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Factors which influence consumer behaviour and purchase intention towards green buildings: A literature review.

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#### 1 - Introduction

Sustainability is a concept that has been discussed amongst academia and practitioners all over the world and inside many industries, services and commerce. For the construction sector, new ways of building are being thought and implemented. Sustainable construction includes the concept of healthy built environment that uses resources in an efficient manner. KIBERT (2009) described that the principles of sustainable construction apply to the entire life cycle of construction, from planning, to maintenance, to disposal. In the context of sustainable construction, we have the notion of what green buildings are.

Green buildings were first mentioned during the first United Nations Conference on Environment and Development in Rio de Janeiro in 1992. KIBERT (2009) has described green buildings as "... healthy facilities designed and built in a resource-efficient manner, using ecologically based principles" (page 9). According to ZHAO et al (2015) the idea of green building can be considered as a major reform in the history of the building industry. To support industry to implement the concept of green buildings, governments all over the world have developed their legislation and certification for this type of construction. Amongst them there are the Leadership in Energy and Environment Design, (LEED USA), BRE Environmental Method (BREEAM UK), Green Building Council of Australia Green Star (GBCA, Australia), Green Mark Scheme (Singapore) and Green Building Index (Malaysia).

In academia, green buildings have become object of studies and many aspects of their characteristics have been discussed. ZUO and ZHAO (2014) in their review, have identified three important areas where studies on green buildings can be categorized. These three areas are dedicated to answer three questions: What?: includes coverage and definition of green buildings, Why?: includes quantification of benefits and costs of green buildings and finally How?: which includes measures and practices to achieve green buildings. When coverage and definition is concerned, many studies have been developed regarding certification, technical and environmental aspects, such as gas emissions, water and energy efficiency, wellbeing and comfort of users, productivity, accessibility. To answer the question "Why green buildings?" ZUO and ZHAO (2014) found studies that focused on benefits of green buildings for environment, for economy and for human aspects such as: thermal comfort, indoor environmental quality and health and productivity. As to question "how to achieve green building?" we find four major topics: use of technology, life cycle assessment, companies' management views on green buildings and cultural/behavioural aspects. Exploring further the latter subject ZUO and ZHAO (2014), pointed out that the view of final users are very significant for green building developments, however, at the same time, is something that has been less discussed and understood.

Studies that focus on the final consumer views of green buildings are very few despite its importance. According to ZHAO et al (2015), the research and development of green buildings are in its infancy and many green buildings are just pilot projects. As we perceive green buildings as the final green product of construction industry and understand how this product

appeals to the eyes of consumers we can start to unveil the aspects of the impact of this product in the market.

The mechanisms that can motivate consumers to select, buy and dispose products are studied by BLACKWELL et al (2005) in their classic Consumer Decision Process Model. What motivates an individual to buy? How consumers make decisions to buy? Which factors can influence one's decision to buy? How these questions can be answered when the product in question is a commercial or residential property? DALY et al (2003) describes this type of purchase as the most important financial decision of an individual's life and can be considered "high involvement goods" because require complex decision making.

As the end consumer starts to understand the advantages of living in a eco-friendly home, the development of this market starts to become more visible and tangible. ZUO and ZHAO (2014), mention that such attitude and behaviour can play a critical role in promoting green buildings. For this reason, the purpose of this research is to investigate and identify what are the factors which can influence consumer behaviour and purchase intention towards green buildings through a systematic review of the literature, establish the relationship between these factors and the Consumer Decision Process Model from Blackwell et al (2005) and determine the direction of influence (positive or negative) that each factor can apply towards purchase intention and consumer behaviour.

This paper is divided into five sections, including this introduction. The second section is a literature review of the theory that permeates the subject. The third section presents the method used for the systematic review of literature. The fourth section introduces the results obtained and offers some discussion about the findings. Fifth section finalizes this paper offering some future studies and final considerations.

#### 2 - Literature Review

In order to understand how consumers are influenced to purchase green buildings it is necessary first, to have the knowlegde of how the concept of green buildings has developed. It is also important to consider how consumer behaviour theories can be applied to green products and more specifically, green buildings.

