

Linking environmental knowledge, environmental responsibility, altruism, and intention toward green hotels through ecocentric and anthropocentric attitudes

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Abstract

Purpose – This study aims to examine the effects of environmental knowledge, perceived environmental responsibility and altruism on tourists' intention to stay in green hotels. In addition, the mediating role played by tourists' attitudes, including ecocentric and anthropocentric attitudes, is explored.

Design/methodology/approach – Data were collected from 393 international tourists in Malaysia. This study followed a cross-sectional approach and applied the partial least squares – structural equation modelling using SmartPLS version 3 software to analyse the data and test the hypotheses.

Findings – The results indicated that environmental knowledge, altruism, environmental responsibility and ecocentric and anthropocentric attitudes positively influence tourists' intention to stay in green hotels. Ecocentric attitudes mediate environmental knowledge, altruism, environmental responsibility and intention to stay in green hotels. However, environmental knowledge and altruism do not influence anthropocentric attitudes. Likewise, anthropocentric attitudes do not mediate the relationship between environmental knowledge, altruism, perceived environmental responsibility and intention to stay in green hotels.



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Research limitations/implications – This study posed several theoretical and practical implications that will benefit future researchers and practitioners while exploring tourists' behaviour in a green hotel context.

Originality/value – This study makes a unique and significant contribution by including ecocentric and anthropocentric attitudes in a unified model underpinned by the Theory of Planned Behaviour and the Value-Basis Theory.

Keywords Green practices, Ecocentric attitude, Anthropocentric attitude, Environmental knowledge, Perceived environmental responsibility, Altruism

Paper type Research paper

1. Introduction

Globally, the tourism industry is a key enabler of economic growth. It accounts for 10.4% of gross domestic product, generates one in ten of the world's jobs, and is worth over US\$1tn (United Nation World Tourism Organization, 2018). The hotel industry is among the most energy and water-intensive industries (Merli *et al.*, 2019). Between 2009 and 2013, the hotel industry led to an approximately 8% increase in the global greenhouse gas emissions and producing 4.5 billion tons of CO₂ equivalents (Bajwa *et al.*, 2019; Glibert, 2020; Sovacool *et al.*, 2021). Therefore, researchers argue that this industry will face significant consequences of global warming affecting the industry's competitiveness (Horng *et al.*, 2013; Sovacool *et al.*, 2021; Verma *et al.*, 2019). Taking this into account, tourism's long-term success is inextricably linked to its ability to address environmental sustainability issues (Martinez-Martinez *et al.*, 2019; Nowacki *et al.*, 2018; Walsh and Dodds, 2017)

Industry experts and stakeholders are striving to ensure sustainable tourism growth (Merli *et al.*, 2019; Nowacki *et al.*, 2018; Patwary *et al.*, 2020). Green practices and environmental considerations are being incorporated in their operations since the 1970s driven by consumers' concerns regarding the environment and sustainability (Otto and Pensini, 2017; Ouyang *et al.*, 2019; Wattar *et al.*, 2019; Yin *et al.*, 2020). Hence, the concept of green hotels has been growing alongside the trend of sustainable development and environmental protection in the hotel and tourism industry (Demir *et al.*, 2021; Chan, 2021). Some studies claim that one-third of consumers' environmental ideals, attitudes and activities have transformed into environmentally favourable acts, such as making eco-friendly acquisitions (Song *et al.*, 2019; Waris and Hameed, 2020).

Hotel managers have an opportunity to leverage this market differentiation (Singjai *et al.*, 2018). Going green has become an effective strategy for hotels to compete and gain market share by attracting guests who are concerned about environmental issues (Asadi *et al.*, 2020; Hsiao *et al.*, 2018; Walsh and Dodds, 2017). Although green practices or going green in the hospitality industry provides competitive advantages, to date, the majority of studies on sustainable consumption only explored how individual consumer choices and behaviours affect environmental quality. This leaves a gap in better understanding consumers' attitudes towards green practices (Ardyan *et al.*, 2017; Pratono *et al.*, 2019). As a rule of thumb, researchers tend to look at all green products together rather than individual green items (Chang *et al.*, 2021).

As pointed out by scholars in this field, there has been instability in the green consumption behaviour construct. Besides, the factors influencing attitude and purchase intention are also ambiguous, requiring further investigation (Daryanto and Song, 2021; Demir *et al.*, 2021). Other researchers demonstrated that consumers' attitudes are a significant determinant of behavioural intention (Merli *et al.*, 2019; Patwary *et al.*, 2020). However, studies (Patwary *et al.*, 2021) also revealed a partial understanding of the factors that impact consumers' green attitudes and purchase intention in the hospitality industry.

Rawashdeh and Ababneh (2021) observed that 85% of travellers consider the consumption of environmentally friendly products as important on their trips but these

consumers are unwilling to spend extra to support environmental sustainability and some believe funding these green initiatives is the sole responsibility of hotels. [Teng et al. \(2018\)](#) observed a negative attitude towards green hotels among consumers because they imagine these practices to be expensive and requiring the need for compromising their needs and experiences. Practitioners are hesitant about going green because of the mixed feelings portrayed by customers regarding environmentally friendly products ([Kumar et al., 2021](#)).

