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Does religion influence consumers' green food consumption? Some insights from Malaysia

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Abstract

Purpose – This paper aims to examine whether Muslim and non-Muslim consumers give different importance to green food consumption.
Design/methodology/approach – Data were analysed using means comparison and multiple discriminant analysis across a sample of 700 students in a public higher learning institution in the Federal Territory of Labuan, Malaysia, using the convenience sampling technique.
Findings – Empirical results via multiple discriminant analysis discovered that imperative aspects such as specific needs, personal environmental values related to green food and governmental efforts strongly predict discrimination towards green food consumption among the non-Muslim consumers. Muslim consumers follow a strict diet that complies with religious dietary laws.
Practical implications – Understanding Muslim and non-Muslim consumers' awareness of and intentions towards green food consumption is very important for any manager in the food industry or food market, as it is critical that the food they produce is safe, environmental and healthy. It is understood that Muslim consumers are very particular about food intake, as they can only consume food that complies with religious dietary laws.
Originality/value – The results of this study presented vital insights and enhanced the understanding of the role of religion and its influence on green food consumption in Asia.

Keywords Consumer behaviour, Malaysia, Green, Consumption intention, Multiple discriminant analysis, Muslim consumers

Paper type Research paper

An executive summary for managers and executive readers can be found at the end of this issue.

Introduction

Green foods are those that are healthy and safe to consume, use less chemicals, have higher vitamin and mineral content and involve consistently higher standards of animal health and welfare than conventional foods (Lea and Worsley, 2005; Norazah, 2013). Green food also stands for edible produce and processed products produced in a sustainable environment which maintains technical standards with quality control, non-pollution, safety, good quality and carries a special logo. Consumers are aware that green foods are rich in nutrients with young cereal grasses such as wheat, barley, oats and alfalfa which have detoxifying values while maintaining pH balance. The potassium and magnesium found in green foods have known health benefits and help to maintain the acid balance in the body and make the body more alkaline.

Consumers are aware of the effect of eating habits on health-related problems like obesity, Type 2 diabetes and coronary diseases (Nicolaou *et al.*, 2009). This motivates them to change their purchasing patterns and eating habits towards higher demand for green food and natural food for their own consumption and health benefits because they are exposed to changes in lifestyle, standard of living, tastes and preferences and have higher purchasing power (Phuah *et al.*, 2011). Technical advances in agriculture and marketing have also affected their concern with their health (Lea and Worsley, 2005; Norazah, 2013; Paul and Rana, 2012; Smith and Paladino, 2010). This behaviour influences the growth of the food industry in ensuring a balance between development and environmental sustainability (Barber *et al.*, 2012; Krystallis *et al.*, 2011; Papista and Krystallis, 2013). Consumers are mainly concerned about health issues, protection of the environment and animal welfare besides food safety in terms of food processing methods, innovative food technologies and chemical substances in foods such as pesticides, toxins and food additives (Borin *et al.*, 2011; Hansen *et al.*, 2011; Stanton *et al.*, 2012).

Preceding research affirmed that cultural diversity is an important criterion to expedite more sustainable food consumption patterns among society (Nicolaou *et al.*, 2009; Schösler *et al.*, 2012). The role of religion in shaping consumer food choice is rather vague except where the impact of food consumption depends on the religion itself (Bonne *et al.*, 2007). Religion can influence consumer attitudes and behaviour, including food purchasing decisions and eating habits (Pettinger *et al.*, 2004). Indeed, each religion focuses on different aspects of

food consumption some of which may be less important to people who strictly adhere to other religious dietary laws. Eating halal food is an Islamic attitude towards food which has become a sign of identity for the Muslim community strictly in line with Islamic values as a reflection of obedience and adherence to the religion's beliefs and teachings (Bonne *et al.*, 2007). Muslim consumers' attitudes towards halal food consumption is influenced by religious belief, mass media and people around them (Aiedah, 2014). Further, the appearance of a religious symbol or halal logo on product packaging helps Muslims to use it as a marker and allegory of Islamic identity to justify their product purchases without hesitation guided by their religious beliefs and laws (Bakar *et al.*, 2013).

Research on food consumption is widely explored in consumer settings in North America and Europe while too few research studies deliberate on religion and green food consumption, specifically differentiating between the behaviour of Muslim and non-Muslim consumers in the context of Asian countries. Study of how to endorse green food consumption intention among Muslim and non-Muslim consumers in Asia is desirable, as it has become a global issue for environmental protection. It is essential to examine whether there is an environmental or food ethic based in Islam and whether this could be used to further ethical consumption (Schösler *et al.*, 2012). Hence, this study aims to examine whether Muslim and non-Muslim consumers give different importance to green food consumption.

Empirical results of this study filled the gap in the existing body of literature concerning the influence of religion on green food consumption in Asia, offered a new stimulus to the findings of previous studies and highlighted for the food and beverage industry the attitudinal profiles of Muslim and non-Muslim consumers in Asia towards green food consumption.

