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Tourists' perceptions of green building design and their intention of staying in green hotel

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Tourists' Knowledge of Green Building Design and Their Intention of Staying in Green Hotels

Abstract

Hotel developer incorporates green building design to reduce capital and operation costs. Hotel operator incorporates green practice to affect tourists' intention of staying (IoS). This paper identified and examined inter-connections of tourists' environmental concern, their perceived importance of green building design (PIGBD) and their IoS in green hotels. With their PIGBD identified as a moderating factor, theoretical connections of tourists' eco-consciousness and their willingness to stay in green hotels is developed. Data are collected through a questionnaire survey with 161 tourists in Hong Kong. Moderated regression is then applied to validate the proposed relationships. Results reveal tourists' eco-consciousness positively affects their IoS. Tourists' PIGBD appears to be a moderator of the EC-IoS relationship. The findings imply that tourists' green purchase attitude is influenced by a rising awareness and knowledge of green hotel design attributes, especially for eco-conscious tourists. Green building design, a main aspect of green hotels, plays important role in affecting tourists' behaviour which in turn influences the current and future value positions of hotels and their associated asset components. Developer and investor identifying moderators of tourists' IoS in green hotels and integrating them in building design and hotel operation add value to their business. Their confidence to invest in green projects will rise when knowing tourists are willing to stay in green hotels because of the society's rising eco-consciousness. Tourists' preference relates to green hotel service quality and their green building knowledge. For the general interest toward sustainable societal lifestyles, it is crucial to grow tourists' knowledge on these 'green ends'.

Keywords: tourist, environmental concern, green hotel design, intention of staying, moderator.

1. INTRODUCTION

Hotels consume resources intensively and thus generate significant greenhouse gas (Lai, 2015) due to its service-based nature. Substantial quantities of energy, water and non-durable products are consumed in the service delivery process (Chen and Tung, 2014). 75% of hotel operation activities are due to the excessive consumption of nondurable goods, energy and water resources followed by contamination of the natural environment (Bohdanowicz, 2009; Hsiao et al., 2018). Hong Kong is a famous tourism city. In 2018, the overnight arrival visitors in Hong Kong have reached 29.26 million, rising by 4.9% comparing with that in 2017 (HKTC, 2019). The hotel industry in Hong Kong has been active due to its high hotel room occupancy rate, 85% in average, in the past decade (Colliers, 2018). As the fastest growing hotel market in Asia in 2018, the hotel industry in Hong Kong has well recognised its role of addressing sustainability as tourism activities generate a massive amount of energy consumption and pollutants (Chan and Lam, 2002). In order to enhance customers' / tourists' recognition and consumption of green products / services, companies contribute to prove environmental performance and produce value added products / services (Hsiao et al., 2018). To follow this trend, the service industry is committed to incorporating green design and practice to reduce resource consumption and deliver quality goods.

A general understanding of a green hotel is that it commits to green practice during its business operation process. Green building design is less emphasized as an important component of a green hotel. According to Leadership in Energy and Environmental Design (LEED), the green assessment rating system using score checklist to assess sustainable projects, green attributes need to be integrated into the life cycle of a building, from the planning (e.g. site selection, building design) to the operating phase. Green building design to certain extent guarantees a high level of operational efficiency of a building to reduce a considerable amount of energy consumption. To promote green hotel design, it is necessary to understand whether green hotel development projects are cost efficient during their operating phase. One related question is how important is green building design as a factor to affect tourists' intention of staying in a green hotel as tourists are willing to pay more to stay in green hotels and to increase the hot revenues (Lee et al., 2010; Rahman and Reynolds, 2016). Previous studies on users' perception of green building attributes concern occupants who spend longer period of time staying in a built environment (e.g. office or residential buildings) and how green building design affects their attitude, work efficiency and wellbeing. Also, in the of hospitality literature, some studies focus on investigating what human behavioural factors affect and how they affect tourists' perception and purchase decision of green hotels (Han et al., 2009; Han and Kim, 2010; Chen and Peng, 2012; Choi et al., 2015; Han and Yoon, 2015); others explore whether tourists' green attitude affects their intention of staying in a green hotel and their willingness to pay (Laroche et al., 2001; Manaktola and Jauhari, 2007; Han et al., 2011; Kang et al., 2012). Chou and Chen (2014) investigate tourists' preferences for separate green hotel attributes to identify the determinants of their choice of green hotel attributes. This paper concerns whether and the extent to which tourists' perceived importance of green building design relates to their intention of staying in a green hotel.

This study is an attempt to understand the relationship between people's perception of green building design and their consuming behaviour, in particular, their purchase decision. Focusing on a specific property type (hotel) and its customers (tourists), this paper develops a model to predict the effect of tourists' perceived importance of green building design on the relationship between their environmental concern and intention of staying in a green hotel. In particular, the study is two folds: first, it identified common green building design attributes in the hotel built environment; second, it conducted a survey to examine the relationships among tourists'

environmental concern (EC), perceived importance of green building design (PIGBD) and intention of staying (IoS) in a green hotel. The findings from a moderated regression test reveal that tourists' EC positively influences on their IoS in a green hotel and tourists' PIGBD has a moderating effect on the relationship between EC and IoS. Other findings include that tourists are not significantly differ in their environmental concern by their age, gender and level of education. It is argued that tourists' understanding of green hotels can be enhanced by comprehensive integration of green attributes in design and management strategies to enhance knowledge and pro-environmental building design. This study has implications for future hotel development and management which relate to building sustainable cities and society.