Notably, existing research has not fully established how product type and consumer involvement can affect behavioural intention regarding green products. Previous researchers have not investigated differences in ecocentric and anthropocentric attitudes in influencing consumers' intentions to visit green hotels. Ecocentric and anthropocentric attitudes are both concerned about the environment and conservation of natural resources, but their motivations differ ([Foguesatto et al., 2019](#)). Hoteliers and academics should be aware of these differences in consumer attitudes and motivations. Ecocentric and anthropocentric attitudes favourably influence the attitude and behavioural intention to pay a premium to stay at green hotels ([Rahman and Reynolds, 2019](#)). This premise requires further investigation by including new variables impacting consumer attitudes and purchase intentions.

To better understand how environmental information affects pro-environmental behaviour, we need to consider other possible intermediaries in the chain of events ([Liu et al., 2021](#)). Additionally, empirical investigations on those factors are inadequate in the Malaysian context. Thus, in this study, we included environmental knowledge, perceived environmental responsibility and altruism as the determinants of attitude and behavioural intention by implementing [Ajzen's \(1991\)](#) Theory of Planned Behaviour (TPB) and [Stern and Dietz's \(1994\)](#) Value-Basis Theory (VBT) to fill the current literature gap. In addition, this study further investigates the mediating role of tourists' ecocentric and anthropocentric attitudes.

2. Literature review

2.1 Theoretical underpinning

Some studies highlight the Theory of Reasoned Action to predict and explain pro-environmental behaviours in tourists and the TPB to explain the consumer attitudes and behavioural intention towards green consumption ([Lin and Niu, 2018](#); [Nguyen et al., 2019](#); [Teng et al., 2018](#)). Our study aimed to resolve this dispute among "green" researchers by including vital TPB-related variables in the research framework that have not been studied previously. The inclusion of a predictor was recommended to observe any significant variance in intention or behaviour ([Ajzen, 1991](#)).

Most studies adapted [Thompson and Barton's \(1994\)](#) ecocentric and anthropocentric attitudes dimension to explain the environmental attitudes underlying tourist behaviour. Ecocentric attitudes are concerned with the environment as a whole and emphasise nature, whereas anthropocentric attitudes are concerned with the environment's positive impact on human well-being ([Thompson and Barton, 1994](#)). Individuals with either ecocentric or anthropocentric attitudes may have a positive attitude toward the environmental experiences, as evidenced by their consumption habits, recycling-reuse, environmental protection and daily life habits ([Kahriman-Ozturk et al., 2012](#)). [Thompson and Barton \(1994\)](#) say ecocentric and anthropocentric attitudes differ based on consumer reasoning in supporting conservation activities.

Although many factors may influence individuals' attitudes ([Kortenkamp and Moore, 2001](#); [Paco and Lavrador, 2017](#); [Patwary et al., 2021](#)), this study considered environmental knowledge, perceived environmental responsibility and altruism as functions of attitudes.

Individuals may have the same attitude about a specific product for very different reasons and companies need to consider this before attempting to change customer mindset (Trang *et al.*, 2019; Szabo and Webster, 2021; Verma *et al.*, 2019). Although a single attitude can serve more than one purpose, one attitude will be dominant. The relationship among environmental knowledge, perceived environmental responsibility, altruism and attitudes is supported by Stern and Dietz's (1994) VBT, which is instantiated on the theoretical aspects of values, beliefs, attitudes and behaviours. Stern and Dietz (1994) suggest that an individual's attitude will be directed towards the environment based on their perception and influence the use of resources. The theory established the relationship between environmental concern and other components, including egoistic, social-altruistic and biospheric value orientations and beliefs about the consequences of environmental change on valued objects.

2.2 Environmental knowledge, ecocentric and anthropocentric attitudes

Previous researchers insisted that environmental knowledge leads to more environmentally friendly behaviour (Indriani *et al.*, 2019; Otto and Pensini, 2017). Several studies in the hospitality and tourism disciplines indicates that knowledge about the environment and green practices significantly influences individuals' eco-friendly attitudes (Choe *et al.*, 2020; Wang *et al.*, 2018; Wang *et al.*, 2020). Consumers are unlikely to act pro-environmentally if they are unaware of potential problems arising from their actions (Daryanto and Song, 2021; Ernst *et al.*, 2017; Szabo and Webster, 2021). For example, Ernst *et al.*'s (2017) meta-analysis reported that environmental knowledge is one of the strongest predictors of responsible environmental attitude and intention. Choe *et al.* (2020) indicated consumers have a high level of environmental knowledge regarding renewable resources, garbage and habitual destruction but have a lower level of knowledge on climate change, energy production and water quality. Making a pro-environmental choice is difficult unless the individual thoroughly understands environmental issues and benefits. For example, students show that increased environmental knowledge positively influences environmental attitudes (Paço and Lavrador, 2017). Likewise, people with environmental knowledge demonstrate more positive attitudes and intentions towards environmental products in the hotel industry (Martinez-Martinez *et al.*, 2019).

Environmental attitudes are widely formed based on a person's awareness, commitment and knowledge of environmental protection (Ernst *et al.*, 2017). Hotel guests can be part of a community that actively acquires knowledge; so, we need to understand their perspective on natural resources when making decisions about sustainability (Singjai *et al.*, 2018). Aligned with Stern and Dietz's (1994) VBT, the use of environmental resources is determined by how knowledgeable people are about environmental issues and how they understand and value them. Thus, we propose:

- H1. Tourists' environmental knowledge positively affects ecocentric attitude.
- H2. Tourists' environmental knowledge positively affects anthropocentric attitude.

