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An extended model of value-attitude-behavior to explain Chinese consumers' green purchase behavior

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ABSTRACT

This study proposed an extended value-attitude-behavior model to explain for consumers' green purchase behavior and validated this model on a random sample of 399 Chinese consumers in Hong Kong. Results of structural equation modelling showed that consumers' environmental consciousness (value) strongly influenced their attitude towards environmental issues and towards eco-social benefits (attitude), which in turn exerted positive effects on their green purchase behavior (behavior). Green product information was found to be a key determinant of consumers' green purchase behavior. Moreover, high quality green products were reported to moderate the relationships between attitude towards eco-social benefits and green purchase behavior and between green product information and green purchase behavior, but not on the relationship between attitude toward environmental issues and green purchase behavior.

1. Introduction

Organizations have been paying more attention to market green products (Kumar et al., 2017; Moser, 2016). In the European Union (EU), 26% of consumers purchased green products frequently while 54% of EU consumers purchased them sometimes (The European Commission, 2016). In China, demand for organic and green food has surged because of increasing disposable income (McCarthy et al., 2015). Young consumers have high intention to purchase green products (Chekima et al., 2016; Yadav and Pathak, 2017) and health consciousness and environmental consciousness influenced their purchase of organic food (Rana and Paul, 2017).

Ritter et al. (2015) suggested that more studies should be done on what and how to promote green purchase behavior. Using customer-dominant logic that focuses on consumers' values, attitudes, behavior, and context rather than organizational strategy, policy, practices, and activities (Cheung and To, 2016; Heinonen and Strandvik, 2015), value-attitude-model (VAB) (Homer and Kahle, 1988; Milfont et al., 2010) was selected because Kim and Choi (2005) highlighted that value-attitude behavior model proved to be useful for understanding the predictors of environmentally conscious behavior and their interrelationships of environmental concern and green purchase behavior in a collectivistic society where individuals are prone to engage in recycling behavior because they are more cooperative and tend to help others than those in collectivistic society (Li, 1997). We also extended this model in this study by examining how consumers' environmental consciousness (value) affects their attitudes towards environmental issues and eco-social benefits (attitudes), which in turn influence consumers' green purchase (behavior). The VAB model is chosen because there is a gap between the high value that people place on the environment and their low level of action taken by them to handle environmental issues. Unless we have a better understanding on reasons of people's considerations on environment, otherwise, we cannot translate their environmental concern onto intensively protecting the environment and achieving sustainable development.

Numerous studies have examined antecedents of green purchase, namely, green marketing orientations (Papadas et al., 2017), environmental concerns, and care for green products (Esmaeilpour and Bahmiary, 2017). Yet, far less has been done on conditions or/and mechanisms that influence how consumers place value on the environment, which in turn exert an impact on green purchase behavior. Recent researchers have started to look at conditions of making consumers purchase more green products because there are internal and external factors that affect the relationship between consumers' attitude towards going green and green purchase behavior. One of internal factors is the attributes of green product, namely the level of quality, degree of aesthetics, and number of functions. By identifying these attributes, researchers can understand better on how to shape consumers'

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attitude towards going green which further induces green purchase behavior. The exceptional study was conducted by Zahid et al. (2018) in which they grounded on the theory of planned behavior to propose that consumers' concern for the environment exerted an indirect impact on green product purchase intention through concern for environmental consequences, and eco factors were able to moderate the relationship between concern for environmental consequences and consumers' purchase intention.

In this study, we conceptualized that consumers' value i.e. their environmental consciousness to produce less waste positively influenced their attitude towards environmental issues and attitude towards eco-social benefits. We also included green product information (i.e. knowledge about green products) as an additional attribute that facilitated consumers to place a high value on green products (Barber et al., 2009; Kumar and Ghodeswar, 2015; Zhao et al., 2014). Bae et al. (2016) highlighted that provision of transparent product information led to a higher acceptability of green products. Indeed, Lin and Huang (2012) found that psychological benefits, a stronger desire for knowledge, and greater novelty seeking are key drivers of consumer choice behavior regarding green products. We also proposed that green product quality would moderate the attitude-behavior relationship. Researchers (Mancini et al., 2017) suggested that eco-friendly product quality represents the willingness of firm to add value onto green products. Given a high desire to protect the environment, consumers who have favourable attitude towards environmental issues may be more alert to the proportion of green ingredients and that influence their confidence in purchasing green products. Compared to green products with poor quality, good quality ones produce less packaging waste and use fewer chemicals in production, this may further strengthen consumers' favourable attitude towards eco-social benefits on purchasing green products. Finally, high-quality green products have better attributes that facilitate consumers to use the green information on screening for green products.