## 2.1 Sustainability and Green Buildings

Green buildings and the majority of green products, green practices and green services have their origin based on the sustainability concept. This concept was first proposed in the Brundtland Report in 1987. In general, sustainability means usage of natural resources in such an equilibrium condition that they do not reach decay, depletion and unrenewable point and handing down the next generations by developing them (YLMAZ; BAKIS, 2015). Sustainable development, according to the Brundtland Report is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. With this respect, three major aspects have to be accounted for: economic growth, environmental protection and welfare of human beings.

KIBERT (2008) considered sustainable construction immersed in the sustainable development principles. The construction sector is known for being a big consumer of resources consumption and besides that, the impact of a building can be felt during and many years after construction. Green buildings are the construction industry attempt to reduce these impacts in the environment. According to ROBICHAUD and ANANTATMULA (2010), green buildings aim to minimize their impact on the environment by including life cycle considerations during project planning and development, while enhancing the health of occupants and return on investment to investors and communities. ROBICHAUD and ANANTATMULA (2010) also claimed green buildings have four main pillars: minimization of impacts on the environment, enhancing the health conditions of occupants, the return on investment to developers and local community, life cycle consideration during the planning and development process.

#### 2.2 Consumer Decision Process Model

On one hand, industries and practices are trying to implement the sustainability concept, developing new green products along with new ways of producing, taking less from the environment; on the other, consumers are aware of this new market and can also choose to make more sustainable choices. On this note, there is a new concept gaining force: green consumerism. Green consumerism can be explained by how individuals perceive, accept and purchase new green products that have become available to them. Green consumerism can also be defined as the environmentally conscious consumption performed by individuals (JOSHI; RAHMAN, 2015). SACHDEVA et al (2015) also pointed out that green consumerism is an accessible way to engage in pro-environmental, sustainable behaviour.

BLACKWELL et al (2005) define consumer behaviour as individual's activities when they select, purchase, consume and discard products, services or experiences to satisfy necessities and desires. BLACKWELL et al (2005) presents the Consumer Decision Process Model which can be divided in seven stages: problem recognition, search for information, evaluation of alternative, purchase, consumption, post-consumption evaluation and discard. The model is shown in Figure 1.

The Consumer Decision Model is a consumer's mind map that marketing professionals and managers can use as a guide to compose their products, communication strategies and sales. Problem recognition is the first step of this process and the individual here feels that there is a difference between what he/she recognizes as ideal versus the real situation, causing him/her to start searching for information (second stage). This can be an internal process, through memory or external, collecting information from the market, friends and family. Once the alternatives have been identified, the third stage starts: evaluation of alternatives. The consumers then make use of their evaluation criteria's regarding products brands and specifications. The fourth stage is the actual purchase. After acquiring the product, the consumer is going to actually make use of the product, this is consumption stage. During the post-consumption stage consumers are going to decide how satisfied or not they are with the acquisition. The final stage is the discard of the product.

Stimuli

Environmental Influences

Culture
Social class
Personal Influences
Family
Shuation

Pre-purchase
atternative
evaluation

Acceptance

Consumption

Post-purchase
atternative
evaluation

External
search

Dissatisfaction

Newstment

Dissatisfaction

Divestment

Environmental Influences
Culture
Social class
Personal
Influences
Consumer
Influences
Influe

Fig.1 - Consumer Decision Process Model

From: Blackwell, Miniard and Engel (2005)

The Consumer Decision Process Model is also influenced by a set of factors. These factors are categorized in two groups: environmental influences and individual differences. Environmental Influences are: culture, social class, personal influences, family and situation. Individual differences are: consumer resources, motivation and involvement, knowledge, attitudes and personality, values and lifestyle. Culture refers to individual's values, ideas and symbols that support communication, interpretation and evaluation as members of society. Social Class is related to socioeconomics differences that lead to different types of consumer behaviour. Family is seen as the primary decision unit, therefore very important for any individual decision. Personal influences are related to the social pressures consumers are under to comply to other peoples 'expectation and situation refers to the circumstances individuals are exposed, for example, losing a job or getting a promotion, these are definitely going to influence consumer's behaviour.