2.3 Perceived environmental responsibility, ecocentric and anthropocentric attitudes

Perceived environmental responsibility refers to the responsibility or actions an individual or group promotes for the sustainable use of natural resources (Chams and Blandón, 2019). Tourists are more likely to participate in pro-environmental activities if they feel responsible for environmental effects (Daryanto and Song, 2021; Zhang *et al.*, 2018). Further, people who recognise the importance of the environment and nature are more likely to demonstrate a

proper attitude towards the environment (Zhang *et al.*, 2018). Previous researchers have suggested that it is necessary to examine the impact of environmental responsibility on attitudes, particularly to comprehend consumers' attitudes towards green lifestyles (Kumar *et al.*, 2021). Szabo and Webster (2021) found that perceived environmental responsibility also affects purchase decisions.

Individuals' 'perceived environmental responsibility refers to a person's duty to protect ecology and ensure that their activities do not negatively impact the ecosystem or anyone else (Chiu *et al.*, 2014; He *et al.*, 2018; Kumar *et al.*, 2021). Tourists' desire to spend more money on environmentally friendly products is a reflection of their desire to take personal responsibility in protecting the environment (Verma and Chandra, 2018). The VBT by Stern and Dietz (1994) proposes that an individual's attitude depends on how that person poses and perceives their responsibility towards environmental protection. Accordingly, we propose:

- H3. Tourists' perceived environmental responsibility positively affects ecocentric attitude.
- H4. Tourists' perceived environmental responsibility positively affects anthropocentric attitude.

2.4 Altruism, ecocentric and anthropocentric attitudes

In their recent study, Morais *et al.* (2021) confirmed that individuals with altruistic characteristics are more likely to engage in green consumer behaviour to contribute to the greater welfare of others. Besides motivation, the go-green practice is generally promoted by Altruism Value (AV), also known as collective values. Several studies have shown that people's positive concerns about protecting the environment believe in AV (Zou and Chan, 2019). Researchers discovered a significant link between altruism and attitude (Prakash *et al.*, 2019; Wilkinson and Wilkinson, 2018). Besides, promoting altruism can positively shape tourist behaviour (Ali *et al.*, 2020; Prakash *et al.*, 2019; Wang *et al.*, 2020).

Further, researchers have focused on two main perspectives: self-interest and altruism (Ali *et al.*, 2020). Multiple studies have been conducted to determine the factors that can induce environmental concern in consumer behaviour and a hike in green purchases in tourism industry proves that consumers' consciousness towards saving the environment is involved (Trang *et al.*, 2019; Verma *et al.*, 2019). Consumers' support for companies that abide by the rules and laws relating to environmental consciousness also indicates that consumers' concerns about protecting the environment are improving (Kim *et al.*, 2020).

For many people, their altruistic beliefs about nature and humanity's role in it are a fundamental part of their belief system in relation to the environment (Ali *et al.*, 2020; Prakash *et al.*, 2019; Wang *et al.*, 2020). The more an individual connects with nature and values altruism, the more likely they develop a positive outlook towards life (Schultz *et al.*, 2004). Perkins and Brown (2012) agreed that people differ on the use of resources and the severity of environmental issues. To understand people's attitudes toward the environment, one must first understand how they view nature and how readily they will sacrifice comfort or luxury (altruism) for it. According to Stern and Dietz's (1994) VBT, the use of environmental resources is determined by how people perceive and value them. It concludes that people's altruistic characteristics can lead to positive attitudes towards environmental aspects (Schultz *et al.*, 2004). Thus, these hypotheses are assumed as:

- H5. Tourists' altruism positively affects ecocentric attitude.
- H6. Tourists' altruism positively affects anthropocentric attitude.

2.5 Ecocentric and anthropocentric attitudes and intention toward visiting green hotels

Intention is the likelihood of engaging in a certain behaviour (Ajzen, 1991). For green hotels, intention is described as tourists' willingness to stay in green hotels when travelling and recommending green hotels to others (Lee, 2009). This study explores tourists' intentions and attitudes towards staying in green hotels while visiting Malaysia. Attitudes drive a person's motives (Ajzen and Fishbein, 1980). Although different people can have a similar attitude towards an object, the reasons behind such attitudes could differ (Ledgerwood *et al.*, 2018). Attitudinal changes may influence the individuals' personal feelings and direct and indirect effects on their behaviour in different situations. For example, consumers may sometimes behave differently from their attitudes depending on different scenarios and contexts (Boncinelli *et al.*, 2019). Previous research has mostly focused on the relationship and disparity between green purchase intentions and actual behaviour or attitude and intention (Prakash *et al.*, 2019).

Attitude constructs explain behaviour, including ethics, values, beliefs and opinions. Self-reflection and self-reporting can be used to infer these feelings, which can be either negative or positive based on cognition and affect (emotion) (Kortenkamp and Moore, 2001; Kahrman-Ozturk *et al.*, 2012). Notably, there is a distinct difference between an ethic and a value, but they are both derived from each other (Ajzen and Fishbein, 1980). Ecocentric and anthropocentric are recognised as two fundamental aspects of attitudinal prospects related to natural environment (Milfont and Duckitt, 2004). Ecocentric attitude is more on preserving nature for its own values. In the tourism and hospitality context, tourists' attitude towards green practices influences one's decision to visit a green hotel and provides the required benefits usually eco-tourists seek (Chiu *et al.*, 2014; Han and Kim, 2010; Merli *et al.*, 2019). Tourists bearing ecocentric attitudes will show more support for environment-friendly infrastructures and facilities. Therefore, tourists with ecocentric attitudes are more prone to visit green hotels while visiting any destination (Xu and Fox, 2014).

