the market. Such awareness efforts should focus more on sustainable buildings' economic and market value since the lowest market preference level is realised on these attributes. Also, the study reveals the need to intensify efforts on building the confidence level of the stakeholders in the supply and demand side on the economic and market benefits of sustainable buildings. The users and the property investors should be prioritised since lowest market confidence was recorded on these stakeholders. Improved market activities of users could stimulate the financiers' (property investors) activities and, in turn, the building contractors' activities. All these could bring about the mainstreaming of sustainable residential property in the property market.

References

- Abdelkader, O.A. (2020). Impact of perception on "willingness and behavior" of individuals toward switching to sustainable energy practices in buildings. *Energy Reports*, 6, 2119–2125.
- Aghimien, D.O.; Awodele, O.A., Oke, A.E. & Aghimien, E.I (2018) Stakeholders' Perception of Sustainability in Educational Buildings in Nigeria. *International Journal of Sustainable Construction Engineering & Technology*, 9(1), 1-13.
- Ahn, Y. H. & Pearce, A. R. (2007). Green construction: contractor experiences, expectations, and perceptions. *Journal of Green Building*, 2(3), 106-122.
- Bagozzi, R. P.; Wong, N.; Abe, S. & Bergami, M. (2000) Cultural and situational contingencies and the theory of reasoned action: Application to fast food restaurant consumption. *Journal of consumer psychology*, 9(2), 97-106.
- Bettman, J. R.; Luce, M. F. & Payne, J. W. (1998). Constructive consumer choice processes. *Journal of consumer research*, 25(3), 187-217.
- Brennan, L. (2001). How prospective students choose universities: a buyer behaviour perspective, PhD thesis, Centre for the Study of Higher Education, The University of Melbourne.
- Bruce, M., & Daly, L. (2006). Buyer behaviour for fast fashion. *Journal of Fashion Marketing and Management*, 10(3), 329 - 344.
- Buys, F. & Hurbissoon, R. (2011). Green buildings: A Mauritian built environment stakeholders' perspective, *Acta Crystallographica B*, 18, 81–101.
- Cadman, D. (2000). The Vicious Circle of Blame, The RICS Research Foundation, London.
- Carifio, J.; Perla, R.J. (2007). Ten common misunderstandings, misconceptions, persistent myths and urban legends about likert scales and likert response formats and their antidotes, *Journal of Social Sciences*, 3(3), 106–116.
- Chan, I. and Leung, M. (2019). Motivational factors and benefits of green building developments. a consultancy report for the pacific association of quantity surveyors. retrieved from <https://www.paqs.net> on 6th Nov., 2021.

- Chapman, D.W. (1981). A model of student college choice. *The Journal of Higher Education*, 52(5), 490-505.
- Chapman, R. G. (1986). Toward a theory of college selection: A model of college search and choice behavior. *ACR North American Advances*.
- Chen, Y. H., & Barnes, S. (2007). Initial trust and online buyer behaviour. *Industrial management & data systems*, 107:1, 21-36.
- Cox, D. F. (1967). Risk handling in consumer behavior: An intensive study of two cases. Risk taking and information handling in consumer behavior, 1067, 34-81. Harvard University Press.
- Dairu, D., Dania, A. A., & Adejoh, A. (2014). An Investigation into the prospects of green building practice in Nigeria. *Journal of Sustainable Development*, 7(6), 158-167.
- Darko, A.; Chan, A. P.; Ameyaw, E. E.; He, B. J. & Olanipekun, A. O. (2017). Examining issues influencing green building technologies adoption: The United States green building experts' perspectives. *Energy and Building*, 144, 320-332.
- Davies, J.; Foxall, G. R. & Pallister, J. (2021). Beyond the intention-behaviour mythology: an integrated model of recycling. *Marketing theory*, 2(1), 29-113.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
- Djokoto, S. D., Dadzie, J. & Ohemeng-Ababio, E. (2014). Barriers to sustainable construction in the Ghanaian construction industry: Consultants perspectives. *Journal of Sustainable Development*, 7(1), 134-143.
- Fusch, P. I. & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The qualitative report*, 20(9), 1408-1416.
- Furse, D. H.; Punj, G. N. & Stewart, D. W. (1984). A typology of individual search strategies among purchasers of new automobiles. *Journal of Consumer Research*, 10(4), 417-431.