Literature review

Theory of planned behaviour

The theory of planned behaviour (TPB) developed by Ajzen (1991) is used as the guiding principle in this study where individuals' specific behaviour is determined by their intention, and such behavioural intention can be predicted by attitude, subjective norm and perceived behavioural control. For sustainable consumption of green food, attitude towards behaviour can be considered an individual (internal) value, but subjective norm or social norm is external social pressure, while perceived behavioural control indicates whether green food is available or convenient to buy (Vermeir and Verbeke, 2008). Besides, both personal factors and context factors can be determinants of sustainable consumption of green food (Tanner and Kast, 2003). Past research by Phuah *et al.* (2011) asserted that TPB has been applied in green food consumption from the attitudes and awareness towards green products, subjective norms (e.g. green society or environmentally friendly society) and perceived behavioural control (e.g. food safety, friendliness towards the environmental and animals). Perceived behaviour control and attitudes towards healthy eating are the central factors in predicting adolescents' intention to eat healthily (Chan and Tsang, 2011).

Effect of internal factors on intention to consume green food

Internal factors are those related to consumers' attitude towards behaviour or personal values which are a prevailing stimulus of environmental behaviour to help protect the environment and to save the limited natural resources on the earth (Stern and Dietz, 1994; Vining and Ebreo, 1992). Human concern for environmental issues affects their behaviour in a positive or negative manner (Chan, 1996; Kim *et al.*, 2012). Factors such as consumer awareness, specific needs, values, lifestyles, motivation and environmental attitudes strongly affect their purchase intentions and also apply to green food consumption (Cleveland *et al.*, 2005; Fraj and Martinez, 2006; Young *et al.*, 2010). Furthermore, there is a strong association between environmental attitudes and purchasing frequency and intention in the sense that more environmentally concerned individuals are more likely to buy green food with the perception that green products are healthier than conventional alternatives (Peattie, 2010; Vermeir and Verbeke, 2008; Zhou *et al.*, 2013).

Effect of external factors on green food consumption

External factors are subjective and social norms related to social environment or government management which could directly or indirectly influence entrepreneurial decisions and company performance (Kuratko and Hodgetts, 2004; Mohd, 2005). Influence of external factors such as governmental efforts and media plays a major role in enlightening consumers on the seriousness of environmental problems which affect sustainable food consumption (Oosterveer and Spaargaren, 2011). Results by Norazah (2013) implied that young consumers used environmental knowledge in assessing products during purchasing decisions where attention was placed on products with green-related statements or assurances on the product label. As a consequence, when consumers are aware of eco labels, they react more positively towards green marketing and the purchase of green products (Rashid, 2009).

Effect of context factors on green food consumption

Context factors are perceived behavioural controls that indicate the ease or difficulty of obtaining green food (Vermeir and Verbeke, 2008). For example, socio-economic characteristics, living conditions and store characteristics facilitate green food consumer behaviour (Tanner and Kast, 2003). Without the right context, consumers may buy environmentally unfriendly food despite their preference for green food (Tanner, 2006). Lack of sustainable products in local retail outlets, factories or farmers' markets may inhibit the purchase of sustainable foods (Bonne *et al.*, 2007; Vermeir and Verbeke, 2008). However, consumers perceive that green food has value and benefits and that is why they are willing to pay a higher price for the improvements of food safety (Henson, 1996).

Additionally, environmental consciousness guides people to make greener purchase decisions (Peattie, 2001). Environmentally conscious people tend to change their purchasing behaviour to improve the environment (Chase, 1991). Thus, environmental behaviour entails environmental values which can significantly influence personal norms and

guide consumers towards environmentally friendly behaviour (Reser and Bentrupperbaumer, 2005; Stern, 2000). Ajzen (1991) demonstrated that environmental beliefs shape attitudes towards behaviour, including buying intentions. Research also shows that technical products are more likely to be rejected by consumers who are interested in environmental matters because they are aware of the damaging impact on the environment (Peattie, 1999).

Effect of green food consumption intention on consumption

Green food consumption can be described as replacement of old consumption and production behaviour with environmentally friendly consumption as well as production. This leads to sustainable green growth and includes a wide range of environmentally friendly actions such as reducing CO^2 emissions (Nikkheslat *et al.*, 2012). Green consumption is also related to consumers' efforts in recycling, energy conservation, energy efficient appliances, mass transit and carpooling besides involvement in community efforts regarding hazardous waste sites, proper disposal of certain products and toxic chemicals and participating in grass-roots efforts and legislation.

Intention influences one's specific behaviour (Ajzen and Madden, 1986; Oliver, 1997; Shaw and Constanzo, 1983). However, to change a specific behaviour, one must first change the intention to perform that behaviour (Coleman *et al.*, 2011). Even if we cannot measure the actual behaviour, Zeithaml *et al.* (1996) view behaviour intention as an indicator that predicts whether consumers will remain with or defect from a particular company. Green consumption intentions are found to significantly influence a person's actual purchasing behaviour (Zhou *et al.*, 2013).