In the 1860s, the term "anthropocentric" was coined to describe the belief that humans are the centre of the whole universe (Campbell, 1983). Anthropocentrism considers humans to be the most important form of life, with other forms of life being only as valuable as their ability to be exploited (Kortenkamp and Moore, 2001). Page and Connell define "anthropocentrism as the view that nature must be preserved for its intrinsic values". Predictors of behavioural intention, such as the TPB, emphasise the importance of attitudes toward behaviour (Ajzen, 1991). Customers' intentions to purchase environmentally friendly products were assessed in Greece and the UK by Kalafatis *et al.* (1999) using the TPB. Li *et al.* (2022) and Rahman and Reynolds (2019) found that the TPB partially supports the decision behind young consumers' purchase intention. For example, the TPB can be used to predict eco-friendly purchasing intention accurately. Thus, we assume:

H7. Ecocentric attitudes positively affect the intention to visit green hotels.

H8. Anthropocentric attitudes positively affect the intention to visit green hotels.

2.6 Mediating role of ecocentric and anthropocentric attitudes

According to the TPB's assumption that the intention to perform a specific behaviour is determined by attitude. Previous research has advocated for domain-specific factors (Armitage and Conner, 2001). The TPB has recently been expanded to include new constructs from a variety of fields (Lin and Niu, 2018; Nguyen *et al.*, 2019). The present study includes three additional constructs to measure consumers' green purchasing intentions: environmental knowledge, altruism and perceived environmental responsibility. Previous studies investigated attitude as a mediating variable between intention and other determinants (Han and Kim, 2010;

Wang *et al.*, 2018). Researchers argued that the gap between individuals' attitude and their intention would be understood more clearly if the mediating role of environmental attitude is imposed on the factors that influence attitude and intention (Sadiq *et al.*, 2022).

Customers will not compromise on a product's functional benefit for the sake of the environment. Hence, it is proposed that the mediation role of ecocentric and anthropocentric attitudes is important in determining green purchasing decisions (Perrea *et al.*, 2014). In addition to those tourists concerned with the environment and its sustainability, they are likely to have a positive attitude towards the environment, which will lead to green purchasing intention (Demir *et al.*, 2021; Prakash *et al.*, 2019). Understanding how consumers' ecocentric and anthropocentric attitudes mediate the relationships that lead to green hotel intention is critical. Thus, the present study also posits the hypotheses as:

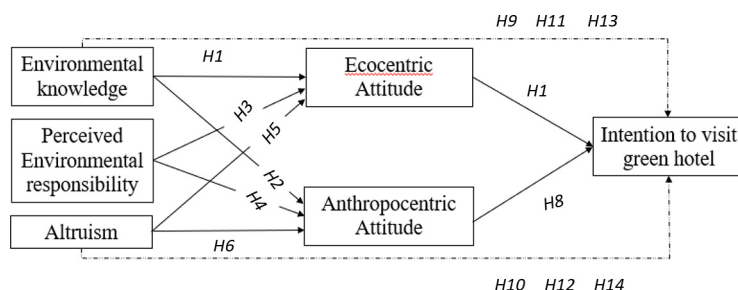
- H9. Tourists' ecocentric attitude is a mediator on the link of environmental knowledge and intention toward visiting green hotels.
- H10. Tourists' ecocentric attitude is a mediator on the link of perceived environmental responsibility and intention toward visiting green hotels.
- H11. Tourists' ecocentric attitude is a mediator on the link of altruism and intention toward visiting green hotels.
- H12. Tourists' anthropocentric attitude is a mediator on the link of environmental knowledge and intention toward visiting green hotels.
- H13. Tourists' anthropocentric attitude is a mediator on the link of perceived environmental responsibility and intention toward visiting green hotels.
- H14. Tourists' anthropocentric attitude is a mediator on the link of altruism and intention toward visiting green hotels.

Figure 1 shows the conceptual framework.

3. Research method

3.1 Sample

We followed the recommendations of earlier scholars in identifying the sample size for our research. For example, Thompson proposed that 384 cases were sufficient to test hypotheses for an unknown population. Thus, our sample size is 384 for the study population size (N) of approximately 25.9 million international tourists in Malaysia. Based on the social science's



Note: (—) Solid indicates direct and (---) dotted line indicates indirect hypotheses

Figure 1.
Conceptual framework

low response rate, the researcher decided to distribute 800 questionnaires among international tourists. Following the above suggestions, our sample size is sufficient as the exact number of international tourists in Malaysia is unknown and varies annually.

3.2 Data collection

Data were collected from June to October 2019. Previous research (Rabiul and Yean, 2021; Rabiul *et al.*, 2021a) has suggested that a more than 50% response rate is satisfactory for a pen–paper survey. Therefore, 800 questionnaires were distributed using a purposive sampling technique to obtain at least 384 responses. Questionnaires were distributed by representatives (such as students, friends and colleagues) and the researchers themselves in Kuala Lumpur, Penang, Selangor, Melaka and Kedah. These are the most prominent tourist areas and have the largest number of hotels (Rabiul *et al.*, 2021a; Rabiul *et al.*, 2021b).