The study aimed at answering the research question of, "To what extent do consumers' green attitudes indirectly influence the relationship between environmental consciousness and green purchase behavior?" Our finding contributes to the literature (for example, Mishal et al., 2017) on green purchase behavior that environmental consciousness, which is a kind of environmental considerations, was unlikely to exert an impact on green purchase behavior, except this link is made through consumers' attitude towards going green, namely attitude towards environmental issues and attitude towards eco-social benefits. Theoretically, we extended our understanding on the VAB model that green product quality moderates the green attitude-behavior relationship. We also added the cognitive factor of green product knowledge into this comprehensive VAB model by driving consumers to promote their green purchase behavior in a high rather than low quality of green product. Moreover, we filled the gap in dearth of research that extended VAR model on explaining for concerns of Chinese consumers on making green purchase behavior. For example, Minkov and Hofstede (2012) highlighted that Chinese tend to have a higher collectivistic value. People of collectivistic value tend to more proactive in environmental protection, such as being cooperative, caring of others, and place higher values on group over personal ones. Indeed, McCarty and Shrum (2001) revealed a positive link of collectivism to pro-environmental behavior. Kim and Choi (2005) suggested that Chinese place importance on prosperity of group over that of personal. Finally, practitioners will be provided clues to how they can develop superior green product attributes and drive for ecologically friendly behavior.

2. Literature review and hypothesis development

Value is an individual's enduring belief that a specific mode of conduct that is personally or morally preferable (Rokeach, 1973). This guides an individual's attitudes towards objects and influences what this person does. Homer and Kahle (1988) suggested that the causal relationships between value, attitude and behavior are *value → attitude → behavior*. Homer and Kahle (1988) provided empirical support for the VAB model of consumers' purchase of natural foods on 831 food shoppers in the United States. Since then, the VAB model has been applied to explain consumers' recycling behavior (McCarty and Shrum, 1994), wildland preservation voting behavior (Vaske and Donnelly, 1999), and consumers' healthy food choices in restaurants (Kang et al., 2015). Kumar et al. (2017) and Moser (2016) applied the theory of planned behavior – a well-known psychological theory to explain green product consumption. Yet, Kumar et al. (2017) reported that subjective norms did not significantly influence consumers' intention to purchase green product directly and their consumption behavior in a collectivist society while Moser (2016) reported that subjective norms should be replaced by personal norms. Moreover, Chen (2016) and Chen and Tung (2010) reported that perceived behavior control was not a significant predictor of environmental behavior among Chinese. Hines et al. (1987) synthesized research on responsible environmental behavior. They reviewed 128 environmental behavior studies and reported that there was moderate, significant correlation between consumers' attitude towards environmental issues/practices and their behavior (mean correlation $r = 0.347$, SD = 0.224) in 51 studies. Hines et al.'s (1987) environmental responsible behavior model suggested that personality factors such as their attitude towards environmental issues/practice and locus of control, and knowledge influenced consumers' intention and actual behavior (Hines et al., 1987; Hungerford and Volk, 1990). Thus, the VAB model was chosen in the study and the effects of consumers' knowledge such as green product information as well as perceived green product quality on green purchase behavior were also explored.

2.1. Environmental consciousness and attitudes

Environmental consciousness has become a human value that reflects individuals' recognition, value judgment, and belief in minimizing harm to the environment (Kim and Chung, 2011). When an individual has a strong environmental consciousness, he/she is more concerned about protecting the environment (Ritter et al., 2015). This concern may shape the individual's attitude towards environmental issues. Gadenne et al. (2011) found that consumers who were concerned about the environment were more likely to develop a positive belief in protecting the environment and reducing the amount of environmental damage. Bech-Larsen (1996) suggested that environmental consciousness led to consumers' positive attitudes towards certain products and brands. Hence, we posit that:

Hypothesis 1a. Environmental consciousness positively influences attitude towards environmental issues.

A consumer with a strong environmental consciousness is more likely to be concerned about eco-social benefits. As s/he shows concern for the environment, s/he is more likely to buy green products that not only preserve the environment, but also develop green market. Concern for the environment may lead an individual to maximize eco-social benefits. For an example, an individual may buy an energy-saving refrigerator to reduce the consumption of natural resources. Liu and Dong (2017) suggested that green consumers might obtain more psychological benefits from purchasing environmental friendly products. Bei and Simpson (1995) highlighted that consumers perceived life improvement through using green products. Moreover, consumers promote their self-image as environmental friendly individuals that are built from purchasing and consuming green products. The enhancement of self-image forms a positive stimulus that drives consumers to consume green products. Consumers show concern for the environment may believe it is their moral obligation to protect the environment. Tsai et al. (2014) suggested that environmentally conscious individuals were more likely than others to reduce cognitive dissonance by eliminating or reducing inconsistencies of benefits related to social–environmental issues. Thus,

we posit that:

Hypothesis 1b. Environmental consciousness positively influences attitude towards eco-social benefits.