2. GREEN HOTEL AND GREEN BUILDING

The Green Hotels Association (2014) defines green hotels as the "environmentally friendly properties whose managers are eager to institute programs that save water, save energy and reduce solid waste – while saving money – to help protect our one and only earth". Cooper (1998) suggests a green hotel should diligently practise environmental management through its business operation to achieve the goal of reducing negative impacts to the environment. Kim and Han (2010) describe a green hotel as "environmentally responsible hotel that actively follow environmentally friendly guidelines, practice environmental management, implement diverse eco-friendly practices, institute sound green programs and commit themselves to achieving environmental improvement by displaying eco-labels or a green globe logo". Millar and Baloglu (2011) examine the environmentally friendly attributes that guests may pay attention to in hotel room. The attributes they identify for a conjoint analysis include: provision of recycling bin, refillable shampoo dispenser, occupancy sensor, key cards to turn power to the room on and off, energy-efficient light bulbs, towel reuse policy, sheets changed on request for stays up to 3 nights, green certification of hotels. Hsiao et al., (2014) define a green hotel as one that is "providing tourists with a comfortable, natural, healthy and safe lodging service infrastructure on the basis of environmental protection, focusing on sustainable development and minimizing the negative impact on the environment". They establish environmental management attributes for the hotel industry to adopt to audit green hotels, including environmental policy, water resource, energy, solid wastes, indoor environment (health and safety), corporate management, staff education, public and community relationship and consumer education. Rahman and Reynolds (2016) summarise environmental management practices for hotels, including "recycling waste, tower and linen reuse programmes, low-flow facets and shower-heads, water-free urinals, refillable bathroom amenities, automatic climate control and light sensors, and natural ventilation adoption". The practice is implemented in line with hotel business operation processes. The literature suggests that applying environmental management practice is the main approach for hotels to achieve sustainability (Copper, 1998; Penny, 2007; Chou et al., 2012; Hsiao et al., 2014; Singh et al., 2014; Hsiao et al., 2018). This paper argues that a hotel that incorporates environmental management may facilitate practice in sustainability. These commitments do not cover a full concept of "green hotel". The concept of green hotel by the Green Hotels Association focuses more on hotel management activities whilst it ignores green building design attributes. The widely acknowledged definition of green hotel excludes the hotels' green built environment attributes.

A green hotel is endowed with state-of-the-art green attributes, including *green building design* and *green operation servicing* attributes. In other words, a green hotel should be developed and managed to meet the sustainability requirement for both the development and operation phases. According to LEED's definition, green building is the "practice of designing, constructing and operating buildings to maximize occupant health and productivity, use fewer resources, reduce

waste and negative environmental impacts, and decrease life cycle costs" (LEED, 2020). LEED provides rating standard to certify sustainable or green buildings based on architectural design, construction details and operation practices. Green building design is an important component in the LEED rating system to certify the sustainability of a hotel. By the LEED standard, an existing hotel or a hotel project can only be certified as "green" when both its building design and operation meet required standards. This however may not cover all hospitality services.

Green building is an important area for the promotion of sustainability widely studied for its environmental concerns (Chan, et al., 2009). Two main rating systems, LEED and BEAM Plus, exist in Hong Kong to certify green buildings. Between 2009 and 2019, 241 new and existing building projects plus 18 building interior projects in Hong Kong are certified under BEAM Plus. BEAM Plus is the environmental assessment scheme for new and existing buildings, owned by the BEAM Society Limited, recognized by the Hong Kong Green Building Council. Within the same time frame, 510 building projects in Hong Kong are LEED certified. Among these building projects, 34 are awarded LEED Platinum and 105 are awarded LEED Gold[1]. However, only limited number of Hong Kong hotel projects are LEED or BEAM Plus certified while office buildings are much more frequently participating in this certification practice.

The development of a green building from cradle to grave is costly and a majority of cost lies in the design and construction phases (Olubunmi et al., 2016). One of the main factors affects green building development is investment return at project initiation, which relates to projected building income (Kang et al., 2012). Hotel operation and office leasing rely on rental revenue, hence tenants' expectation and demand on building performance are significant concerns by developer, designer and building manager. Compared to office buildings, hotels are associated with short-term rental paid by tourists so their expectation for building performance, especially green building attributes, are less emphasized. In other words, hotel guests pay more attention to hotel operation related service delivery; they pay less attention on building design features. Hotel building design and its relationship with tourists' perception and preference regarding green hotels are not well understood. This paper fills the literature gap by investigating tourists' perceived importance of building design and their motivation of staying in green hotels.

3. PERCEPTION OF GREEN BUILDING AND ATTRIBUTES

Compared to a global average of 40%, buildings in Hong Kong account for over 90% of the city's electricity consumption (HKGBC, 2020). Recognizing that green design helps enhance energy, material and land use efficiency, the Hong Kong Government has been facilitating sustainable design in building projects. Over the years, it has strived to promote green practice in built environment to facilitate general public's understanding of green building. Instead of introducing features and function of green buildings, the government exerts influences on the general public by providing educative information of green buildings. Instead of information on what attributes a green building possesses, people are informed by the contribution of green buildings, such as "green buildings save energy", "green buildings reduce waste", "green buildings save water", etc. (HKGOV, 2020). The general public's knowledge of green building and its specific attributes are limiting. People understand green building better by experiencing positive outcomes brought by them.

Attributes of green buildings are systematised to become basis of green building certification schemes. The evaluation criteria to certify a green or sustainable building project by LEED are based on eight categories, namely integrative process, location and transportation, energy and atmosphere, water efficiency, sustainable sites, material and resources, indoor environment

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[1] http://www.gbig.org/places/526

quality, innovation and design process, regional priority (LEED, 2020). BEAM Plus has six evaluation criteria categories, including site aspects (SA), water use (WU), material aspects (MA), energy use (EU), indoor environment quality (IEQ), innovations and additions (IA).

We refer to the local certification scheme in Hong Kong - BEAM Plus's assessment criteria and identified several aspects that are building design or functions that can be observed in the hotel room areas. Tourists spend most of their time in their rooms while staying in a hotel. So it is sensible to assume that it is easier for them to understand building design attributes within the hotel room areas. Table 1 shows the certification criteria of the BEAM Plus. The identified aspects (marked with "✓") are used to design the survey questions to measure tourists' perceived importance of green building design.