Each questionnaire was directly handed to the participating tourist in a sealed envelope with a pencil. Only guests from outside Malaysia were approached. To reduce participation referrals, the researchers explained the study's purpose, and the survey was only distributed to those who showed a willingness to participate. Direct distribution of questionnaires minimises bias and confirms the anonymity and confidentiality of the respondents. The response rate was 55.37%, as 443 questionnaires were returned to us. After removing incomplete questionnaires with missing data and outliers, a total of 393 responses were considered valid for empirical testing.

3.3 Measurement

International tourists rated their opinions on environmental knowledge, perceived environmental responsibility, altruism, ecocentric attitude, anthropocentric attitude and intention on a seven-point Likert scale from “Strongly agree = 7” to “strongly disagree = 1” (see all items in supplementary materials).

Environmental knowledge was measured using seven items (out of ten) taken from the studies by Hornig *et al.* (2013). These seven items had good reliability and validity by Teng *et al.* (2018). The items include “I have knowledge about global warming (such as greenhouse effect)”.

Perceived environmental responsibility was measured using seven items taken from the study by Lee (2009). We used five items for perceived environmental responsibility after deleting two items (discussed in Section 4.2). The items include “I should be responsible for protecting our environment”.

AV was measured using six questions, adapted from the scales in the study by Rushton *et al.* (1981) and modified by Wang *et al.* (2020) (e.g. “I have given directions to a stranger”).

Ecocentric and anthropocentric attitudes were measured using ten and six items, respectively, adapted from the study by Thompson and Barton (1994). Two and three items were deleted from ecocentric and anthropocentric attitudes, respectively (Section 4.2). Items included for ecocentric and anthropocentric attitudes were “It makes me sad to see natural environments destroyed” and “We need to preserve resources to maintain a high quality of life”.

To assess the construct of visit intention, we used three items adapted from Ajzen and Fishbein, (1980) which were modified by Han *et al.* (2010). A sample item is “I am willing to stay at a green hotel when travelling”. Overall, the wording of the measures was modified slightly to fit with the study context and appropriateness.

3.4 Demographic profile of the respondents

Among the 393 respondents, male (50.9%) and female (49.1%) segregation are almost similar. The majority of the respondents are in the age group of 28–32 years old (22.6%), 43–47 years old (20.1%), followed by 33–37 years old (18.8%), where 69% of them are married. Meanwhile, 55.7% of the respondents are in the government sector, and 30.5% with the private sector. Respondents' nationality has been categorised in sub-regions as per the United Nations World Tourism Organization. Majority of the tourists are from the neighbouring countries: South-East Asia region (31.3%), South Asia (20.4), North-East Asia (14.8%), Northern Europe (10.7%), Oceania (6.6%), North America (5.1%), Western Europe (4.6%), Middle East (2.5%), Southern/Mediterranean Europe (2.3%), North Africa (1.3%) and the Caribbean (0.5%).

3.5 Data analysis

We applied partial least squares – structural equation modelling (PLS-SEM), the appropriate tool for testing theory and path analysis (Rasoolimanesh *et al.*, 2021). SEM measures and accommodates observed variables, representing any ambiguity in a construct of latent variables, and simultaneously explains casual relationships among latent and observed variables (Hair *et al.*, 2020). Further, some of the measurement errors prevalent in tourism research can be solved using PLS-SEM with many latent variables (Dijkstra and Henseler, 2015; Henseler *et al.*, 2015; Rasoolimanesh *et al.*, 2021).

4. Results

4.1 Outliers and common method bias

First, as Lynch (2013) recommended, outliers (only multivariate) with a significance level greater than 0.001 were identified and removed. Given the single source of the data, both procedural and statistical remedies were applied to avoid potential common method variance (Podsakoff and Organ, 1986). The variables' measurements were placed randomly (Podsakoff and Organ, 1986). Further, a shorter version of the behavioural intention measurement ensured no overlapping between constructs (Rabiul and Yean, 2021). Harman's single factor test was also applied, indicating that a single factor explained only 16.54% of the total variance of 63.23%. As this value was less than 50%, it can be established that the data did not have a common method variance (Podsakoff and Organ, 1986). Table 1 reports the correlation, mean and standard deviation of the variables.

4.2 Results of measurement model assessment

To evaluate measurement validity, we followed Dijkstra and Henseler (2015) proposed formula (consistent alogirth) where all items must load at least 0.60, have a composite

Constructs	Mean	SD	1	2	3	4	5	6
Environmental knowledge	4.755	1.153	1					
Perceived environmental responsibility	5.465	1.020	0.083	1				
Altruism	5.215	0.9519	0.097	0.332**	1			
Ecocentric attitude	4.751	1.042	0.232**	0.220**	0.216**	1		
Anthropocentric attitude	4.636	1.198	0.042	0.161**	0.091	0.241**	1	
Intention	5.156	1.293	0.202**	0.303**	0.307**	0.321**	0.215**	1

Note: **Two-tailed significant correlation at 0.01 level

Table 1.
Bivariate Pearson correlation among variables, mean, and standard deviation (Std. Dev)

reliability (CR) greater than 0.70 and an average variance extracted (AVE) greater than 0.50 (Henseler *et al.*, 2015; Hair *et al.*, 2020). As suggested by Hair *et al.* (2014), a few items were omitted for low factors loadings (less than 0.60), namely, two items for perceived environmental responsibility, two for ecocentric attitude and three for anthropocentric attitude.