Regarding individual differences that can influence consumer's behaviour, consumer resources is related to the three resources every consumer holds: time, money and information reception and processing capability (attention). Motivation and involvement is related to the motives that trigger individuals to perform a certain behaviour. Knowledge here is defined as the information stored in memory; attitudes are a general evaluation about alternatives and finally personality, values and lifestyle are all related to the individual's peculiarities that can influence market behaviour.

Some studies regarding consumer preferences related to green buildings have been performed in academia showing interesting results. TAN (2013), used a survey to examine the determinants of intention to inhabit eco-friendly homes in Malaysia. CHAU et al, (2010) examined the attitudes of a green residential community in Hong Kong and discovered that they

were willing to pay more for water efficiency, indoor air quality and noise control, than for other attributes of green buildings.

# 3 – Methodology

The purpose of this systematic literature review is to identify factors that can influence consumer behaviour and purchase intention towards green buildings. According to DENYER and TRANFIELD (2009), a systematic review is a specific methodology that locates existing studies, selects and evaluates contributions, analyses and synthetizes data and reports the evidence in a clear way.

For this research the systematic review method used was as per CONFORTO, AMARAL e SILVA (2011). This method is composed of three steps. The first step is called Input and the research protocol including selection of databases, research objective, research description and articles selection criteria are defined. The searches were made in tittles, abstracts and keywords. The protocol summary assumed for this research is shown in Table 1. For this study four databases were selected: Scopus, Science Direct, Proquest and EBSCO. These databases were chosen to ensure as much coverage as possible of the subjects and also to ensure inclusion of high quality articles.

Table 1 – Research Protocol

Research Title	Consumer Behaviour towards Green Buildings
Objective	Identify the state of the art literature about factors that can influence consumer behaviour and purchase intention towards green buildings.
Description	State of the art literature regarding consumer behaviour and purchase intention factors towards Green Building
Main Question	What are the factors which influence consumer behaviour and purchase intention towards green buildings?
Key words	purchase intention OR consumer behaviour OR consumer perception OR consumer attitude AND green building OR Eco-friendly homes
Languages	English
Databases	Scopus, Science Direct, Proquest and EBSCO (Academic Premier)
Inclusion criteria	The research addresses factors which can influence consumer behaviour towards green buildings
<b>Publication dates</b>	Up until August 2016
Types of studies	Empirical and Revisions
Search period	From July 2016 to August 2016

Sources: The Authors

The second step is called Processing, which concerns the actual search. The searches were made using a combination of words related to consumer behaviour and perception aspects applied to the object (green building or eco-friendly homes), using the string AND: "consumer behaviour", "purchase intention", "consumer perception", "consumer attitude". In total there were four combinations used in all four databases chosen.

The systematic review model adopted presumes that three filters are applied during the systematic search. The first filter involves the selection of all articles found in all databases for all combination of words. For this study filter one resulted in 130 articles including 42 duplicated, totalling 88 articles. For the second filter, articles abstracts and conclusions were read identifying the relevance of them towards the search objective. For the second filter 18 articles were selected. For the third and final filter, articles were read and analysed in their full content and are presented here as the research results. For the four selected articles in filter three, we present descriptive and content information findings in the results section for three articles, as one study had to be excluded due to lack of access to articles full content. Information such as: publication year, journal, country of authors, research method (surveys, reviews, etc..) are also presented in the results section.

#### 4 – Results and Discussion

It is clear that not many studies related to factors that can influence green buildings purchase intention and consumer behaviour have been developed in recent years. Three articles were selected and analysed here, two from Malaysia and one from China. The timeframe of selected articles range from 2013 to 2015. Journals that published these selected articles are: Renewable and Sustainable Energy Review, IOP Conference Series: Earth and Environmental Science and Journal of Green Building. Regarding the methodology there are two survey researches and one exploratory qualitative research. Table 2 summarizes the findings and display the degree of novelty of this theme.