Table 1. Selected Evaluation Categories from BEAM Plus

Site Aspects (SA)	Water use (WU)
• Site location	• Water conservation ✓
• Site planning and design ✓	• Effluent discharge to foul sewers ✓
• Emission from the site	
Material aspects (MA)	**Energy use (EU)**
• Efficient use of materials ✓	• Annual energy use
• Selection of materials ✓	• Energy efficient system ✓
• Waste management	• Provisions for energy management
	• Building design for energy efficiency ✓
Indoor environment quality (IEQ)	**Innovations and additions (IA)**
• Security	• Innovative techniques
• Hygiene	• Performance enhancements
• Indoor air quality ✓	• BEAM Professionals
• Ventilation ✓	
• Thermal comfort ✓	
• Lighting quality ✓	
• Acoustics and noise	
• Building amenities	

4. THEORY AND HYPOTHESIS

4.1 Tourists' environmental concern

In marketing literature, people's green purchase decision is proven to associate with their environmental concerns. A rising number of people has started to be aware of environmental issues realising that natural resources are being exhausted (Han et al., 2011). Environmental concern is regarded as an indicator to reflect a person's awareness (attitude) of environmental issues. According to Schwartz's (1977) *norm activation theory*, environmental concern induces "a sense of responsibility to perform a behaviour, which in turn activates a personal norm or a moral obligation to perform the behaviour" (Fujii, 2006). In other words, environmental concern activates social norm to pro-environmental behaviour or pro-environmental behaviour intent. Also, environmental concern is found to relate to one's basic beliefs or values (Schultz, 2000; Stern et al., 1995). The attitudes are gradually formed and matured, and become a strong motivator to compel them to commit to pro-environmental behaviour. An individual's concern level on environmental issues is proven to be a useful predictor of environmentally conscious behaviour (Kim and Choi, 2005), such as recycling and green purchase behaviour. Consumers with stronger concern of the environment are more likely to purchase green products than those

who are less concerned about environmental issues. Environmental concern also positively influences a series of pro-environmental intention, including choosing ecological products, willingness to pay for a premium for renewable energy, etc. (Holmgren et al., 2017).

Age, gender and education hypotheses: the literature on investigating factors that correlates to environmental concern is abundant. The correlation between environmental concern and age, gender (or sex), education, income, occupational prestige, residence, political party and political ideology are most frequently examined (Liere and Dunlap, 1980; Robert, 1996; Evanschitzky and Wunderlich, 2006). Han et al., (2011) examine tourist sub-groups' intention of staying in green hotels by their age, gender, education and household income. They show that gender difference relates to their intention of staying is found.

The aim of this study is to investigate the relationship between environmental concern, perceived importance of green building design and green purchase decision. Moreover, it also explores possible strategies to raise tourists' environmental concern through understanding the personal characteristics that affect environmental concern. It hypothesizes that tourists differ by age, gender and education level also differ in their environmental concern (H1 – H3).

H1: Tourists of different age differ in environmental concern

H2: Tourists of different gender differ in environmental concern

H3: Tourists with different education level differ in environmental concern

4.2 Intention of staying (IoS) in a green hotel

Green purchase intention is defined as the likelihood a consumer buys a particular product due to her environmental desire (Chen and Chang, 2012). Lancaster's (1966) theory of consumer demand postulates consumers make decision about a particular product or service basing on its attributes as a whole, which applies to hotel products (Millar and Baloglu, 2011). Although people may understand the severity of environmental cost, their pro-environment attitudes do not necessarily lead to their willingness to pay.

In the past decade, an increasing number of tourists chose to stay in green hotels (Lee et al., 2010). Tourists are the central stakeholders of hotels who determine hotels being environmental friendly (Hsiao et al., 2014; Rahman and Reynolds, 2016). In the hospitality literature, there is an increasing number of studies on tourists' green attitude and behaviour. Manaktola and Jauhari (2007) investigated tourists' attitudes and behaviours concerning hotels' environmentally friendly practices. Han et al., (2011) examine tourists' eco-friendly attitudes on their intention to visit a green hotel, to engage in word-of-mouth, and to pay premium. They found positive correlations between the attitude and the behaviour components. Kang et al., (2012) studied U.S. hotel guests and found those who have higher environmental concern also willing to pay higher price for green hotels. Chen and Tung (2014) developed a theoretical framework based on the theory of planned behaviour. Part of their model entails an awareness-attitude-behavioural intension relationship, which indicates that consumers' environmental concern exert positive influence on their attitude towards green hotels, which in turn influences their intention of staying. Chou and Chen (2014) identified green hotel attributes affect tourists' hotel choice. They use a stated preference approach to estimate relative effects of psychological and physical attributes on tourists' choice. This paper hypothesizes that tourists' environmental concern positively affects their intention of staying in green hotels (H4).

H4: Tourists' environmental concern positively affects their intention of staying in green hotels

4.3 The moderating role of perceived importance of green building design (PIGBD)

The built environment discipline approaches people's perception of green building attributes from green building and green design perspectives. Kato et al., (2009) examine how people perceive and occupy green workplace. They find green workplace offers greater psychological benefits to occupiers than the physical improvement. Monfared and Sharples (2011) investigate occupants' perception of green building in association with their attitude towards green building, building performance and their satisfaction with the building performance. Holmgren et al., (2017) conducted an experiment to investigate the interaction effects (both psychological and physical) that influence occupants' perception of green buildings. Use exploratory factor analyses, To et al. (2018) identified key factors of building users' perceived smartness and sustainability of a building. In their questionnaire design, they use four core dimensions of the smart and sustainable building features: building indoor environment, smart building skin, eco and social spaces, building security and network systems.