2.2. Environmental attitudes, green product information, and green purchase behavior

When an individual has a favourable attitude towards the environment, s/he shows more concern for environmental issues and focuses on eco-social benefits. This may drive her/him to replace non-green products with green ones. Researchers (Hines et al., 1987; Kotchen and Reiling, 2000) found that environmental attitudes were salient drivers of environmental behavior and behavioral intention. Kumar et al. (2017) and Lin and Huang (2012) reported that consumers' attitude towards environmental issues had positive effects on green product purchase intention. When consumers know such intention do more good to society, they will make more purchase of green products. Indeed, Chan (1999) suggested that attitude towards green purchase could affect green purchase behavior via the mediator of green purchase intention. Kim and Chung (2011) reported that environmental consciousness influenced consumers' attitude towards buying organic skin/hair care products, which in turn influenced their intentions to buy such products. Hence, we posit that:

Hypothesis 2a. A positive attitude towards environmental issues positively influences consumers' green purchase behavior.

Hypothesis 2b. A positive attitude towards eco-social benefits positively influences consumers' green purchase behavior.

When an individual is knowledgeable about green products including product information and green product quality, s/he knows what kind of action may affect the environment. Such information can be available in eco-labels. Rex and Baumann (2007) suggested that the information shown in eco-labels was an effective tool to facilitate consumers in making purchase decision about whether green products were safe to be consumed. Leire and Thidell (2005) stated that eco-labels facilitated consumers to make green purchase decision. The information can be available in different forms including videos showing the stringent green specifications and/or awards that facilitated consumers to make smart decisions on green product purchase.

When consumers get accessible information on green products at the point of sale, they find it easier to evaluate product ingredients and decide whether paying higher prices for green products that might cause less harm to the environment. In fact, researchers (Biswas and Roy, 2015; Rokicka, 2002) found that consumer knowledge on ecological issues was a key determinant of environmentally friendly behavior, such as green product purchase. Thus, we posit:

Hypothesis 2c. Green product information positively influences consumers' green purchase behavior.

2.3. The moderating role of green product quality

Hines et al. (1987) reported that the strength of the association between environmental attitude and environmental behavior was moderate. Tikka et al. (2000) argued that this relationship could be moderated by gender. Given a stronger pro-social environmental orientation (Seager, 2003), women are more focused on environmental protection than men. Chekima et al. (2016) showed that the relationships between cultural values and green purchase intention and between green product information and green purchase intention were moderated by gender, and women tended to have stronger green purchase intention.

Aside from gender, Lee (2009) found that the association between Hong Kong adolescents' environmental attitude and green purchasing behavior was weak, a finding suggesting that adolescent consumers' green purchasing behavior could be moderated by emotional appeals. Similarly, Volsky et al. (1999) claimed that consumers did not purchase eco-friendly products based on their attitude towards the environment alone. Thus, we conjecture that green product quality is one of the factors that may moderate the effects of consumers' attitude towards environmental issues, their attitude towards eco-social benefits, and green product information on green purchase behavior.

Numerous researchers (Borin et al., 2011; D'Souza et al., 2007; Ritter et al., 2015) suggested that green product quality affected consumers' green purchase intention and behavior. As green products consume less energy and/or resources, consumers believe that the use of such products may bring more benefits and strengthen consumers' favourable attitude towards environmental protection. The value gained on saving energy and/or resources may create a stronger drive to purchase more green products. By contrast, even if consumers have favourable attitude towards environmental issues but green products are of lower quality, they may find no substantial difference in using green from that of non-green products. Hence, they may purchase less green products.

Hypothesis 3a. Green product quality moderates the positive relationship between consumers' attitude towards environmental issues and green purchase behavior.

Green products of higher ecological quality usually have clear eco-labels that show green specifications and ingredients. Such labels provide information about environmental impacts of production, distribution, and disposal to consumers (Taufique et al., 2014). Brécard et al. (2009) suggested that eco-labels provided ways for consumers to retrieve such certified information. Armed with such information, consumers are prone to address environmental externalities and believe that green products offer different human and environmental health benefits to future society. Such benefits arouse consumers to take up more moral responsibilities of choosing green over non-green products. When consumers develop favourable attitude towards eco-social benefits, this may signal them to choose and make more purchases of green products. In the context of electricity supply market, Teisl and Roe (1999) suggested that eco-labels provided additional information on potential environmental effects of products, and that influenced consumers to purchase more green products. Thus, we posit:

Hypothesis 3b. Green product quality moderates the positive relationship between consumers' attitude towards eco-social benefits and green purchase behavior.

Compared to low-quality green products, high-quality ones provide credible information on stringent environmental management system standards, such as ISO 14001 (To and Lee, 2014). Such information updates consumer knowledge on selecting authentic green products effectively at a lower cost, and this further facilitates more purchase of green products. As indicated by Tran (2009), high-quality green products are more appealed to consumers with a stronger aesthetic harmony between the products and the environment. Moreover, consumers having credible green product information are less likely to be deceived by the misleading claims of environmental benefits. When consumers have become hesitant to believe such claims, this will dampen their incentives to purchase green products. Indeed, Kaufman (2014) highlighted that credible information overcome barriers to promote long term market performance of green products and facilitates more purchase of these products.