Table 2 – Articles Selected

Article	Authors	Year	Journal	Research Method
Determinants of intention to inhabit eco-friendly homes in Malaysia	Teck Hong Tan	2013	IOP Conference Series: Earth and environmental Science	Survey
Theorethical Explanations of Environment Motivations and Expectations of Clients on Green Building Demand	Joachim, O. et al	2015	Journal of Green Buildings	Exploratory
Social problems of green buildings: From the humanistic needs to social acceptance	Zhao, D et al	2015	Renewable and Sustainable Energy Reviews	Survey

Source: The Authors

Regarding the selected articles content, nine factors that can influence consumers 'purchase intention and behaviour were identified, as follows: environmental attitude, purchase intention, physical attributes, social references, perceived behavioural control, perceived individual identity, motivation values, price and demographics. Physical attributes, purchase intention and social references were mentioned in all selected articles, followed by price, demographics and environmental attitude. The less mentioned factors were perceived

individual identity and motivation values having one citation each. Table 3 illustrates these findings.

Table 3 – Factors influencing consumer behaviour and purchase intention towards green buildings

	Articles Selected				
Factors	Teck Hong Tan (2013)	Joachim, O. et al (2015)	Zhao, D et al (2015)		
Purchase Intention	X	X	X		
Environmental Attitude	X	X			
Perceived Behavioural Control	X	X			
Perceived Individual Identity	X				
Motivation Values		X			
Physical Attributes	X	X	X		
Social References	X	X	Х		
Price	37.3111	X	Х		
Demographics	X		X		

Source: The authors

Having identified the factors that can influence consumer behaviour and purchase intention, we continue relating these factors to BLACKWELL et al (2005) Consumer Decision Process Model, defining each factor and displaying the direction of influence, in other words, if the factors in its context can influence consumers in a positive or negative way. For this, the selected factors were divided in two groups: environmental influences and individual differences. This categorization helps understanding the essence of each group factor and is based on the BLACKWELL et al (2005) model.

## **4.1 - Group 1 – Individual Differences**

Group 1 comprehends aspects related to individual's particularities. Every individual is unique and what is suitable for one person may not be sufficient for someone else. Therefore, it is very important to understand which target group to aim for when developing a business strategy. Individual differences are: purchase intention, environmental attitude, perceived behavioural control, perceived individual identity, motivation values and demographics.

Purchase intention is cited in all articles. ZHAO et al (2015) commented that intention to purchase green buildings is directly linked to economic efficiency performance of the building during its life cycle. JOACHIM et al (2015) mentioned that purchase intention is connected to desire to protect the eco-system environment. TAN (2012) referenced Ajzen and Fishbein (1980) saying that behavioural intentions are the immediate precursors to behaviour which could lead to a particular outcome and therefore, can be seen as a predictor of behaviour. According to BLACKWELL et al (2005) intentions are subjective judgments about how a given behaviour is going to happen in the future. If an individual intends to buy a certain product, it is more likely that the purchase happen at some point compared to someone who does not have

any intention to buy the same product. Therefore, purchase intention can lead to purchase behaviour, and this factor can positively influence the behaviour (TAN, 2013)

Environmental attitude is mentioned in two out of three articles. According to TAN (2013) attitudes are a function of salient beliefs about the likelihood of performing a particular behaviour. Where it comes to green products, it is sound to assume that an environmental attitude has a positive influence towards sustainable products. SQUIRES et al (2001) mentioned that individuals who hold environmental attitudes tend to purchase more green products. Therefore, according to the cited authors, this factor can have a positive impact in consumer behaviour and purchase intention.

Perceived behavioural control is mentioned in two out of three articles. Perceived behavioural control is the perceived control over an individual's action. It is the capacity of someone to perform a given behaviour (AJZEN, 1991), it is also the perception that the individual has regarding the ease or difficulty to perform a given behaviour. TAN (2012) concluded that the relationship between perceived behaviour control and purchase intention is that if the individual is not completely determined by one's will, then this person will need some other resources and opportunities to perform this behaviour. Perceived individual identity is mentioned in one article. Perceived individual identity is related to the person's self-concept towards executing a given behaviour. Individuals acquire products that are compatible with their self-identity TAN (2013). When it comes to green products this factor is related to how individuals consider themselves as environmentally conscious. Environmental attitude, perceived behavioural control and perceived individual identity can be considered as types of "attitude". Attitudes are the determinants factors of all intentions (TAN, 2012). According to BLACKWELL et al (2005) attitudes represent what we do and don't like. If an individual has a positive attitude towards a product or service, then this is going to influence his/her intention to purchase in a positive way.