Green building design contributes significantly in hotels' green practice and it is an important green attribute of green hotel. Tourists' perception of green building design has rarely been researched previously in understanding their green purchase intention. According to Young et al., (2010), a product's green attributes is a key motive to influence customers' green purchase behaviour. Gleim et al., (2013) argue that customers' perception of poor product is an important barrier that affecting their green purchase decisions. Products with favourable functions and ethical attributes and high quality have positive influences on customers' purchasing behaviour (Joshi and Rahman, 2015). In this study, hotel customers' perceived importance of green building design is a factor that affects their intention of staying in green hotels (H5):

H5: Perceived importance of green building design positively affects intention of staying in green hotels

Since previous studies have proved the association between environmental concern and green purchase intention, activities are organised to encourage people to commit to green purchase. However, studies that focus on customer consumption patterns suggest that knowledge of the product affect consumers' green purchase behaviour where situation factors could undermine customers' responsible purchasing and lessen the influence of a positive environment attitude (Laroche et al., 2001; Joshi and Rahman, 2015). Forkink (2010) and Luchs et al., (2010) suggest that consumers express their environmental concern according to the characteristics of products, such as the accuracy of green product claims, information provided on the products and its benefits to customers. Chen and Peng (2012) found that knowledge about green hotels is a significant moderator of tourist intentions of staying in the hotels. Yet, the knowledge about green hotels has not considered include understanding of green building design. Chou and Chen (2014) integrate facility attributes as one of the factor that influence tourist's choice behavior. However, the facility attributes are confined with such service related green attributes as room class, personal toiletries, and environmental measure programs.

This study suggests that, to a certain extent, the PIGBD reflects tourists' understanding and perception of green hotels. For tourists who perceive green building design an important factor, the relationship between their EC and green purchase intention is stronger. Tourists with a high level of perceived importance of green building design to certain extent indicate that she has a better knowledge of green building attributes and the contribution of green building design to the environment. Tourists' PIGBD affects the relationship between EC and IoS in a green hotel. This study hypothesises that the relationship between EC and IoS will be stronger among tourists with a higher degree of perceived importance of green attributes of buildings (H6). Figure 1 shows the hypotheses of H4 to H6.

H6: Perceived importance of green building design moderates the direct effects of tourists' environmental concern on intention of staying in green hotels.
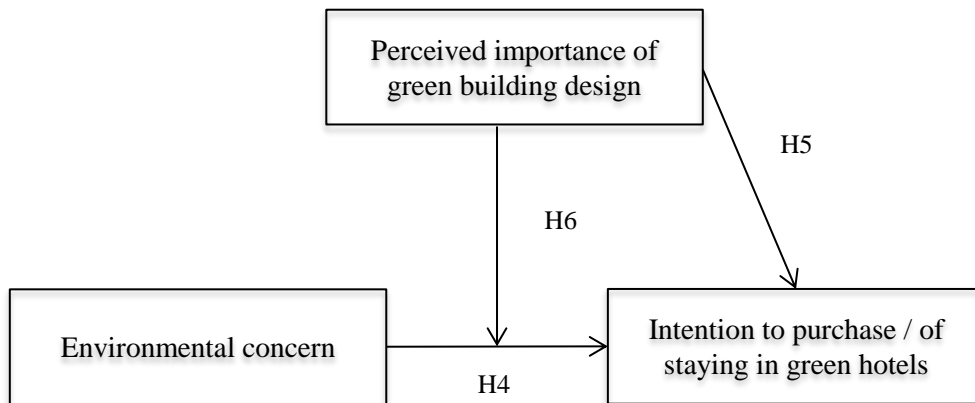

Figure 1. Conceptual Representation of the Proposed Moderating Effect of PIGBD on EC and IoS

5. METHODOLOGY

5.1 Survey design and measurement parameters

A survey questionnaire was designed to contain three parts (Appendix 1). Part one includes questions to collect participants' demographic data. Part two includes eight instruments; each describes peoples' opinions towards environment. A scale of environmental concern developed by Chen and Tung (2014) was used to determine participants' level of environmental concern. They were asked to rate their level of agreement based on a seven-point Likert scale (1 = strongly agree; 7 = strongly disagree). Part three includes ten statements describing the green building attributes and respondents were asked to rate their perceived importance of each green building attribute. In the seven-point Likert scale, one stands for extremely important, seven means extremely unimportant. In this study, 15 original statements were designed based on selected evaluation aspects from BEAM Plus (Table 1). A pilot test was conducted with ten hotel guests. Five statements were removed from the questionnaire as they found it difficult to understand these specific green attributes of a building and cannot judge their importance.

The selected green building attributes mainly describe the green attributes that can be identified in a green hotel environment. The evaluation categories are presented in the survey questions in layman's terms. Respondents are required to indicate their perceived importance of the following green building design items, namely, building design to maximize passive solar energy, rainwater / air-conditioning system water collection and grey water reuse, using water-saving plumbing fixtures, alternative renewable energy power sources, such as solar power or wind power, adopting energy-efficient lighting and appliances, efficient layout design to maximize space utilisation, using non-toxic materials, using environment friendly product, use of recycled building material, ventilation systems designed for efficient heating and cooling (table 1).

The last question was designed to capture the respondents' IoS in green hotels. Appendix 1 is an illustration of the 19 instruments used in the questionnaire.

5.2 Sampling procedure and data collection

The questionnaire was distributed at eleven famous tourism spots in Hong Kong. The survey administers were trained to deliver a questionnaire-based interview with overseas tourists. The tourists were approached on a random basis and they were firstly asked whether they had experience of living in hotels in Hong Kong before they started to complete the questionnaire. This serves as a screening question was asked to select qualified participants who didn't have a previous experience of staying at a green hotel. After the respondents accepted the interview request, the survey administers provided detailed information of the study to them, including the background of the study and the concept of green hotels. Survey administrators were also required to provide brief explanation of green building attributes to the respondents at the beginning of the survey. We intended to collect opinions from tourists who didn't have a previous experience of staying in a green hotel. 161 questionnaires were collected, among which 5 data was incomplete and treated as invalid.

5.3 Moderated Regression

Analyses of variance (ANOVAs) were performed to test hypotheses 1 to 3 to investigate the significance level of difference among interviewees with different gender, age, and education background.

To test hypotheses 4 to 6, moderated regression was used to regress the environmental concern (EC) and perceived importance of green building design (PIGBD) on a linear combination of predictors, moderator and predictor-moderator interactions (Equation 1).

$$Y = B_0 + B_1X + B_2Z + B_3XZ + e \qquad \text{(Equation 1)}$$

where Y is the predicted value of the criterion; B_0 is the least squares estimate of the intercept of the best fit equation; B_1 is the least squares estimate of the population regression coefficient for X, the main predictor (EC); B_2 is the least squares estimate of the population regression coefficient for Z, the proposed moderator (PIGBD); and B_3 is the least squares estimate of the population regression coefficient for the product term which carries information about the interaction between X (EC) and Z (PIGBD).