Hypothesis 3c. Green product quality moderates the relationship between green product information and green purchase behavior, and this relationship is much stronger for high-than for low-quality green products.

Fig. 1 show the relationships between the selected variables and the associated hypotheses.

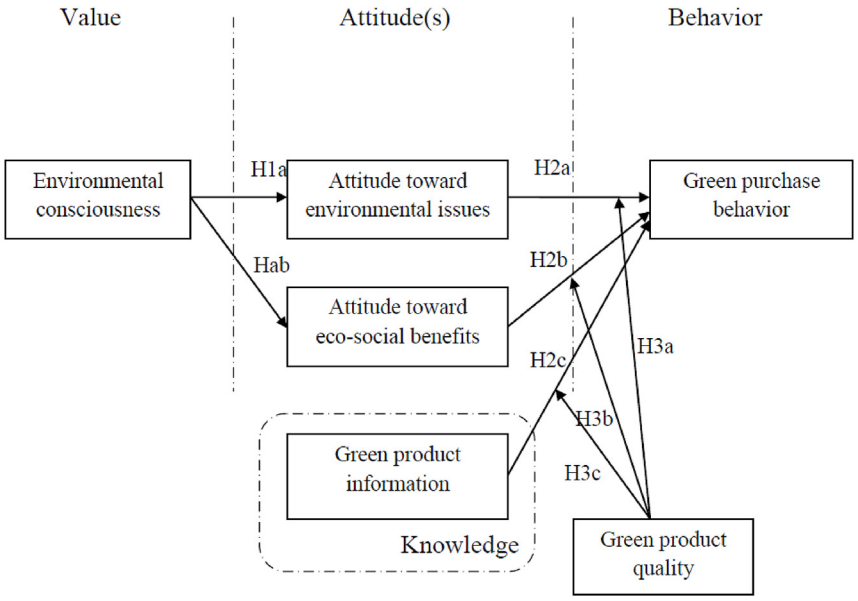

Fig. 1. The extended VAR model.

3. Research methodology

3.1. Sample

To avoid the potential response bias, our research teams that have expertise in conducting marketing research randomly distributed 1000 hard copies to consumers in different districts of Hong Kong at different periods of time. There was no non-response bias because respondents did not differ in meaningful ways from non-respondents as observed by our research teams. We got the consent of respondents to fill out the questionnaire voluntarily and we assured the respondents of the confidentiality of their responses. Small tokens were provided to respondents.

3.2. Questionnaire design

The first part of the questionnaire explained the objectives of the study and described what green products are. The second part of the questionnaire consisted of 18 items to measure the following constructs. This questionnaire was translated from English to Chinese and then back translated to English (Brislin, 1980) and checked for any discrepancies in meanings after the back translation was conducted and modified two items slightly. The last part of the questionnaire consisted of control variables. We conducted 15 pilot tests and incorporated the comments on the instructions and fine-tuned meanings of some items. Items regarding environmental consciousness, attitudes towards environmental issues and eco-social benefits, and green product information were rated using a 5-point Likert scale, with 1 representing 'strongly disagree' and 5 representing 'strongly agree'. Items regarding green purchase behavior were rated using a 5-point scale from 1 = never/do not buy/no to 5 = always/buy a lot of/a lot of. Items regarding green product quality were rated using a 5-point scale from 1 = much lower/much less/much worse to 5 = much better/much more/much better. All of the items are shown in Appendix 1.

Environmental consciousness measures the extent of the respondents' enduring concern about the environment and the future of the planet. Three items were adopted from Ritter et al. (2015). Cronbach's alpha of the construct was 0.73.

Attitude towards environmental issues measures the degree to which the respondents paid attention to news about environmental issues and their willingness to act on such environmental news. Three items were adopted from Ritter et al. (2015). Ritter et al. (2015) suggested that this construct would be reflected by individuals' concerns for the environmental, such as reading newspaper relevant to environmental problems, and their willingness to act accordingly, such as stop buying the product from non-compliance company. Cronbach's alpha of the construct was 0.70.

Attitude towards eco-social benefits measures the degree to which the respondents agreed that purchasing green products brought social benefits and was moral. Three items were adopted from Ritter et al. (2015). Cronbach's alpha of the construct was 0.78.

Green product information measures the respondents' knowledge about screening for good green products, such as labels and specifications. Three items were adopted from Ritter et al. (2015). Cronbach's alpha of the construct was 0.81.

Green purchase behavior measures the frequency, number and amount of green product purchases. One item was adopted from Ritter et al. (2015) and two items were developed by the authors. Cronbach's alpha of the construct was 0.89.