Motivation values mentioned by one study. JOACHIM et al (2015) explains that there is a list of motivation values that can influence consumers to purchase and demand for green buildings: quest for conservation of natural resources and for energy efficiency, water and air quality, reduction in maintenance costs and reduction of site impact. All these motivations can lead to environmental behaviour and attitude as values are linked to how individuals behave and respond to their environment. It is particular to each individual. Motivation values are linked to the consumer's necessity to satisfy their needs purchasing a product. BLACKWELL et al (2005) defines motivation as the intention to satisfy psychological and physiological necessities through buying and consuming a product. It is fair to hypothesize that motivation values have a positive impact on consumer's purchase intention (BLACKWELL et al 2005).

Demographics focus on how population in the world is changing due to birth rates, immigration, death rates and economic resources (BLACKWELL et al 2005). When analysing consumer behaviour, it is important to understand the market on a global basis. In the articles selected, the variables analysed in this criteria are: education, gender and marital status. People who are highly educated, male and married are more likely to purchase a property. CRABB (2002) also indicated that individuals between ages of 35 to 45 are more likely to have higher housing consumption (TAN, 2013). BLACKWELL et al (2005) also suggest that it is very important to

understand consumer's personality, values and lifestyle along with demographics in order to have a better understanding of the market.

# **4.2** – Group 2 – Environmental Influences

Group 2 is formed by factors relating to environmental and external influences. Social references, price and physical attributes can be included in this group.

Social References are cited in all three articles. It includes influences from family, spouses and close friends. BLACKWELL et al (2005) indicates that family references are important for two reasons: many products are bought by a family unit and individual purchases are very much influence by members of family. TAN (2012) explained that family and friend's approval can enhance individual's intention and lead to the actual purchase behaviour. JOACHIM et al (2015) mentioned that having a green lifestyle has become a social desire, this therefore can exert influence in individuals intention and behaviour. JOSHI et al, (2015) confirm that social references can have a positive influence in green purchase intention. It is proper to say that for green buildings; social reference can have a positive influence on purchase intention.

Price is analysed in one article and shows very interesting results. According to ZHAO et al (2015) green buildings are more expensive and challenging to investors and consumers. However, in their research, 90% of the selected sample used for their survey said that would pay more for green buildings over a standard building, although 35% were not sure about how much more exactly they would pay. Price has always been a sensitive factor. It can influence a consumer's decision in positive and negative ways. For example, low price sensitivity of consumers is found to positively affect consumer behaviour, however high price sensitivity has the opposite effect (JOSHI et al, 2015). Regarding green buildings, it is acknowledged by the market that they are about 10% higher in price than traditional buildings. On the other hand, costs with maintenance are supposedly lower. For this reason, it is proper to conclude that price can influence green building consumers in a positive or negative way.

Physical attributes or physical characteristics is also mentioned in all selected articles, demonstrating how this factor plays a critical role in consumer's decision. JOSHI et al, (2015) concluded that physical attributes combined with perceived quality can influence consumer's decision in a positive way. Properties characteristics/attributes are: size of house/apartment, natural lighting, peacefulness, parking options, house/ apartment infrastructure. According to TAN (2008) housing characteristics can be important to explain the motivations for home owning. ZHAO et al (2015) also mentioned that architectural styles, public facilities, cultural heritage and green living space are important and desired aspects to green buildings consumers. When it comes to green buildings and its particular characteristics (thermal comfort, water and energy efficiency, natural lighting etc..) these attributes can have a positive impact on consumer's intention to buy.

Table 4 summarizes the framework of factors that influence purchase intention and consumer behaviour towards green buildings along with the type of influence (positive or negative).