Effects of consumer religion

Specific ideologies are related to green food consumption and sustainable food choices which include some elements of spiritual lifestyles, such as locavorism and vegetarianism, practiced widely by Western immigrants in Western European countries (Schösler *et al.*, 2012). Food choices are deeply embedded within Turkish traditions that set the Western and non-Western immigrant groups apart (Schösler *et al.*, 2012). Many Muslim immigrants in Western European countries are strongly religious (Saroglou and Galand, 2004). Muslims' diets are more normative and abide by dietary laws fixed in their holy scriptures, concerned with the preparation and consumption of meat which has to be "halal" (Roodenburg, 2007). The Qur'an mentions food often and praises it as one of God's gifts to humanity (Davidson, 2006). According to Schwartz (1994), religious people have characteristics such as favouring values that support conservation of social and individual order (tradition and conformity), place less value on openness to change and autonomy (stimulation and self-direction) and do not value self-transcendence, universalism and self-enhancement (power, hedonism and stimulation). It was found that universalism was negatively associated with (classic) religiosity compared to spirituality among Belgian citizens and Muslim immigrants (Saroglou and Galand, 2004).

Based on the above reasoning, the following hypotheses are postulated:

H1. Specific needs strongly predict discrimination between Muslim and non-Muslim consumers.

H2. Convenience strongly predicts discrimination between Muslim and non-Muslim consumers.

H3. Green food consumption intention strongly predicts discrimination between Muslim and non-Muslim consumers.

H4. Green food consumption strongly predicts discrimination between Muslim and non-Muslim consumers.

H5. Promotion strongly predicts discrimination between Muslim and non-Muslim consumers.

H6. Governmental efforts strongly predict discrimination between Muslim and non-Muslim consumers.

H7. General environmental values strongly predict discrimination between Muslim and non-Muslim consumers.

H8. Personal environmental values related to green food strongly predict discrimination between Muslim and non-Muslim consumers.

Methodology

Out of a total of 750 structured close-ended questionnaires administered to the students in a public higher learning institution in the Federal Territory of Labuan, Malaysia, using convenience sampling technique during one month (from 1 March 2013 to 31 March 2013), a total of 700 completed and usable questionnaires were successfully collected, yielding an effective response rate of 93 per cent. Students from Generation Y (born between 1978 and 1994) tend to be more concerned about the green environment and influence their parents' purchasing decisions (Coddington, 1993; Tulgan and Martin, 2001). This sampling method did not allow the researcher to have any control over the representativeness of the most readily available sample, regardless of characteristics. Students' participation was purely voluntary.

The multiple-item measurement instruments were compiled from various validated sources based on literature review and past studies from the work of Tanner and Kast (2003) while green food consumption intention was adopted from Grankvist and Biel (2001) and Wandel and Bugge (1997), and green food consumption behaviour was adopted from Chan (2001) with some modifications to suit the context of this research. The multiple items were measured on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree and were estimated using the mean values for data analysis. The structured close-ended questionnaire comprised three sections. The first part of the questionnaire gathered characteristics of respondents' demographic profiles. The second section collected information on respondents' experience of green food. The final part attempted to examine subjects' perception of green food consumption such as

knowledge of green consumption, attitudes towards green consumption, internal and external influencing factors and green consumer behaviour. Descriptive analysis such as means and standard deviation, factor analysis and correlation analysis were performed via Statistical Package for Social Sciences (SPSS) computer program Version 21. Means comparison and multiple discriminant analysis were then carried out for data analysis.

Data analysis

Table I gives the demographic information of respondents – gender, age and education level – of Muslim and non-Muslim respondents. Of the 700 participating respondents, 385 were female and 315 were male. As this study was conducted on students, they were young adults between 18 and 25 years old. Specifically, more than half of the participating subjects were between 22 and 25 years old (61.3 per cent). Close to three quarters of the participants were currently undertaking degree programs (74 per cent).

Experience of green food consumption

Table II displays respondents' experiences with green food consumption. When asked about monthly expenditures for green food, 292 out of 700 respondents selected "RM21-RM40". This indicates that most people are willing to spend money on green consumption. Approximately, 58 per cent of respondents reported visiting a green food cafe one to three times (Table II). In their experience of switching to a different green food cafe, three quarters of the respondents switch one to three times. The reason for choosing green food is mainly health (74 per cent), followed by more choices of green food (19 per cent) and cheaper price (7 per cent).

Description of green food consumption

The descriptive statistics, mean, standard deviation and standard error mean of each item of green food consumption among Muslim and non-Muslim consumers are detailed in Appendix 1. Little variation exists in the mean values among the questionnaire items for both religious groups.