Green product quality measures the respondents' perceived overall quality of green products. One item was adopted from Ritter et al. (2015) and two items were developed by the authors. Cronbach's alpha of the construct was 0.70.

Control variables include demographic variables such as gender, age group, marital status, education level, industry/sector, job position and working experience. These demographics were controlled for their effects on green attitudes and green behavior. These variables were also controlled in Barbarossa and De Pelsmacker (2016).

4. Results and analysis

Of the 399 completed responses, 58.9% were completed by female respondents and 41.1% by male respondents. Most respondents (29.3%) were 20–29 years old, were single and living with their parents (43.9%) or had a bachelor's degree (45.9%). Many respondents worked in the food and beverage industry (38.4%), had working experience of 8 years or more (30.5%) and worked as frontline employees (32.7%) as shown in Table 1.

Before testing our hypotheses, we checked the skewness and kurtosis indices. Skewness ranged from −0.61 to 0.08 and kurtosis ranged from 0.19 to 0.68. The range of kurtosis was between −2 and +2 which could be considered as normal univariate distribution (George and Mallery, 2010). Cronbach's alpha values of environmental consciousness, attitude towards environmental issues, attitude towards

Table 1
Demographic profile of respondents (N = 399).

Frequency		Frequency	
Gender:		Industry:	
Male	164 (41.1%)	Engg. & construction	49 (12.3%)
Female	235 (58.9%)	IT & computing	36 (9.0%)
Age:		Banking & finance	64 (16.0%)
< 20	81 (20.3%)	Retail	97 (24.3%)
20-29	117 (29.3%)	Food & Beverage	153 (38.4%)
30-39	91 (22.8%)	Working experience:	
40-49	59 (14.8%)	< 1yr	76 (19.9%)
50 or above	51 (12.8%)	1–2 years	64 (17.0%)
Marital status:		2–4 years	63 (15.8%)
Single & living with parents	175 (43.9%)	4–8years	66 (16.8%)
Single & living alone	56 (14.0%)	8 years or above	130 (30.5%)
Married, no children	43 (10.8%)	Job position:	
Married with children	118 (29.6%)	Frontline	130 (32.7%)
Others	7 (1.7%)	Supportive	56 (14.1%)
Education:		Administrative	69 (17.3%)
Secondary	160 (40.1%)	Executive	42 (10.6%)
Bachelor's degree	183 (45.9%)	Others	102 (25.3%)
Masters' or above	25 (6.3%)		
Others	31 (7.7%)		

eco-social benefits, green product information, green product quality, and green purchase behavior ranged from 0.70 to 0.89. All of the values were greater than or equal to the threshold value of 0.7 (Hair et al., 2006).

We used IBM SPSS AMOS 23.0 to conduct confirmatory factor analysis of the measurement model. Results indicated that when a six-factor model (χ^2 = 985.51, *d.f.* = 130, *CFI* = 0.95, *TLI* = 0.91, *RMSEA* = 0.04) comprising environmental consciousness, attitude towards environmental issues, attitude towards eco-social benefits, green product information, green product quality, and green purchase behavior was tested against a single-factor model (χ^2 = 1060.81, *d.f.* = 135, *CFI* = 0.86, *TLI* = 0.88, *RMSEA* = 0.12), the change in the chi-square value between the six- and one-factor models was significant ($\triangle\chi^2$ = 75.3, *d.f.* = 5, $p < 0.001$), indicating that the six-factor model fitted the collected data better.

Next, we conducted the Harman's test. Results of Harman's test indicated that six-factor structure explained 67.7% of the variance and first factor explained 36.6% of the total variance (Kaiser-Meyer-Olkin = 0.90, $p < 0.001$), and no single factor accounted for the majority of the variance. Thus, there was little common method variance to confound the interpretation of the findings. The factors loadings are shown in Table 2.

Means, standard deviations and correlations of the variables ranged from 1.09 to 4.07 and the standard deviations ranged from 0.61 to 2.45 as shown in Table 3. As suggested by Podsakoff et al. (2003), possibility of common method bias can be reduced by checking the discriminant validity. Fornell and Larcker (1981) suggested that two constructs have discriminant validity if the correlation coefficient of two constructs is less than the square root of the AVE. The AVE of environmental consciousness (0.69), attitude towards environmental issues (0.51), attitudes towards eco-social benefits (0.52), green product information (0.57), green purchase behavior (0.65), and green product quality (0.55) were higher than the acceptable value of 0.50 (Fornell and Larcker, 1981). The AVE of these constructs are found lower than the square root of AVE values of environmental consciousness (0.83), attitude towards environmental issues (0.71), attitude towards eco-social benefits (0.72), green product information (0.75), green product quality (0.74), and green purchase behavior (0.81), and this yields acceptable discriminant validity.