6. RESULTS

Among the 161 questionnaire respondents, 49.7% are males. Majority of the respondents (50.3%) are from the age group of 18 to 34. Most respondents (74.6%) have education level above undergraduate. 60% have a full time job. Table 2 shows the demographic profile of the respondents.

Table 2 Frequency distribution for respondents' demographics (n=161)

Variable		Frequency	Percentage
Gender	Male	80	49.7%
	Female	81	50.3%
Age	18-24	31	19.3%
	25-34	55	34.2%
	35-44	26	16.1%
	45-54	29	18.0%
	55-64	16	9.9%
	65 and above	2	2.5%
Education	Postgraduate	22	13.7%

		N		
Graduate		42	26.1%	
Undergraduate		56	34.8%	
Diploma		23	14.3%	
High school		17	10.6%	
Others		1	0.6%	

6.1 Environmental concern as a significant between-group factor

One-way ANOVA tests were performed to test whether there is significant difference between groups (gender, age, education). Revealed in table 3, the results of all ANOVA tests show that the p-values are greater than 0.05. Thus, hypotheses 1 – 3 are rejected. The findings show: (1) male and female respondents do not significantly differ by their environmental concerns; (2) respondents of different age groups do not significantly differ by their environmental concerns, and (3) respondents with different education qualifications do not significantly differ by their environmental concerns.

Table 3. Between- group difference in environmental concern

			N	Mean	SE	p-value
Environmental Concern	Gender	Male	80	2.078	.152	.455
		Female	81	1.911	.158	
	Age	18-24	31	1.957	.188	.822
		25-34	55	1.946	.166	
		35-44	26	2.111	.191	
		45-54	29	2.006	.170	
		55-64	16	1.870	.224	
		>65	2	2.317	.391	
	Education	Postgraduate	22	2.198	.161	.754
		Graduate	42	2.226	.134	
		Undergraduate	56	2.111	.127	
		Diploma	23	2.262	.177	
		High school	17	2.176	.178	
		Others	1	1.235	.736	

6.2 Descriptive statistics of variables

The Cronbach's alpha values of environmental concern (EC: 8 items) and the perceived importance of green building design (PIGBD: 10 items) were 0.889 and 0.919 respectively. All Cronbach's alpha values were above the 0.7 threshold (Hair et al., 2006), suggesting sound reliability of these items which can be averaged into a single item. Table 4 shows mean and standard deviation of the three variables.

Table 4. Descriptive statistics (N=161)

	Mean	SD
Environmental concern (EC)	2.1281	.70641
Perceived importance of green building design (PIGBD)	2.3677	.83663
Intention of staying (IoS)	2.360	.9052

Figure 2 shows the rating of respondents' perceived importance of green building design. Over 50% of respondents consider all the green building design attributes are extremely important

or important; almost 80% of respondents rated 1 to 3, meaning that their perceived importance of the green building design attributes ranges from moderately important to highly important. This indicates that, in general, the respondents consider green building design to be important.
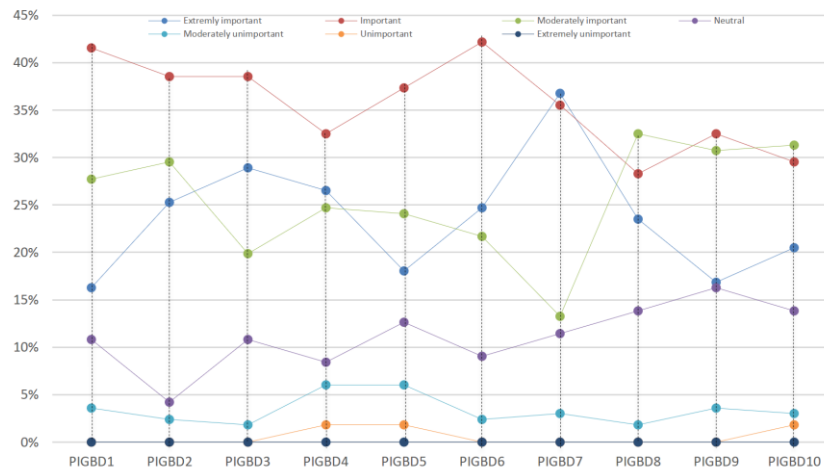

Figure 2. Rating of Perceived Importance of Green Building Design

More than one quarter of respondents regard that "adopting energy-efficient lighting and appliances (PIGBD2, 25%)", "using water-saving plumbing fixtures (PIGBD3, 29%)", "alternative renewable energy power sources such as solar power or wind power (PIGBD4, 27%)", "using environment friendly product (PIGBD6, 25%)" and "using non-toxic materials (PIGBD7, 37%)" are extremely important. Respondents who hold neutral attitude towards the importance of the 10 green building attributes range from 4% to 16% respectively. What worth noting is "alternative renewable energy power sources such as solar power or wind power (PIGBD4)" and "building design to maximize passive solar energy (PIGBD 5)", among the 10 green building design attributes, are two attributes rated by the highest number (8% respectively) of the respondents to be either moderately unimportant or unimportant.

6.3 Moderating effect of PIGBD

We hypothesized that both EC and PIGBD have a positive effect on IoS. Additionally, PIGBD moderates the association between EC and IoS. A hierarchical multiple regression was conducted, and to avoid multicollinearity, the data were standardized. Results show that the EC and PIGBD together accounted for 24.6% of variation in IoS ($F_{(2, 158)} = 25.74$, $p = .000$), and the introduction of the interaction term explained a significant increase of the variation of IoS ($F_{(1, 157)} = 19.11$, $p = .000$; R^2 change = .02, $p < .05$). Results implied that both the PIGBD and the interaction term have a significant effect on IoS (b PIGBD = .32, t = 3.32, $p < .01$; b interaction = .13, t = 2.16, $p < .05$), while the effect of EC on IoS does not (b EC = .14, t = 1.40, $p > .1$) (Table 6). The moderator PIGBD positively influences strength of relationship between EC and IoS. Tourists with a high level PIGBD present higher level of IoS in green hotels than those with a low level PIGBD. H5 and H6 were supported, whereas H4 was not.