Among non-Muslim consumers, the statement "Humans need to understand the existing and developing ways of nature and then comply with these ways" was the most popular (M =

Table I Demographic profile of respondents

Characteristics	Muslim (*n* = 504) (%)	Non-Muslim (*n* = 196) (%)	Total (*n* = 700) (%)
Gender			
Male	199 (63)	116 (37)	315 (45)
Female	305 (79)	80 (21)	385 (55)
Age (years old)			
18-21	211 (41.9)	60 (30.6)	271 (38.7)
22-25	293 (58.1)	136 (69.4)	429 (61.3)
Education level			
STPM/matriculation	110 (73.8)	39 (26.2)	149 (21.3)
Diploma	29 (90.6)	3 (9.4)	32 (4.6)
Degree	365 (70.3)	154 (29.7)	519 (74.1)

Table II Experiences on green food consumption

Experiences	Frequency	(%)
Monthly expenses for green food		
<RM20	259	37.0
RM21-RM40	292	41.7
RM41-RM60	108	15.4
RM61-RM80	31	4.4
>RM81	10	1.5
Frequency of visiting the green food café		
1-3 times	405	57.9
3-8 times	229	32.7
8-12 times	50	7.1
>12 times	16	2.3
Experience for switch to a different green food café		
1-3 times	531	75.9
3-8 times	153	21.9
>8 times	16	2.3
Main reason of choosing green food		
Healthy	517	73.9
Cheaper price	47	6.7
More choices of green food	136	19.4

3.903), and the statement "To survive, humans must harmoniously coexist with nature" (M = 3.898) was the second most popular. This is followed by the statement "Promotion by media can increase green food consumption" with M = 3.883 while the statement "I always buy green food" was the least popular (M = 3.342) among non-Muslim consumers.

Among the Muslim consumers, the statement "Promoting green food helps to better preserve the environment of our country" was the most prevalent item (M = 3.871), and the statement "Humans need to understand the existing and developing ways of nature and then comply with these ways" (M = 3.835) was the second most popular among Muslim consumers. This was followed by the statement "We need to harmoniously coexist with nature" with M = 3.804 while the statement "When preparing parties or dinners, I would choose green food" was the least popular (M = 3.323) among Muslim consumers.

Factor analysis

Factor analysis, a data reduction technique, was deployed to reduce a large number of variables to a smaller set of underlying factors, which categorize and summarize the essential information contained in the variables. Principal component analysis with varimax rotation was chosen as the extraction method to the test the validity of the constructs for the 32 items (Appendix 2). The Bartlett test of sphericity was significant (χ^2 = 5,473.322; p < 0.01) and the Kaiser-Meyer-Olkin measure of the sampling adequacy was well above 0.50 at 0.86 signifying sufficient inter-correlations. Inspection of the anti-image of the correlation matrix was well beyond the satisfactory level of 0.50.

In this study, after the 30 remaining items with loadings above 0.50 were grouped into 8 factors, they were labelled

with different names that summarized the essential contents of the variables (Appendix 2). Factor loadings ranged between 0.525 and 0.857. The first referred to item "I will go with friends to buy green food" and the last referred to items "Food safety supervision by government is satisfactory". Before that, two items "I like to buy green food as a responsible consumer" and "Promoting green food helps to better preserve the environment of our country" were dropped from further analysis as having item loadings below the threshold value of 0.50.

Reliability analysis

The internal consistency of the constructs was measured via Cronbach's coefficient alpha to determine whether a group of items consistently reflected the construct it was measuring. Results in Table III display Cronbach's alpha values of all variables greater than the benchmark value of 0.700, thus confirming that the items grouped into this factor are reasonable and the measurement reliability of this study is acceptable.

Correlation analysis

Pearson correlation coefficient was computed to examine the strength and direction of the correlation between two continuous variables beside the linear relationship between independent variables and the dependent variable in the study. Empirical results in Table IV revealed that all correlations among the study variables were significant at the 0.05 level of which convenience factor has the strongest correlation with "green food consumption intention" factor ($r = 0.446$, $p < 0.01$), followed by specific needs factor ($r = 0.413$, $p < 0.01$). This showed that both variables were dependent on each other and had a positive correlation. Furthermore, all the variables have variance inflation factor (VIF) values of less than 10, and tolerance values of more than 0.10, thus ensuring that multicollinearity was absent.

Comparison of mean values between Muslim and non-Muslim consumers

Table V portrays comparison of mean values for factors of green food consumption between Muslim and non-Muslim

consumers with its ranking of importance. The non-Muslims include Hindus and Buddhists who are strict vegetarians and have strict dietary rules. In fact, both groups of consumers express very encouraging attitudes towards personal environmental values related to green food (Muslim consumers: M = 3.775, SD = 0.663 while non-Muslim consumers: M = 3.855, SD = 0.595), followed by promotion (Muslim consumers: M = 3.765, SD = 0.716 while non-Muslim consumers: M = 3.816, SD = 0.705). Moreover, results show that Muslim consumers have lower scores on the factors, except for convenience factor.