Table 3 shows that environmental consciousness was positively associated with attitude towards environmental issues (r = 0.44, $p < 0.01$) and attitude towards eco-social benefits (r = 0.53, $p < 0.01$). In addition, attitude towards environmental issues (r = 0.50, $p < 0.01$), attitude towards eco-social benefits (r = 0.42, $p < 0.01$) and green product information (r = 0.48, $p < 0.01$) were found to be associated with green purchase behavior. Finally, green product quality was positively associated with green purchase behavior (r = 0.38, $p < 0.01$).

4.1. Structural equation modelling

Results of structural equation modelling revealed that environmental consciousness positively influenced attitudes towards environmental issues (β = 0.92, $p < 0.001$) and eco-social benefits (β = 0.75, $p < 0.001$). Hence, Hypotheses 1a and 1b were supported. In addition, attitude towards environmental issues (β = 0.29, $p < 0.001$), attitude towards eco-social benefits (β = 0.11, $p < 0.05$) and green product information (β = 0.20, $p < 0.001$) positively accounted for green purchase behavior. Thus, Hypotheses 2a, 2b and 2c were supported.

We composed a new interaction term by multiplying each item of green product quality with each item of attitude towards environmental issues. Interaction terms were created by multiplying each item of green product quality with each item of attitude towards eco-social benefits and green product information. We standardized each of these interaction terms and tested their effects on green purchase behavior. Results indicated that interactive effect of green product quality and attitude towards environmental issues (β = 0.03, *n.s.*) insignificantly related to predict green purchase behavior. Hypothesis 3a was unsupported.

The interactive role of green product quality and attitude towards eco-social benefits positively influenced green purchase behavior (β = 0.13, $p < 0.05$). Results of the slope test indicated that the interaction effect was much stronger for a high (simple slope test: β = 0.22, $p < 0.05$) than for a low level of green purchase behavior (simple slope test: β = 0.07, *n.s.*), as shown in Fig. 2. Hypothesis 3b was supported.

Similarly, interactive relationship between green product quality and green product information was positively predictive of green purchase behavior (β = 0.12, $p < 0.05$). Slope test showed that the interaction effect was much stronger for a high (simple slope test: β = 0.20, $p < 0.05$) than for a low level of green purchase behavior (simple slope test: β = 0.04, *n.s.*) as shown in Fig. 3. Accordingly, Hypothesis 3c was supported.

We included the demographic variables as controls by linking gender, age, marital status, education, industry, job position and work experience. Results indicated that green purchase behavior had non-significant relationships with gender (β = 0.1, *n.s.)*, age (β = *0.1, n.s.)*, marital status (β = 0.0, *n.s.)*, educational level (β = 0.0, *n.s.)*, industry (β = 0.0, *n.s.)*, job position (β = *0.0, n.s.)* and work experience (β = 0.04, *n.s.)*. The final structural model is shown in Fig. 4.

5. Discussion

We provided a strong empirical support on the positive relationships between environmental consciousness and attitude towards environmental issues and between environmental consciousness and attitude towards eco-social benefits, and these relationships in turn positively influenced consumers' green product purchase in high rather than low quality of green products. Green product quality, however, failed to moderate the relationship between consumers' perception on green product information and green purchase behavior. We extended the research of VAB model in the field of green product consumption.

First, our results provided a clearer picture on the process of how value of consumers on present and future of the environment frames their attitudes towards environmental issues and eco-social benefits, and that attitudes in turn influenced the frequency and amount of green product purchase. Hence, we extended the study of Teng et al. (2014) from the field of hospitality to green products. Moreover, attitude

Table 2
Factor loadings of constructs.

	Attitude towards environmental issue (Att. Issue)	Environmental consciousness (Consciousness)	Green product information (Information)	Green purchase behavior (Purchase)	Attitude towards eco-social benefits (Eco-social)	Green product quality (Quality)
Att. Issue 1	**0.72**	0.24	0.17	0.13	0.20	0.22
Att. Issue 2	**0.72**	0.26	0.15	0.14	0.11	0.13
Att. Issue 3	**0.70**	0.27	0.20	0.03	0.17	0.12
Consciousness 1	0.53	**0.85**	0.14	0.17	0.30	0.11
Consciousness 2	0.51	**0.85**	0.18	0.14	0.31	0.30
Consciousness 3	0.28	**0.79**	0.19	0.12	0.35	0.09
Information 1	0.43	0.34	**0.79**	0.16	0.19	0.22
Information 2	0.15	0.27	**0.76**	0.15	0.08	0.07
Information 3	0.29	0.19	**0.71**	0.14	0.09	0.10
Purchase 1	0.16	0.30	0.14	**0.83**	0.18	0.02
Purchase 2	0.40	0.25	0.11	**0.81**	0.12	0.13
Purchase 3	0.31	0.40	0.14	**0.78**	0.28	0.22
Eco-social 1	0.21	0.23	0.09	0.17	**0.80**	0.28
Eco-social 2	0.19	0.21	0.14	0.15	**0.70**	0.15
Eco-social 3	0.28	0.24	0.66	0.06	**0.66**	0.19
Eco-social 4	0.21	0.14	0.04	0.14	**0.72**	0.08
Quality 1	0.14	0.16	0.09	0.24	0.35	**0.82**
Quality 2	0.27	0.15	0.12	0.29	0.17	**0.73**
Quality 3	0.17	0.05	0.12	0.03	0.12	**0.67**