Table 2 shows that all items in the constructs had acceptable loadings between 0.686 and 0.911 (Dijkstra and Henseler, 2015; Hair *et al.*, 2020). The CR values (Table 2) were 0.934 for environmental knowledge, 0.937 for perceived environmental responsibility, 0.909 for altruism, 0.946 for ecocentric attitude, 0.878 for anthropocentric attitude and 0.918 for intention (0.918), respectively. Hence, all our variables met the satisfactory criterion for convergent validity (Dijkstra and Henseler, 2015). Additionally, heterotrait-and-monotrait

Variables	Items	Loading	CR	AVE
Anthropocentric attitude	AA1	0.778	0.878	0.547
	AA2	0.731		
	AA3	0.713		
	AA4	0.728		
	AA5	0.741		
	AA6	0.743		
Altruism	ALT1	0.865	0.909	0.628
	ALT2	0.838		
	ALT3	0.695		
	ALT4	0.901		
	ALT5	0.686		
	ALT6	0.743		
Ecocentric attitude	EA1	0.843	0.946	0.639
	EA10	0.740		
	EA2	0.804		
	EA3	0.772		
	EA4	0.821		
	EA5	0.831		
	EA6	0.766		
	EA7	0.855		
	EA8	0.823		
Environmental knowledge	EA9	0.727	0.939	0.660
	EK2	0.830		
	EK3	0.826		
	EK4	0.846		
	EK5	0.796		
	EK6	0.827		
	EK7	0.782		
	EK8	0.765		
Intention	INT1	0.873	0.918	0.738
	INT2	0.901		
	INT3	0.811		
Perceived environmental responsibility	PER1	0.854	0.937	0.751
	PER2	0.904		
	PER3	0.897		
	PER4	0.910		
	PER5	0.757		

Table 2.
Convergent validity
and reliability

Notes: AVE = average variance extracted; CR = composite reliability

(HTMT) ratios were below the recommended value of 0.85 as suggested by Henseler *et al.* (2015) (see Table 3). Thus, it confirms no discriminant validity issues for all variables

The cross-validated redundancy (Q^2) value should be greater than 0.02 and standardised root mean residual (SRMR) < 0.08 for a minimum fit model in PLS (Hair *et al.*, 2020). Although a coefficient of determination (R^2) of 0.10 indicates satisfaction, values of 0.041, 0.125 and 0.129 indicate weak influence (Hair *et al.*, 2014, 2020). Table 4 presents the detailed values and evaluation of SRMR, R^2 and (Q^2) and shows that with moderate effects and moderate predictive relevance, the model is good (Hair *et al.*, 2014, 2020).

4.3 Results of structural model assessment and hypothesis testing

To evaluate the stated hypotheses, we used consistent bootstrapping with over 5,000 resamples against 393 respondents. We used statistical methods (i.e. p -values, t -values) and bootstrapping, as suggested by Nitzl *et al.* (2016) and Rasoolimanesh *et al.* (2021), to test direct and indirect effects (see Table 5). Out of 12 hypotheses, nine were supported, and three were not (see t -values, p -values, and path coefficient in Table 5).

For direct effects, as shown in Table 5, environmental knowledge, perceived environmental responsibility and altruism positively influenced consumers' ecocentric attitudes; therefore, $H1$ (t -value = 3.908, p -value = 0.000), $H3$ (t -value = 2.470, p -value = 0.014), and $H5$ (t -value = 3.100, p -value = 0.002) are supported. Perceived environmental responsibility influences anthropocentric attitude (t -value = 3.100; p -value = 0.002) but environmental knowledge (t -value = 0.534; p -value = 0.593) and altruism (t -value = 1.053; p -value = 0.293) do not. Thus, $H2$ and $H6$ are not supported while $H4$ is supported. Ecocentric and anthropocentric attitudes positively influence consumers' behavioural intention; therefore, $H7$ (t -value = 4.988; p -value = 0.000) and $H8$ (t -value = 2.664; p -value = 0.008) were also supported.

For indirect effect, if any effect on the dependent variable by an independent variable is not significant with the mediator's help, this reveals that the mediator variable has no mediation effect (Nitzl *et al.*, 2016). Table 5 demonstrates the indirect effects and shows that ecocentric attitude mediates the relationship of environmental knowledge (t -value = 2.062;

Variables	1	2	3	4	5	6
1. Altruism						
2. Anthropocentric attitude	0.128					
3. Ecocentric attitude	0.237	0.270				
4. Environmental knowledge	0.124	0.068	0.256			
5. Intention	0.331	0.247	0.364	0.219		
6. Perceived environmental responsibility	0.369	0.184	0.237	0.119	0.333	

Table 3.
HTMT (heterotrait and monotrait) ratio

Variables	R^2	Q^2	SRMR
Anthropocentric attitude	0.041 (Weak)	0.015 (Weak)	
Ecocentric attitude	0.125 (Satisfactory)	0.075	0.058 (Good)
Intention	0.129 (Moderate)	0.09 (Moderate)	

Notes: SRMR = standardised root mean residual; R^2 = coefficient of determination; Q^2 = cross-validated redundancy