Multiple discriminant analysis

Multiple discriminant analysis was performed to examine whether Muslim and non-Muslim consumers give importance to different attributes of green food. The discrimination of consumer religion with respect to green food was successful in classifying 56 per cent of the original grouped respondents (Table VI), signifying the research findings have classification accuracy greater than 25 per cent achieved by chance and have cross validation beyond the discriminating results as suggested by Hair *et al.* (2010). Only one religious discriminant function was used in the analysis, as two groups were investigated with results of Wilks' $\lambda = 0.983$; $\chi^2 = 11.974$; df = 8, p-value < 0.001 which was considered significant.

In Table VII, results of the standardized religious discriminant function coefficients and the discriminant loadings of the multiple discriminant analysis indicated the specific needs (discriminant loading = 0.712) had the highest discriminating power and represent the main contributing factor in discriminating between Muslim and non-Muslim consumers' green food consumption. Thus, *H1* was supported. However, they were not affected by factors such as convenience, green food consumption intention and green food consumption behaviour, as discriminant loadings less than the cut-off value of 0.30, inferring *H2*, *H3* and *H4* were not sustained.

Further assessment of the findings, as detailed in Table VII, divulged that promotion/diffusion (discriminant loading = 0.546) and governmental efforts (discriminant loading = 0.608) also strongly predicted the discrimination between Muslim and non-Muslim consumers' green food consumption. Therefore, *H5* and *H6* are supported. Next, general environmental value (discriminant loading = 0.523) as posited in *H7* significantly impacted their green food consumption, thus *H7* was accepted and conformed to the empirical data. Likewise, personal environmental value related to green food factor (discriminant loading = 0.619) significantly predicted the differences between the non-Muslim and the Muslim consumers' green food consumption, inferring *H8* is also retained.

Discussion

This study examined whether Muslim and non-Muslim consumers give importance to different attributes of green food consumption and provided meaningful interpretations that are worthy of discussion. Multiple discriminant analysis results revealed that each group emphasizes different aspects of green food consumption. Based on the large standardized

Table III Reliability analysis

Variable	No. of items	No. of item dropped	Cronbach's alpha
CON A: specific needs	4	0	0.768
CON B: convenience	3	0	0.737
TEN: green food consumption intention	6	1	0.755
BEH: green food consumption behaviours	4	0	0.789
EXT A: promotion/diffusion	2	0	0.700
EXT B: governmental efforts	3	0	0.781
INT A: general environmental value	4	0	0.757
INT B: personal environmental value related to green food	4	1	0.741

Table IV Inter-correlations among variables

Factors	CON A	CON B	TEN	BEH	EXT A	EXT B	INT A	INT B	Religion
CON A	1								
CON B	0.566**	1							
TEN	0.413**	0.446**	1						
BEH	0.464**	0.421**	0.468**	1					
EXT A	0.135**	0.161**	0.171**	0.110**	1				
EXT B	0.270**	0.261**	0.206**	0.260**	0.462**	1			
INT A	0.150**	0.179**	0.222**	0.072	0.202**	0.162**	1		
INT B	0.118**	0.092*	0.117**	0.048	0.190**	0.160**	0.275**	1	
Religion	0.094*	−0.005	0.008	0.011	0.032	0.041	0.023	0.055	1
Mean	3.434	3.569	3.620	3.432	3.779	3.644	3.773	3.798	1.280
SD	0.673	0.602	0.538	0.717	0.713	0.665	0.590	0.645	0.449
Skewness	−0.524	−0.567	−0.557	−0.555	−0.487	−0.317	−0.007	1.599	0.982
Kurtosis	0.562	1.802	2.041	1.046	0.477	0.349	−0.063	1.744	−1.039
Tolerance	0.599	0.605	0.671	0.664	0.757	0.718	0.863	0.898	
VIF	1.669	1.652	1.491	1.505	1.320	1.392	1.159	1.114	

Notes: *Correlation is significant at the 0.05 level (two-tailed); **correlation is significant at the 0.01 level (two-tailed); SD = standard deviation; VIF = variance inflation factor

Table V Comparison of mean values between muslim and non-muslim consumers

Factors	Muslim consumers				Non-Muslim consumers			
	Mean	SD	Standard error mean	Rank	Mean	SD	Standard error mean	Rank
Specific needs	3.394	0.677	0.030	8	3.534	0.654	0.047	7
Convenience	3.571	0.591	0.026	6	3.565	0.630	0.045	6
Green food consumption intention	3.618	0.521	0.023	5	3.627	0.579	0.041	5
Green food consumption behaviours	3.427	0.719	0.032	7	3.445	0.712	0.051	8
Promotion/diffusion	3.765	0.716	0.032	2	3.816	0.705	0.050	2
Governmental efforts	3.627	0.664	0.030	4	3.687	0.668	0.048	4
General environmental value	3.764	0.586	0.026	3	3.795	0.603	0.043	3
Personal environmental value related to green food	3.775	0.663	0.030	1	3.855	0.595	0.042	1