towards eco-social benefits had a greater effect on green purchase behavior in high rather than low quality of green products. This enlightened the research on green studies such as Rahimah et al. (2018) by emphasizing the contribution to the society i.e. creating more jobs and developing new niches of green business. Driven by their attitudes, consumers may be morally obligated to buy green products if the quality of these products is high. Also, the study contributed to incorporate consumers' knowledge about green products i.e. the availability and credible information of green products to the VAB model.

Second, our finding extended the VAR model by adding the moderating role of green product quality on the green attitude-behavior relationship. Specifically, we enriched study of Kim and Choi (2005) by confirming that the positive relationship between attitude towards eco-social benefits and green purchase behavior was found stronger on high rather than low quality of green product. Similarly, the positive effect of credible and available product information on green purchase behavior was found on high rather than low quality of green products. Our finding also enriched the study of Kim and Choi (2005) that cognitive factor of green product information can be incorporated into the VAR model on promoting consumers to make more green purchase behavior in a high rather than a low quality of green products.

Third, finding of this study extended our understanding on Chinese consumers concern on purchasing green products. Other than ecological knowledge (Chan, 1999), this study highlighted that consumer of whom are knowledgeable in screening for green product did promote more green purchase behavior in a collectivistic society. In addition, our finding extended the study of Li (1997) that beyond that of the role of demographics, amount of green product information was found as a salient but neglected cognitive factor in determining green purchase behavior on the condition of green product quality.

Last but not least, green product quality surprisingly failed to moderate the relationship between attitude towards environmental issues and green purchase behavior. This reconfirmed the study of Chan (1999) that green product quality might not be one of the best facilitators that make consumers to purchase more green products. Even if consumers behaviourally shows a strong attitude on concerning about the environment, they may purchase more green products only if these products are strictly manufactured under comprehensive eco-certification scheme in rigorous standard. Schebesta (2018) also highlighted that consumers rely on certification as one of key determinants for making green purchase decision. Given that this study examines whether quality of green products exerts any moderating effect of consumers' attitude towards environmental issues on amount, quantity, and frequency of one-off green purchasing, we cannot rule out the possibility of green product quality may exert a greater moderating effect on the relationship between attitude toward environmental issues and repetitive green purchase behavior in the future.

Given the importance of green product information, green marketers should provide transparent and credible online information to help consumers better understand the specifications and characteristics

Table 3
Descriptive statistics of study variables (N = 399).

	Skew	Kurt	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender			1.09	0.97												
2. Age			2.70	1.30	0.11*											
3. Marital status			3.02	2.26	0.04	0.23**										
4. Education			2.53	2.45	0.04	0.12*	0.01									
5. Industry			1.33	2.06	0.30**	0.08	0.05	0.06								
6. Position			4.07	2.09	0.29**	0.15**	0.04	0.03	0.41**							
7. Work experience			3.28	1.52	0.18**	0.34**	0.17**	0.11*	0.09	0.17**						
8.Environmental consciousness	−0.46	0.49	3.66	0.70	0.04	0.17	0.06	0.05	0.02	0.02	0.08					
9.Attitude towards environmental issues	−0.61	0.20	3.26	0.75	0.07	0.02	0.02	0.02	0.01	0.01	0.01	0.44**				
10.Attitude towards eco-social benefits	−0.25	0.19	3.43	0.73	0.01	0.04	0.05	0.05	0.02	0.02	0.05	0.53**	0.48**			
11.Green product information	−0.41	0.39	3.53	0.76	0.03	0.03	0.01	0.05	0.05	0.03	0.06	0.03	0.54**	0.57**		
12. Green product quality	−0.19	0.68	3.25	0.61	0.17**	0.04	0.02	0.02	0.09	0.01	0.01	0.17**	0.32**	0.31**	0.34**	
13. Green purchase behavior	0.08	0.29	2.62	0.72	0.17**	0.10	0.03	0.03	0.11*	0.05	0.07	0.17**	0.50**	0.42**	0.48**	0.38**

Notes: *p < 0.05; **p < 0.01; Skew = Skewness; Kurt = Kurtosis.