Table 6. Summary of Multiple Regression Analysis Results

	Intention to purchase / stay in a green hotel (IoS)		
Predictor	**B**	**SE**	**t-statistic**
EC	.141	.101	1.40
PIGBD	.319	.096	3.32***
EC x PIGBD	.131	.061	2.16**

Note. N=161. *p < .05; **p<.01; ***p<.001

A moderation test was conducted via PROCESS 3.3 (Hayes, 2017) to examine the details of this effect. Results (figure 3) indicate that although the effect of EC on IoS was generally not significant, it was when PIGBD is high (b 1SD above = 1.13, t = 2.81, p < .01). Put differently, there is a boundary condition for the effect of EC on IoS, that is, only when consumers perceive green building design to be highly important, would their environmental concern increase their IoS in green hotels.
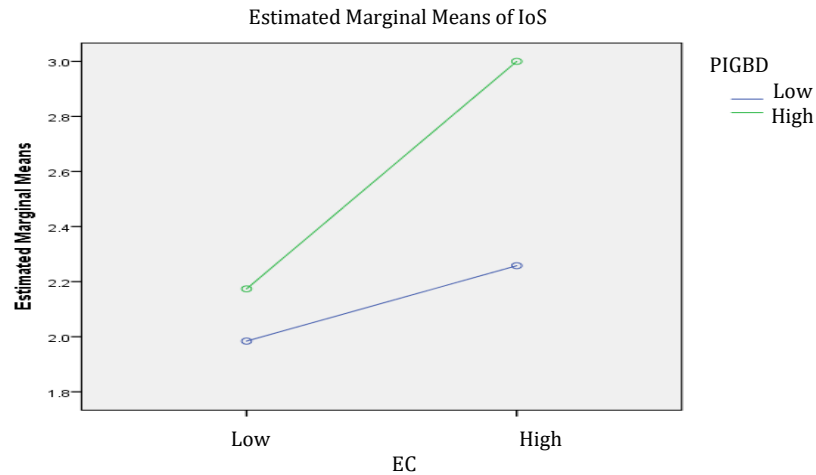

Figure 3. Simple slopes for the effect of EC on IoS by PIGBD

7. FURTHER DISCUSSIONS

Previous studies found gender difference for tourists' attitude towards green practice and those with higher level of education tend to show higher environmental concern. Finding of this study tells otherwise. Survey evidence suggests EC does not simply differ by gender even in small sample. Tourists from different age groups and with different levels of education do not significantly differ by their EC which means that it may be nurtured through people's day-to-day life, not just shaped by formal training and learning. As communication technology rapidly evolves, it is likely that tourists' EC is heavily shaped by the information flows of social media. Modern tourists are exposed to extensive media coverage on environmental issues which enhances, even converges, their attitudes such as their ECs.

Even when people's EC is positively associated with their decision-making, their perception of the product (or service) may affect their actual decision. Green attributes of a product (or a service) is one of the significant factors. In this study, green building design, being one of the most important green attributes of green hotels, is studied, where tourists' PIGBD is used as a moderator. The proved moderation effect of PIGBD suggests that the EC's effect on IoS in a green hotel is moderated by tourists' PIGBD, which means that among tourists with a higher level of PIGBD, their EC on their IoS tends to grow stronger. Green building design, as one important green attributes of green hotels, is therefore proved to play a role in affecting tourists' decision-making which positively influences the current and future positions of hotels and their associated sectors. It will help shape the sustainable future of future cities and society.

The contribution of this study also lies in that it has implications to various fields of practice. It contributes to the study of consumer behaviour in the area of service marketing and real estate development by bringing in a new factor for customers' (tourists') attitude-behaviour relationship in the context of green hotels: PIGBD. It shows that PIGBD has moderating effect on the relationship between EC and IoS in green hotels. This implies that consumer knowledge of green building design shall be endorsed to strengthen their' willingness to stay in a green

hotel. Consumer's PIGBD influences her EC. As tourists' customers' EC increases in society, knowledge about what green hotel attributes are affecting and how they are affecting tourists' perception and attitude has rising importance.

Insights about the role of PIGBD to affect tourists' IoS in green hotels not only has implication to developer and investor, but also to service operator. Developer and investor's confidence to engage in green hotel projects is reinforced when knowing tourists are willing to stay in green hotel due to society's rising environmental concern. Hotel building design enhances tourists' PIGBD so designers may skilfully integrate green designs explicitly or implicitly for tourists to observe and to experience during their staying. Eco-conscious tourists value green building design is in line with their social belief by showing strong green purchase intention. Associated marketing strategies help promote green hotel building design to contribute to environmental good (Hartmann et al., 2005). The strategies may involve increasing information of green design on hotel's online platforms or social media, having hotel certified by green building rating systems, serving as role model in the community to disseminate green building information, organizing education events to improve public knowledge.

The knowledge enhancement also involves identifying other perceptual factors strongly relate to people's EC to affect private and social choices, which has implication to other areas of built environment studies such as commercial, residential, and public real estates. It is conceivable that perception of green building design will improve residents and building users' gratitude of ecological good which affects their environmental psychology. Furthermore, their perceptions of green building design may be converted and incorporated into green building rating systems, valuable for interior design projects. On policy or industry standard, if the building occupier's perception of green building design enhance their pro-environmental attitudes, that building with superior green design should be awarded with extra credits under relevant rating systems. Given green building design features often going unnoticed by the general public, new methods are needed to make green hotels design features more conspicuous for social awareness.