Table VI Classification results

	Predicted group membership		
Religion	Muslim consumers (%)	Non-Muslim consumers (%)	Total
Muslim consumers	274 (54.4)	230 (45.6)	504
Non-Muslim consumers	79 (40.3)	117 (59.7)	196

religious discriminant function coefficients and discriminant loadings, presented in Table VII, it is worthwhile to note that specific needs were the main contributing factor and the strongest predictor in discriminating between Muslim and non-Muslim consumers' green food consumption. Therefore, *H1* was retained and conformed to the empirical data. Among the non-Muslim consumers, they mainly stated that in a good mood, they would buy green food to reward themselves and also would choose green food with higher prices when giving presents to other friends or family members.

Non-Muslim consumers' positive green food consumption is further enhanced when payment is flexible, such as credit card can be used for product purchases in the market. They also would choose green food when preparing parties or dinners, as they are very concerned with having a healthy lifestyle (Appendix 1). Muslim consumers follow a strict diet that overwhelmingly complies with religious dietary laws which could promote more sustainable and healthy lifestyles. Chan and Tsang (2011) affirmed that attitudes towards healthy eating greatly influence youngsters' intention to eat healthily. Past studies, for instance, Chan et al. (2013), Chao et al. (2005), Fleck et al. (2012), Tantiseneepong et al. (2012) and Thwaites et al. (2012) found that a consumer, who has a positive perception of the product brand, will be inclined to develop a greater willingness to purchase the product and subsequently actively seek out the product in a store.

The findings of this research further demonstrated that the next striking factor in discriminating between Muslim and non-Muslim consumers is personal environmental values related to green food aspects, hence supporting *H8*. Non-Muslim consumers regarded "Humans need to understand the existing and development ways of nature and then comply with these ways" as the most popular issue, followed by "To survive, humans must harmoniously coexist with nature", and "Humans are only part of nature". On the other hand, Muslim consumers were very concerned with the statement "We need to harmoniously coexist with nature". This finding is aligned with Norazah (2013), Paul and Rana

Table VII Results of multiple discriminant analysis

Hypotheses	Factors	Standardized canonical coefficients	Discriminant loadings	Rank
H1	Specific needs	1.109	0.712*	1
H2	Convenience	−0.622	−0.035	6
H3	Green food consumption intention	−0.137	−0.057	7
H4	Green food consumption behaviours	−0.169	−0.086	8
H5	Promotion/diffusion	0.110	0.546*	4
H6	Governmental efforts	0.139	0.608*	3
H7	General environmental value	0.030	0.523*	5
H8	Personal environmental value related to green food	0.324	0.619*	2

Note: *Denote significant predictor of religious discriminant function with discriminant loadings $> \pm 0.30$

(2012) and Tobler *et al.* (2011) who noted that environmental motives influence consumers to purchase green food which is facilitated by positive attitudes towards environmental protection (Kim *et al.*, 2012; Tanner and Kast, 2003). Indeed, any changes in lifestyle of consumers will have a related impact on their purchase intention (Heilig, 2003). It is important to note that humans need to understand the existing and developing ways of nature and then comply with these ways. The changes in consumer lifestyle cause them to demand more green food and natural food consumption, including halal food and healthy food (Phuah *et al.*, 2011).

Further investigation of the study discovered that Muslim and non-Muslim consumers value green food consumption differently within the dimension of governmental efforts, implying *H6* is ascertained. Specifically, non-Muslim consumers expressed satisfaction with government efforts on the management of green food labelling in promoting green food consumption among consumers. Green food labelling and cues can not only provide information communication between consumers and producers but also promote more sustainable and ethical business practices. Governmental efforts to enforce the environmental-friendly logos and cues, including the halal logo, can help the consumers to differentiate the food products that comply with green concepts and are halal for consumption. Besides, consumers are also concerned with the issues of satisfactory food safety supervision by the appointed government bodies in Malaysia such as Ministry of Health and Malaysia's Department of Islamic Development. Next, promotion/diffusion was the fourth successful predictor of Muslim and non-Muslim consumers' green food consumption, signifying *H5* was also retained. The attractive and informative promotions related to green product awareness and consumption via the traditional or digital media also contribute to an increase in green food consumption. This finding reiterates previous research of Engels *et al.* (2010) that government efforts such as a comprehensive sustainability label could considerably influence green food consumption patterns.

Conclusion and recommendations

This research conveys intriguing and vital implications for research and practice, as green food consumption continues to be an important research issue. The empirical findings offer academic contributions in the form of a new forward motion to the existing body of knowledge of green food consumption

among Muslim and non-Muslim consumers in Asia by providing additional information to narrow the research gap with regards to enhancing the understanding of whether Muslim and non-Muslim consumers give importance to different attributes of green food consumption. Empirically, this quantitative research finding demonstrated that specific needs, personal environmental values related to green food and governmental efforts were important in predicting the non-Muslim consumers' consumption of green food, which provided evidence that a green food lifestyle is reflected in an individual's consumption pattern.