- Gbadegesin, J. T.; Ojekalu, S. O.; Gbadegesin, F. T. & Kelani, O. O. (2023). Consumer's welfare in the retail environment: implication for retail property development planning and policy. *International Journal of Construction Management*, 23(9), 1518-1526.
- Gbadegesin, J.T.; Komolafe, M.O.; Gbadegesin, T.F. & Omotoso, K.O. (2021). Off-campus student housing satisfaction indicators and the drivers: From student perspectives to policy re-awakening in governance. *Journal of Human Behavior in the Social Environment*, 31(7), 889-915.
- Guest, G.; Bunce, A. & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field methods*, 18(1), 59-82.
- Grover, P. (2015). Analysing market feasibility of residential green buildings in Tier-II Cities in India. *IOSR Journal of Business and Management*, 17(3), 62-69.
- Hennink, M. M.; Kaiser, B. N. & Marconi, V. C. (2017). Code saturation versus meaning saturation: how many interviews are enough? *Qualitative health research*, 27(4), 591-608.
- Kalafatis, S. P.; Pollard, M.; East, R. & Tsogas, M. H. (1999). Green marketing and Ajzen's theory of planned behaviour: a cross-market examination. *Journal of consumer marketing*.
- Keke, O. V. & Oladejo, E. I. (2017). Facility Performance and the Need for Building Sustainability in Nigeria: A Review. *Environmental Review*, 6(1).
- Khalfan, M.; Noor, A.; Maqsood, T.; Alshambri, N. & Sagoo, A. (2015). Perceptions towards Sustainable Construction amongst Construction Contractors in State of Victoria, Australia. *Journal of Economics, Business and Management*, 3(10), 940-947.
- Kim, S.; Lim, B. T. & Kim, J. (2017). Tenants' decision to or not to lease green & non-green buildings: A conceptual framework. *International High-Performance Built Environment Conference— A Sustainable Built Environment Conference 2016 Series (SBE16)*, iHBE 2016.
- Komolafe, M.O. & Oyewole, M. O. (2018). Awareness and perception of office property users on green building in Lagos, Nigeria. *International Journal of Built Environment and Sustainability*, 2018, 5(3), 208-213.
- Komolafe, M.O.; Oyewole, M. O. & Gbadegesin, J. T. (2020). Stakeholders' relevance in sustainable residential property development. *Smart and Sustainable Built Environment*, 9(2), 112-129.
- Komolafe, M.O.; Oyewole, M. O. & Kolawole, J. T. (2016). Extent of incorporation of green features in office properties in Lagos, Nigeria. *Smart and Sustainable Built Environment*, 5(3), 232 – 260.
- Lin, P. C. & Huang, Y. H. (2012). The influence factors on choice behaviour regarding green products based on the theory of consumption values. *Journal of Cleaner Production*, 22(1), 11-18.
- Lin, P. C. & Huang, Y. H. (2021). The influence factors on choice behavior regarding green products based on the theory of consumption values. *Journal of Cleaner Production*, 22(1), 11-18.
- Litten, L. H. (1982). Different strokes in the applicant pool: Some refinements in a model of student college choice. *The Journal of Higher Education*, 53:4, 383-402.
- Myeda, N.; Kamaruzzaman, S. N.; Zaid, S. M. & Fong, Y. P. (2016). Sustainable housing: demographic analysis of customers' demand in Klang Valley. *Journal of Building Performance*, 7:1, 116-124.
- Marshall, B.; Cardon, P.; Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research? A review of qualitative interviews in IS research. *Journal of computer information systems*, 54(1), 11-22.
- Myers, G.; Reed, R. G. & Robinson, J. (2008). Sustainable property – the future of the New Zealand Market. *Pacific Rim Property Research Journal*, 14(3), 298-321.
- Ogunba, O. A.; Dabara, D. I. & Gbadegesin, J. T. (2023). Sustainable real estate management practice: Exploring the priority of operational stage for actualising sustainable built environment goal in sub-Saharan Africa. *International Journal of Construction Management*, 23(10) 1746-1755.
- Olaleye, A.; Ayodele, T. O. & Komolafe, M. O. (2015). The Relevance of green building practice in emerging markets: A perceptual analysis of commercial and industrial building users in Ibadan, Nigeria. *Journal of Sustainable Real Estate*, 7:1, 41-59.