8. CONCLUSION

This paper focuses on tourists' environmental attitudes and their preference of green hotel as a whole. It uses moderated regression method to identify the moderation effect of the perceived importance of green building design on the relationship between environmental concern and intention of staying in a green hotel. The findings suggest that tourists' level of EC is positively associated with their IoS in green hotels without moderator effects. This is consistent with the theoretical proposition that EC (green attitude) has positive effect on green purchase intention. It implies that tourists generally believe that the hotel, tourism, and real estate sectors are able to contribute to a sustainable society. With enhanced green awareness, they are willing to engage in pro-environmental decision such as preferring green hotel and design.

This study is also an attempt to understand tourists' PIGBD of green hotels. Tourists often are familiar with attributes related to green hotel operation and practices. Their knowledge of the underlying green building and design attributes is often limited. This implies their response to the perceived importance of environmental attributes of a hotel can be biased due to their partial comprehension of meaning of green hotel building attributes. This paper has its empirical facts based on a relatively small sample. Future studies may include a larger sample size and tourists with and without experience of a green hotel staying implies this potential sub-group analysis of behaviour variation. Hotel typically operates on short-term rental model and so longer-term rental or owner occupied properties may exhibit different perceptions of green building design

where they affect occupier behaviour differently from green hotels. The research methodology of this study may be modified for the issue regarding longer-term renting or owning scenario.

REFERENCE

Architectural Service Department, (2020). Sustainable Building Design, Retrieved 26th January, available at:<https://www.archsd.gov.hk/archsd/html/report2018/en/sustainable-building-design.html>.

BEAM Plus, (2020). Introduction, Retrieved 3rd. February, available at: < https://www.hkgbc.org.hk/eng/beam-plus/introduction/>.

Bohdanowicz, P., (2009). *Theory and practice of environmental management and monitoring in hotel chains*. In: Gossling, S., Hall, C.M., Weaver, D.B. (Eds.), Sustainable Tourism Futures: Perspectives on Systems, Restructuring and Innovations. Routledge, New York, pp. 102–130.

Chan, W.W. and Lam, J.C., (2002). "Prediction of pollutant emission through electricity consumption by the hotel industry in Hong Kong". *International Journal of Hospitality Management*, 21(4), pp.381-391.

Chan, E.H., Qian, Q.K. and Lam, P.T., (2009). The market for green building in developed Asian cities—the perspectives of building designers. *Energy Policy*, *37*(8), pp.3061-3070.

Chen, Y.S. and Chang, C.H., (2012). "Enhance green purchase intentions – the roles of green perceived value, green perceived risks, and green trust". *Management Decision*, 50(3): 502-520

Chen, A., & Peng, N. (2012). Green hotel knowledge and tourists' staying behavior. *Annals of Tourism Research*, 39(4), 2211–2216.

Chen, M.F. and Tung, P.J., (2014). "Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels". *International journal of hospitality management*, *36*, pp.221-230.

Choi, H., Jang, J. and Kandampully, J., (2015). Application of the extended VBN theory to understand consumers' decisions about green hotels. *International Journal of Hospitality Management*, *51*, pp.87-95.

Chou, Chia-Jung and Chen, Kuo-Sheng and Wang, Yueh-Ying, (2012). Green practices in the restaurant industry from an innovation adoption perspective: Evidence from Taiwan. *International Journal of Hospitality Management*. 31, pp. 703-711

Chou, Chia-Jung and Chen, Pei-Chun, (2014). Preferences and willingness to pay for green hotel attributes in tourist choice behavior: The case of Taiwan. *Journal of Travel & Tourism Marketing*, *31*(8), pp.937-957.

Colliers, (2018). "Colliers Radar Report", Available at: < https://www.colliers.com/-/media/files/marketresearch/apac/hongkong/hk-research/colliers%20radar_hong%20kong%20hotel%20investment_050918.pdf?la=en-gb>

Cooper, I., (1998). *Emerging issues in environmental management. In: Facility Management: Theory and Practice*. Spon Press, London, pp. 111–119.

Evanschitzky, H., Wunderlich, M., 2006. An examination of moderator effects: the four stage loyalty model. Journal of Service Research 8 (4), 330–345

Forkink, A. (2010). "Perception, Awareness, and Acceptance of Green Kitchen Cleaners: Go Green Market Research". Online report. Retrieved 24 June 2012, http://www.greenbook.org/Content/GoGreen/Green_Cleaners_report.pdf.

Fujii, S., (2006). "Environmental concern, attitude toward frugality, and ease of behavior as determinants of pro-environmental behavior intentions". *Journal of environmental psychology*, *26*(4), pp.262-268.

Gleim, M. R., Smith, J. S., Andrews, D., & Cronin Jr, J. J. (2013). "Against the green: A multi-method examination of the barriers to green consumption". *Journal of Retailing*, 89(1), 44-61.

Green Hotels Association. (2019). "What are green hotels? Retrieved December 22nd, 2019", <available at>: http://www.greenhotels.com/.

Hair, J.F., Jr.; Aderson, R.E.; Tatham, R.E.; Black, W.C. (2006). *Multivariate Data Analysis*, 6th ed.; Prentice Hall; Englewood Cliffs, NJ, USA.

Han, H., Hsu, L., Lee, J., 2009. Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers' eco-friendly decision-making process. *International Journal of Hospitality Management*, 28 (4), 519–528.

Han, H. and Kim, Y., (2010). An investigation of green hotel customers' decision formation: Developing an extended model of the theory of planned behavior. *International journal of hospitality management*, *29*(4), pp.659-668.

Han, H., Hsu, L. J., Lee, J. and Sheu, C. (2011). "Are lodging customers ready to go green? An examination of attitudes, demographics, and eco-friendly intentions". *International Journal of Hospitality Management*, 30, pp. 345-355

Han, H. and Yoon, H.J., (2015). Hotel customers' environmentally responsible behavioral intention: Impact of key constructs on decision in green consumerism. *International Journal of Hospitality Management*, *45*, pp.22-33.

Hartmann, P., Ibanez, V.A., Sainz, F.J.F., (2005). Green branding effects on attitude: functional versus emotional positioning strategies. *Marketing Intelligence and Planning* 23 (1), 9–29.