Table 4.
Model evaluation

Table 5.
Direct hypotheses

No.	Hypothesised Path	β	t-values	p-values	95% BCCI		Supported
					LL	UL	
H1	Environmental Knowledge → Ecocentric Attitude	0.220	3.908	0.000*	0.086	0.308	Yes
H2	Environmental Knowledge → Anthropocentric Attitude	0.030	0.534	0.593 ns	-0.092	0.128	No
H3	Perceived Environmental Responsibility → Ecocentric Attitude	0.156	2.470	0.014**	0.045	0.287	Yes
H4	Perceived Environmental Responsibility → Anthropocentric Attitude	0.168	3.100	0.002**	0.044	0.268	Yes
H5	Altruism → Ecocentric Attitude	0.148	2.773	0.006**	0.024	0.244	Yes
H6	Altruism → Anthropocentric Attitude	0.062	1.053	0.293 ns	-0.075	0.162	No
H7	Ecocentric Attitude → Intention	0.296	4.988	0.000*	0.166	0.393	Yes
H8	Anthropocentric Attitude → Intention	0.142	2.664	0.008**	0.016	0.248	Yes
<i>Indirect or Mediated Hypotheses</i>							
H9	Environmental Knowledge → Ecocentric Attitude → Intention	0.065	2.062	0.004**	0.029	0.107	Yes
H10	Environmental Knowledge → Anthropocentric Attitude → Intention	0.004	0.490	0.624 ns	-0.014	0.023	No
H11	Perceived Environmental Responsibility → Ecocentric Attitude → Intention	0.046	2.123	0.034***	0.014	0.100	Yes
H12	Perceived Environmental Responsibility → Anthropocentric Attitude → Intention	0.024	1.752	0.080 ns	0.003	0.060	No
H13	Altruism → Ecocentric Attitude → Intention	0.044	2.062	0.040***	0.006	0.088	Yes
H14	Altruism → Anthropocentric Attitude → Intention	0.009	0.920	0.358 ns	-0.008	0.029	No

Notes: ** $p \leq 0.01$ or $t \geq 2.58$; *** $p \leq 0.05$ or $t \geq 1.96$; β = path coefficient. ns= not significant; BCCI = bias corrected confidence interval; LL = lower level; UL = upper level; * $p \leq 0.001$ or $t \geq 3.29$

p -value = 0.004), perceived environmental responsibility (t -value = 2.123; p -value = 0.034), altruism (t -value = 2.062; p -value = 0.040), and intention. Thus, *H9*, *H11* and *H13* are supported. Anthropocentric attitude mediates the relationship of perceived environmental responsibility (t -value = 1.752; p -value = 0.080) and intention. Thus, *H12* is supported. However, anthropocentric attitude does not mediate the relationship among environmental knowledge (t -value = 0.490; p -value = 0.624), altruism (t -value = 0.920; p -value = 0.358), and intention; thus, *H10* and *H14* are not supported.

5. Discussion

This study found that environmental knowledge, perceived environmental responsibility and altruism positively influences consumers ecocentric attitudes. According to [Levine and Strube \(2012\)](#), people's pro-environmental attitudes can largely be predicted by their level of ecological knowledge. When it comes to buying green products, consumers who have better long-term environmental knowledge are more likely to spend more money and be more eager ([Brosdahl and Carpenter, 2010](#)). This finding also corresponds with previous studies that reported that having sufficient information about environmental issues and being responsible for the environment will cultivate consumers' ecocentric attitudes while considering the behavioural intention of choosing green hotels ([Paco and Lavrador, 2017](#); [Patwary et al., 2022](#); [Rahman and Reynolds, 2016](#)).

Our findings also suggest that perceived environmental responsibility positively influences anthropocentric attitudes. Previous studies statistically found that environmentally responsible tourists tend to have a positive attitude towards green or eco-friendly practices while visiting ([Chiu et al., 2014](#); [He et al., 2018](#)). However, environmental knowledge and altruism do not influence anthropocentric attitudes. Although previous literature indicates that environmental knowledge and altruism can affect the way people value the green hotels ([Prud'homme and Raymond, 2016](#)). Nonetheless, putting environmental knowledge into the perspective of anthropocentric attitudes, some may think that innovation or development of green technology and infrastructure also could harm nature. This could be the reason why environmental knowledge and altruism do not influence positively anthropocentric attitudes.

Our findings further confirm that consumers' ecocentric and anthropocentric attitudes play a fundamental function in their behavioural intention. This result aligns with previous studies ([Rahman and Reynolds, 2016](#); [Teng et al., 2018](#)). It has been pointed out that regardless of ecocentric or anthropocentric attitudes, consumers might still have positive behaviours about environmental issues ([Thompson and Barton, 1994](#)). According to [Nitzl et al. \(2016\)](#), a mediator explains why or how its predictor leads to its outcome variable. The current study highlights the importance of the mediating mechanism of ecocentric attitude among environmental knowledge, perceived environmental responsibility, altruism and intention. These findings are consistent with previous studies where attitude mediates the relationship between intention and related factors ([Patwary et al., 2021](#); [Wang et al., 2018](#); [Yin et al., 2020](#)).

Meanwhile, anthropocentric attitudes did not influence as mediator on the link of environmental knowledge, altruism and intention toward visiting green hotels. Some studies found no mediating effect of attitude while connecting behavioural intention in the hotel industry ([Demir et al., 2021](#); [Sadiq et al., 2022](#)). The reason could be that having environmental knowledge and altruistic behaviour might lead to a negative perception of green development and infrastructure. But attitude did mediate the relationship between perceived environmental responsibility and intention, which reconfirms the previous study [Patwary et al. \(2021\)](#). Thus, for green hotel managers, enhancing attitude

level is critical for maximising the influence of environmental knowledge, perceived environmental responsibility and altruism on visit intention.