Furthermore, this study extended an application of the TPB by investigating the role of religion and its influence on the consumers' sustainable consumption of green food in Asia. Thus, this study contributes to a better understanding of these issues to current theories of green consumption. Based on the theory, attitude towards behaviour was considered an individual (internal) value; subjective norm or social norm was referred to as external social pressure, while perceived behavioural control indicated that the green food was available or convenient to buy (Vermeir and Verbeke, 2008). Next, this research could be the basis for further research in which researchers could replicate the quantitative data analyses used and explicate the contribution of the current study to understand whether Muslim and non-Muslim consumers give different importance to attributes of green food consumption.

Incontestably, it is essential for managers in the food industry to know whether Muslim and non-Muslim consumers give importance to different attributes of green food to help them to offer products which can satisfy all ranges of customers' unlimited needs and wants. It is understood that Muslim consumers are very particular about food intake guided by the useful allegory of the halal logo, as they can only consume food that strictly complies with religious dietary laws. The results of this study provided valuable insights to managers in the food industry to also look into the non-Muslim consumers as one of their target markets in the halal food industry. This category of consumers develop positive acceptance of halal food during product selection and evaluation by referring to the clear halal labelling and logo placed on the product packaging, as they prefer to consume clean and hygienic food to enjoy a more healthy lifestyle. Bonne *et al.* (2007) noted that non-Muslim consumers' decisions to value halal food products are purely voluntary due to health benefits it offers. Thus, the products of the food

industry are very critical for food safety, environmental protection and health (Rezai *et al.*, 2011).

Furthermore, managers in the food industry dealing with or considering international markets or doing business in Islamic countries can use the findings of this study while they are developing their marketing strategies by recognizing the importance of religion to elements of specific needs, personal environmental values related to green food and governmental efforts. They need to carry out effective marketing campaigns to stimulate positive awareness of green food consumption values and benefits towards developing healthy lifestyles among Muslim and non-Muslim consumers in national and international trade shows, exhibitions and advertisements. Indeed, they need to ensure that their marketing communication strategies comply with socially accepted norms, as consumers share a common bond of religion. For example, managers in the food industry need to develop effective marketing strategies and activities through the use of clear and acceptable religious cues in green food product packaging and advertisements for a uniquely Malaysian way of marketing to minimize consumer doubts of consuming unsuitable products by not complying with religious dietary laws, when the products are imported. These efforts could uphold positive perceptions towards green products and quality for increased green product market sustainability and acceptance (Norazah, 2013).

There are a few limitations to the current research findings. One limitation of this study is related to sampling. The sample was only distributed among 700 students from one of the public higher learning institutions in the Federal Territory of Labuan, Malaysia. Thus, the results may have limited application to Malaysia and also include only young adults with an educational level higher than that of most Malaysians. It is recommended to widen the coverage of sample selection across students regardless of university or secondary level in Asian countries to improve the generalizability of the results and to provide more accurate and holistic results. A comparison between different cultural groups would reflect the differences and similarities of green food consumption. Next, the study focuses on general green food products when assessing the relative importance of influencing factors of green food consumption behaviours and their ability to predict consumers' religion. This would suggest that findings are not easily generalizable to all green food products. Furthermore, generalizability of the findings could be improved by investigating a specific green food product which offers diverse avenues for further research.