Table 4 - Influence of factors towards purchase intention and consumer behaviour for green Buildings

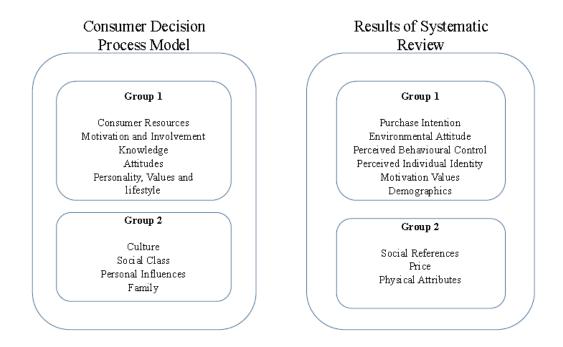
8	Factors	Direction
Craus 1	Purchase Intention	(+)
	Environmental Attitude	(+)
	Perceived Behavioural Control	(+)
Group 1	Perceived Individual Identity	(+)
	Motivation Values	(+)
	Demographics	(+)
Group 2	Social References	(+)
	Price	(+)/(-)
	Physical Attributes	(+)

Source: The Authors

## 4.3 – Discussion

In this section, a comparison between the factors that have been found in literature to determine consumer behaviour and purchase intention towards green buildings is made with factors from the traditional Consumer Decision Process Model from BLACKWELL et al (2005). Figure 2 displays factors that influence consumer behaviour according to BLACKWELL et al (2005) and the findings realized in this research.

Fig. 2 – Comparison Consumer Decision Process Model versus Findings of this research



Source: The Authors

With respect to Group 1, Individual Differences, the factor "attitudes" are well represented in the green buildings research by environmental attitude, perceived behavioural control and perceived individual identity. Also, motivation values are mentioned in both, the classical theory and the empirical researches. Demographics is not explicitly mentioned in the Consumer Decision Process Model, however it is described when the authors explain how important it is to understand the target market and its peculiarities, such as age groups, marital status, level of income, level of education amongst others. Purchase intention, according to BLACKWELL et al (2005) is the primary indicator that a given behaviour might happen in the future. Therefore, it is the first step towards the process of consummation and the reason why it is addressed in all empirical studies found in this research.

Regarding Group 2, Environmental Influences, Social References is the only factor mentioned in both models. For this green building systematic review research, social references apply to family, friends and social expectations. BLACKWELL et al (2005), on the other hand, separates all these different sources of influence into family and personal influences. Social Class, mentioned by BLACKWELL et al (2005) is directly related to individual's socio-economic status influencing how much money the individuals will have at disposal for their purchases. This can be linked to the factor price, presented by the empirical researches selected here. Physical attributes are directly related to the object and its particularities regarding design and location. BLACKWELL et al (2005) do not make any mention of this characteristic in their model.

## 5 - Conclusion

How individuals make decisions can be a very complex and dynamic arrangement. Individuals usually are rational and use all information available, considering all implications of their choice, before deciding to act. The purpose of this article was to identify factors that can have influence green buildings consumer's purchase intention and behaviour performing a systematic review of the literature.

The results indicate that not much attention has been given to this subject over the past few years as only three studies have been found and selected for this research, despite its importance to green buildings development and market opportunities. The findings also showed that nine factors were studied and analysed in literature: environmental attitude, purchase intention, physical attributes, social references, perceived behavioural control, perceived individual identity, motivation values, price and demographics. The majority of the factors can influence consumer behaviour and purchase intention in a positive way, apart from the price factor. Price can influence consumers in a positive or negative way.

Considering the small amount of studies found, the factors gathered here and the hypothesis established in this research still need to be implemented and tested for further validation. It is also proper to assume that the more individuals have knowledge of the concept of what green buildings are and understand how the facilities of this type of building can impact on one's day to day life then more demand will be generated.

Future research should focus on figuring out how some of these factors can actually impact on consumer's purchase intention. It is valuable to mention that factors such as demographics, social references and attitudes can vary immensely and have different impacts in different. cultural and social backgrounds. Other factors, such as price, need to be explored in greater detail.

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