5.1 Theoretical contributions

First, the stimulating role of environmental knowledge perceived environmental responsibility, and altruism in cultivating consumers' attitudes in the Malaysian context, has been confirmed, contributing to the VBT by [Stern and Dietz \(1994\)](#). In other words, our findings show the applicability of VBT by investigating international tourists in Malaysia. Second, ecocentric and anthropocentric attitudes have been shown to influence consumers' behavioural intention to choose green hotels positively. The results also validate [Ajzen and Fishbein's \(1980\)](#) TPB, where consumers' behavioural intention depends on the presence of attitude and related factors. Thus, our study is contributing to TPB theory in the hotel industry by investigating international tourists.

Third, an ecocentric attitude is a significant mediator among international tourists' altruism, environmental knowledge and responsibility and visiting green hotels. Hence, this study makes a significant contribution to the construction of a new model using SEM, integrating chosen additional variables and contributing to the applications of both the TPB and VBT theories. Future studies can take the advantage of similar factors or theories to measure consumers' attitudes and intentions. Centred on the research outcomes, it is confirmed that international tourists' attitudes and behavioural intentions in Malaysia are significantly influenced by environmental knowledge, perceived environmental responsibility and altruism.

5.2 Practical implications

The conceptual framework established in this study suggests a new direction for the managers to develop marketing strategies for green hotels more effectively in developing countries like Malaysia. Equally, this framework will also benefit more mature destinations by replicating their traditional business model into a customer-oriented paradigm. This section draws the attention of hotel managers and offers practical implications by highlighting consumers' attitudes and behavioural intentions concerning green practices in the hotel industry. This study will be useful for marketers by understanding the attitudinal factors that significantly influence tourists' intention to stay in green hotels.

This study will also assist the marketers in green hotels in making decisions and reinforcing the strategies to convince tourists in Malaysia to patronise green hotels. When it comes to environmentally friendly products, there is no single solution for all. Marketing strategies for green products must consider that items might differ significantly based on their linked participation, consumption dynamics and features. Regarding the role of international tourists' green practices; this study establishes, in a Malaysian context, that tourists' attitudes are significantly influenced by the environmental factors depicted by environmental knowledge, perceived environmental responsibility and altruism. This implies that managers need to adhere to these factors in their marketing activities.

Accordingly, the findings of this study provide practical implications for managers in the Malaysian tourism sector because it proves that international tourist's environmental knowledge, environmental responsibility and altruistic behaviour have a positive effect on attitude towards green hotels. As suggested by [Wang et al. \(2020\)](#), making efforts to increase environmental knowledge among tourists is an important element and part of marketing for hoteliers. The hotels can take the initiative to display informative posters of the green hotel rooms and facilities to make tourists aware of sustainable consumption and environmental protection ([Aboramadan and Karatepe, 2021](#)). These initiatives will encourage tourists to

select green hotels during their visit. Awareness about green hotels is still in the early stage among Malaysia consumers. This implies improving international tourists' attitudes towards the intention to visit green hotels. Besides, hotel managers must address environmental issues by marketing their services as environmentally friendly and green to attract more international guests. International travellers' desire to stay in environmentally friendly hotels is examined in this study using a practical and integrated approach. This information can be used in the development of programs to attract international travellers to stay in green hotels.

5.3 Policy implication

This study offers input needed by policymakers in understanding the reason and demonstrating the importance of green practices in the hotel industry and its connection with related factors in achieving sustainable tourism development in Malaysia as part of national tourism policy transformation strategies and sustainable development goals of the 2030 Agenda. As proposed in Malaysia's "National Tourism Policy" and its six transformational strategies, one of the strategies is to practise sustainable and responsible tourism. In this study, the central focus was responsible consumption by implementing green practices in the hotel industry, entirely aligned with Malaysian national tourism policy and one of the sustainable development goals.

5.4 Limitations and future research directions

There are, despite our contributions, a number of limitations to this study and future research directions are suggested. First and foremost, demographic characteristics and their ties to the main research model were not taken into account in this study. If these demographic variables had been controlled, the study would have yielded more significant results and better explanations for its findings. It is recommended that future studies take into account demographic factors including gender, age, race and religious affiliation to better understand hotel guests' preferences for environmentally friendly operations.

Second, despite the use of proven research instruments and measuring scales equipped with validity and reliability testing, the internal validity of the questionnaires may be compromised. Because this survey was centred around the opinions and perceptions of international tourists in Malaysia, there is always the possibility that respondents may provide superficial replies or even provide false information to appease the researcher. As a result, future studies may need to use a different method to solve this problem and may benefit from a different quantitative or qualitative method.

Third, Malaysia's economic expansion and rising standard of living will necessitate a greater focus on environmentally friendly methods by practitioners and consumers in the near future. Therefore, to develop a solid foundation and body of knowledge in this field in Malaysia, conducting research using a combination of qualitative and mixed methods would be beneficial. Emerging cases of environmental protection and some related issues in Malaysia that have been sustained over time are examples of issues that future researchers can address. Further, studies based on in-depth interviews with business professionals and tourism academics can further develop new models to boost this research area.

6. Conclusion

This study has confirmed that environmental knowledge, perceived environmental responsibility and altruism significantly influences consumer attitude. In keeping with the above, businesses are left with no choice but to consider these factors in their marketing activities to motivate and retain "green" tourists. Notably, tourists' behavioural intentions in

considering green hotels can be significantly predicted by their ecocentric and anthropocentric attitudes. Hence, together, the predictive power of the TPB and the VBT was valid as our findings adequately accorded with the theory, achieved empirical fit and showed that reliance on such theory is justifiable.

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