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Appendix 1

Table AI Descriptive statistics of green food consumption

Statements	Label	Religion	Mean	SD	Standard error mean
Promotion by media can increase green food consumption	EXT1	Muslim	3.782	0.825	0.037
		Non-Muslim	3.883	0.792	0.057
More channels for promotion by media can increase green food consumption	EXT2	Muslim	3.748	0.791	0.035
		Non-Muslim	3.750	0.856	0.061
I will follow friends to buy green food	EXT3	Muslim	3.558	0.903	0.040
		Non-Muslim	3.587	0.882	0.063
Food safety supervision by government is satisfactory	EXT4	Muslim	3.649	0.823	0.037
		Non-Muslim	3.684	0.878	0.063
Green food labelling management by government is satisfactory	EXT5	Muslim	3.675	0.803	0.036
		Non-Muslim	3.791	0.849	0.061
To survive, humans must harmoniously coexist with nature	INT1	Muslim	3.714	0.799	0.036
		Non-Muslim	3.898	0.791	0.056
Humans need to understand the existing and developing ways of nature and then comply with these ways	INT2	Muslim	3.835	0.748	0.033
		Non-Muslim	3.903	0.762	0.054
We need to harmoniously coexist with nature	INT3	Muslim	3.804	1.580	0.070
		Non-Muslim	3.770	0.930	0.066
Humans are only part of nature	INT4	Muslim	3.748	0.847	0.038
		Non-Muslim	3.847	0.846	0.060
Promoting green food helps to better preserve the environment of our country	INT5	Muslim	3.871	0.742	0.033
		Non-Muslim	3.816	0.808	0.058
Green food makes me think more about the environmental protection of our country	INT6	Muslim	3.778	0.791	0.035
		Non-Muslim	3.801	0.808	0.058
Production methods of green food can decrease pollution in the world	INT7	Muslim	3.734	0.801	0.036
		Non-Muslim	3.760	0.803	0.057
Promoting green food helps preserve the environment for the next generation	INT8	Muslim	3.788	0.860	0.038
		Non-Muslim	3.801	0.892	0.064
When human interface with nature exceeds the limit, disasters will come	INT9	Muslim	3.758	0.903	0.040
		Non-Muslim	3.816	0.869	0.062
When giving presents, I would choose green food with higher prices	CON1	Muslim	3.421	0.910	0.041
		Non-Muslim	3.531	0.941	0.067
When preparing parties or dinners, I would choose green food	CON2	Muslim	3.323	0.897	0.040
		Non-Muslim	3.464	0.862	0.062
When flexible payment such as credit or band card can be used, I would buy green food	CON3	Muslim	3.389	0.822	0.037
		Non-Muslim	3.475	0.897	0.064
In a good mood, I would buy green food to reward myself	CON4	Muslim	3.444	0.863	0.038
		Non-Muslim	3.668	0.802	0.057
Shops selling green food have a good environment	CON5	Muslim	3.633	0.758	0.034
		Non-Muslim	3.638	0.749	0.053
Shops selling green food are conveniently located for transportation	CON6	Muslim	3.458	0.776	0.035
		Non-Muslim	3.520	0.800	0.057
There are many outlets for purchasing green food	CON7	Muslim	3.621	0.828	0.037
		Non-Muslim	3.536	0.850	0.061
I plan to continue to buy green food	TEN1	Muslim	3.641	0.798	0.036
		Non-Muslim	3.582	0.840	0.060
I plan to buy green food next month	TEN2	Muslim	3.486	0.862	0.038
		Non-Muslim	3.536	0.774	0.055
I will buy green food to guarantee my health	TEN3	Muslim	3.667	0.722	0.032
		Non-Muslim	3.679	0.774	0.055
					(*continued*)

Table AI.

Statements	Label	Religion	Mean	SD	Standard error mean
I will pay more for green food for high quality life	TEN4	Muslim	3.569	0.878	0.039
		Non-Muslim	3.648	0.873	0.062
I would like to buy green food to avoid illness, as unhealthy food may hurt my health	TEN5	Muslim	3.708	0.752	0.033
		Non-Muslim	3.668	0.776	0.055
I would like to buy green food to reduce environmental damage	TEN6	Muslim	3.635	0.768	0.034
		Non-Muslim	3.648	0.825	0.059
I would like to buy green food as a responsible consumer	TEN7	Muslim	3.542	0.774	0.034
		Non-Muslim	3.541	0.873	0.062
I always buy green food	BEH1	Muslim	3.341	0.935	0.042
		Non-Muslim	3.342	0.950	0.068
I always try to buy food with green labels	BEH2	Muslim	3.468	0.845	0.038
		Non-Muslim	3.454	0.812	0.058
I buy green food even at higher prices	BEH3	Muslim	3.333	1.005	0.045
		Non-Muslim	3.388	1.009	0.072
I recommend green food that I have consumed to my relatives and friends	BEH4	Muslim	3.566	0.862	0.038
		Non-Muslim	3.597	0.909	0.065

Appendix 2

Table AII Factor loadings for green food consumption

Items	CON A	CON B	TEN	BEH	EXT A	EXT B	INT A	INT B
CON2	0.796							
CON1	0.767							
CON3	0.706							
CON4	0.649							
CON7		0.809						
CON6		0.718						
CON5		0.631						
TEN3			0.692					
TEN4			0.684					
TEN2			0.645					
TEN6			0.611					
TEN1			0.546					
TEN5			0.541					
BEH3				0.760				
BEH2				0.690				
BEH1				0.670				
BEH4				0.642				
EXT1					0.856			
EXT2					0.837			
EXT4						0.857		
EXT5						0.807		
EXT3						0.525		
INT8							0.808	
INT7							0.751	
INT9							0.607	
INT6							0.574	
INT1								0.706
INT2								0.673
INT3								0.614
INT4								0.596
TVE	6.204	2.633	1.891	1.598	1.392	1.287	1.058	0.986
PVE	20.68	8.778	6.303	5.325	4.640	4.290	3.527	3.288

Notes: CON A = specific needs; CON B = convenience; TEN = green food consumption intention; BEH = green food consumption behaviours; EXT A = promotion/diffusion; EXT B = governmental efforts; INT A = general environmental value; INT B = personal environmental value related to green food; TVE = total variance explained; PVE = percentage variance explained