- Onuoha, I. J.; Aliagha, G. U.; Abdul Rahman, M. S.; Kalu, I. U.; Onyike, J. A. & Okeahialam, S. A. (2017). Green and sustainable commercial property demand in Malaysia and Nigeria. *Journal of Energy Technologies and Policy*, 2017, 7: 9. 20 – 32.
- Onuoha, I. J.; Aliagha, G. U.; Abdul Rahman, M. S.; Kalu, I. U.; Onyike, J. A. & Okeahialam, S. A. (2017). Green and sustainable commercial property demand in Malaysia and Nigeria. *Journal of Energy Technologies and Policy*, 7(9) 20 – 32.
- Otegbulu, A.C. (2011). Economics of green design and environmental sustainability. *Journal of Sustainable Development*, 4(2), 240-248.
- Otegbulu, A.C.; Akujuru, V.C.; Oladejo, E. & Oyewunmi, G. (2015). Client driven demand for Sustainable Features in Office Buildings in Lagos, Nigeria. *Journal of Sustainable Development in Africa*, 17(7), 29-50.
- Oyewole, M. O.; Komolafe, M. O. & Gbadegesin, J. T. (2023). Understanding stakeholders' opinion and willingness on the adoption of sustainable residential property features in a developing property market. *International Journal of Construction Management*, 23(2), 358-370.
- Oyewole, M. & Komolafe, M. O. (2018). Tenants' willingness to pay for green features in office properties, Nigerian. *Journal of Environmental Science and Technology*, 2(2), 233-242.

- Pallant, J. (2010). *SPSS survival manual: a step-by-step guide to data analysis using SPSS*. Maidenhead: Open University Press/McGrawHill.
- Ramboll (2021). Sustainable buildings market study. *The green market study*. Retrieved from <https://ramboll.com> on 6th Nov. 2021
- Rodríguez-Torrico, P.; Cabezudo, R. J. & San-Martín, S. (2017). Tell me what they are like and I will tell you where they buy. An analysis of omnichannel consumer behavior. *Computers in Human Behavior*, 68, 465-471.
- Saunders, B.; Sim, J.; Kingstone, T.; Baker, S.; Waterfield, J.; Bartlam, B. ... & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualisation and operationalisation. *Quality & quantity*, 52:4, 1893-1907.
- United States Green Building Council (2009). LEED for new construction and major renovations. U.S. Green Building Council. Washington, DC. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID 5546>.
- Vallerand, R. J.; Deshaies, P.; Cuerrier, J. P. & Pelletier, L. G. (1992). Ajzen and Fishbein's theory of reasoned action as applied to moral behavior: A confirmatory analysis. *Journal of personality and social psychology*, 62:1, 98.
- Warren-Myers, G. & Heywood, C. A. (2018). new demand-supply model to enable sustainability in New Australian Housing. *Sustainability*. 10, 376-393.
- Wigley, C.J. (2013). Dispelling three myths about Likert Scales in communication trait research. *Communication Research Reports*. 30(4), 366-372.
- Worldometer (2020). Population of Nigeria: 2020 and Historical. Retrieved from <https://www.worldometers.info/world-population/nigeria-population/> accessed on 5th October 2020.
- Yin, B.; Laing, R.; Leon, M. & Mabon, L. (2018). An evaluation of sustainable construction perceptions and practices in Singapore, *Sustainable cities and society*, 39, 613-620.
- Yousafzai, S. Y.; Foxall, G. R. & Pallister, J. G. (2010). Explaining internet banking behavior: theory of reasoned action, theory of planned behavior, or technology acceptance model? *Journal of applied social psychology*, 40(5), 1172-1202.
- Zaichkowsky, J. L. (1994). The personal involvement inventory: Reduction, revision, and application to advertising. *Journal of advertising*, 23(4), 59-70.
- Zainordin, N. & Noor, S. N. (2017). Green Building Concept Implementation for Residential Project: An Insight Among Construction Players in Sarawak. Paper presented at the international conference on Advances in Business Management & Information Technology.
- Zenios, M. & Allen, C. J. (2016). The perceived barriers to the construction of green buildings in Nelson Mandela Bay, South Africa. The 9th cidb Postgraduate Conference, Cape Town, South Africa, Retrieved from <https://openbooks.uct.ac>.
- Zinkhan, G. M. & Braunsberger, K. (2004). The complexity of consumers' cognitive structures and its relevance to consumer behavior. *Journal of Business Research*. 57(6), 575-582.