Hayes, A. F. (2017). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-based Approach*. Guilford Publications, New York, NY.

Hsiao, T.-Y., Chuang, C.-M., Kuo, N.-W., Yu, S.M.-F., (2014). Establishing attributes of an environmental management system for green hotel evaluation. *International Journal of Hospitality Management*. 36, 197–208

Hsiao, T, Chuang, C and Huang, L. (2018). "The contents, determinants, and strategic procedure for implementing suitable green activities in star hotels", *International Journal of Hospitality Management*, 69, pp.1-13

HKGBC, (2020). What is Green Building, Available at: < https://www.hkgbc.org.hk/eng/about-us/what-is-green-building/index.jsp>

HKTC, (2019). Tourism Performance in 2018, Available at: < https://www.tourism.gov.hk/english/statistics/statistics_perform.html>

Holmgren, M., Kabanshi, A. and Sörqvist, P., 2017. Occupant perception of "green" buildings: Distinguishing physical and psychological factors. *Building and Environment*, *114*, pp.140-147.

Hong Kong Government, (2020). "Green Buildings", Available at: < https://www.gov.hk/en/residents/environment/sustainable/buildings.htm>

Joshi, Y. and Rahman, Z., (2015). "Factors affecting green purchase behaviour and future research directions". *International Strategic management review*, *3*(1-2), pp.128-143.

Kato, H., Too, L. and Rask, A., (2009). Occupier perceptions of green workplace environment: the Australian experience. *Journal of corporate real estate*, *11*(3), pp.183-195.

Kim, Y. and Choi, S.M., (2005). "Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE". *ACR North American Advances*.

Kim, Y., & Han, H. (2010). Intention to pay conventional hotel prices at a green hotel –A modification of the theory of planned behavior. *Journal of Sustainable Tourism*, 18(8), 997–1014.

Lai, J.H., (2015). Carbon footprints of hotels: Analysis of three archetypes in Hong Kong. *Sustainable Cities and Society*, *14*, pp.334-341.

Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmental friendly products. *Journal of Consumer Marketing*, 18(6), 503–520

Lee, J, Hsu, L, Han, H and Kim, Y. (2010). "Understanding how consumers view green hotels: how a hotel's green image can influence behavioural intentions", *Journal of Sustainable Tourism*, 18(7), 901-914.

Liere, K.D.V. and Dunlap, R.E., (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public opinion quarterly*, 44(2), pp.181-197.

Luchs, M. G. et al. (2010). "The Sustainability Liability: Potential Negative Effects of Ethicality on Product Preference". *Journal of Marketing* 74: 18–31.

Manaktola, K., Jauhari, V., (2007). Exploring consumer attitude and behaviour towards green practices in the lodging industry in India. *International Journal of Contemporary Hospitality Management*. 19, 364–377

Millar, M. and Baloglu, S., (2011). Hotel guests' preferences for green guest room attributes. *Cornell Hospitality Quarterly*, *52*(3), pp.302-311.

Monfared, I.G. and Sharples, S., (2011). Occupants' perceptions and expectations of a green office building: a longitudinal case study. *Architectural Science Review*, *54*(4), pp.344-355.

Murphy, P. E., Kangun, N. and Locander, W. B. (1978). Environmentally Concerned Consumers - Racial Variations. *Journal of Marketing* 42: 61–66.

Olubunmi, O.A., Xia, P.B. and Skitmore, M., (2016). Green building incentives: A review. *Renewable and Sustainable Energy Reviews*, *59*, pp.1611-1621.

Penny, W.Y.K., 2007. The use of environmental management as a facilities management tool in the Macao hotel sector. *Facilities*, 25 (7/8), 286–295.

Rahman, I. and Reynolds, D. (2016). "Predicting green hotel behavioral intentions using a theory of environmental commitment and sacrifice for the environment". *International Journal of Hospitality Management*, 52, pp. 107-116

Roberts, J.A., 1996. Green consumers in the 1990s: profile and implications for advertising. *Journal of Business Research*, 36, 217–231.

Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 10 (pp. 221–279). New York: Academic Press.

Shrum, L., McCarty, J. and Lowrey, T. (1995). Buyer Characteristics of the Green Consumer and their Implications for Advertising Strategy. *Journal of Advertising*. 24(2): 71–82.

Singh, N., Cranage, D. and Lee, S., (2014). Green strategies for hotels: Estimation of recycling benefits. *International Journal of Hospitality Management*, 43, 13-32

To, W.M., Lai, L.S., Lam, K.H. and Chung, A.W., 2018. Perceived importance of smart and sustainable building features from the users' perspective. *Smart Cities*, *1*(1), pp.163-175.

Young, W., Hwang, K., McDonald, S., & Oates, C. J. (2010). Sustainable consumption: green consumer behaviour when purchasing products. *Sustainable Development*, 18(1), 20-31.

Appendix 1 Questionnaire instruments

Variable	Items	Statements
Environmental concern	EC1	I am extremely worried about the state of the world's environment
	EC2	Mankind is severely abusing the environment
	EC3	When humans interfere with nature it often produces disastrous
	EC4	The balance of nature is very delicate and easily upset
	EC5	Humans must live in harmony with nature in order to survive
	EC6	I think environmental problems are very important
	EC7	I think environmental problems cannot be ignored
	EC8	I think we should care about environmental problems
Perceived importance of green building design	PIGBD1	Ventilation systems designed for efficient heating and cooling
	PIGBD 2	Adopting energy-efficient lighting and appliances
	PIGBD 3	Using water-saving plumbing fixtures
	PIGBD 4	Alternative renewable energy power sources such as solar power or
	PIGBD 5	Building design to maximize passive solar energy
	PIGBD 6	Using environment friendly product
	PIGBD 7	Using non-toxic materials

	PIGBD 8	Efficient layout design to maximize space utilisation
	PIGBD 9	Use of recycled building material
	PIGBD10	Rainwater / air-conditioning water collection and grey water reuse
Intention of staying	IoS	I am willing to stay at a green hotel when travelling / purchase a hotel room in a green hotel