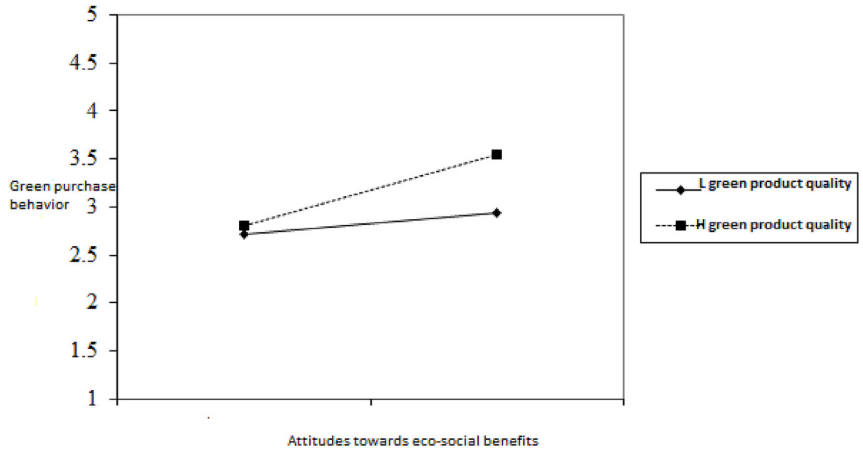

Fig. 2. Interactive role of green product quality and attitude toward eco-social benefits on green purchase behavior.

of authentic green products. As many consumers are young consumers, marketers are advised to communicate green information through Facebook, WhatsApp, WeChat, and QQ. Consumers are encouraged to make suggestions on novel features of green products they find attractive. Olli et al. (2001) suggested that consumers' active participation in an environmental network promoted environmental behavior. Firms can put videos on their websites displaying how their eco-friendly products are made with green ingredients and are packaged using recycled materials. Firms may increase the portfolio of green products. When consumers understand that green products' benefits out-weight cost in long term, consumers will purchase more green products. Huang et al. (2014) reported that consumers' information and knowledge could change their current purchasing behavior towards a greener lifestyle. As indicated by Chatterjee (2009), consumers who use green products may regard the use of these products as a way to enhance their social status. Hence, firms are encouraged to design visually attractive green products or provide evidence of how green products outperform non-green ones. Firms should devote more efforts to research and development by adding new features.

5.1. Directions for future research

As with most studies, our findings are limited by the use of a cross-sectional study. Further research should test the proposed research model using a longitudinal study. Future researchers may examine other forms of environmental attitudes, such as environmental concern of reference groups. Gupta and Ogden (2009) suggested that opinions of reference groups strongly influence green buying. Future researchers may test other conditions, such as personality, that may affect environmental attitudes and green purchase behavior. Indeed, Lu et al. (2015) found that personality traits of consumers may moderate the effects of environmental attitude on green purchase behavior because individuals of greater self-efficacy tend to be concerned about the environment (Hirsch, 2010). This concern may increase consumer confidence to protect the environment by saving energy and reducing waste, which in turn speed up their switching to green products.

6. Conclusions

The study is one of the first studies to examine the mechanism and condition of how consumers' environmental value influenced green purchase behavior indirectly through environmental attitudes. Consumers' attitude towards environmental issues and attitude towards eco-social benefits had stronger influence on green product purchase in high rather than low quality of these products. Green product quality, however, failed to moderate the relationship between green product information and green purchase behavior.

Appendix 1. Constructs and items.

Environmental consciousness

- You are concerned about the future of the planet.
- You feel as though you are part of the environment.
- You have a conscious of decreasing the amount of plastic waste and the usage of chemicals, water, and energy.

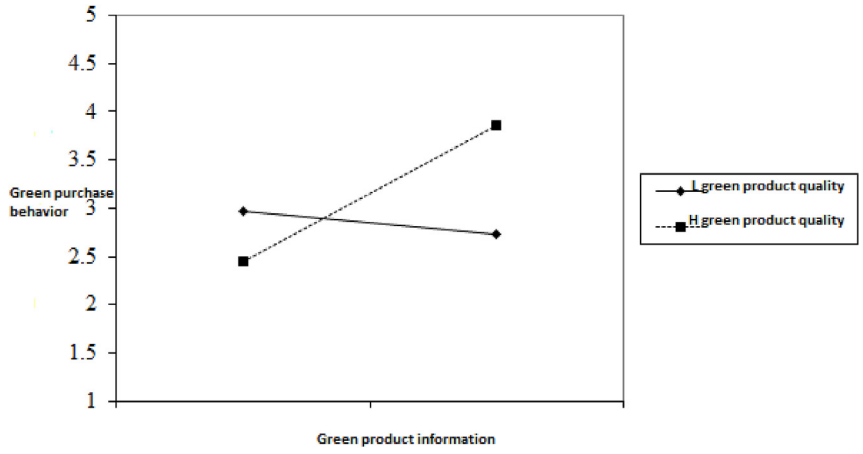

Fig. 3. Interactive role of green product quality and green product information on green purchase behavior.

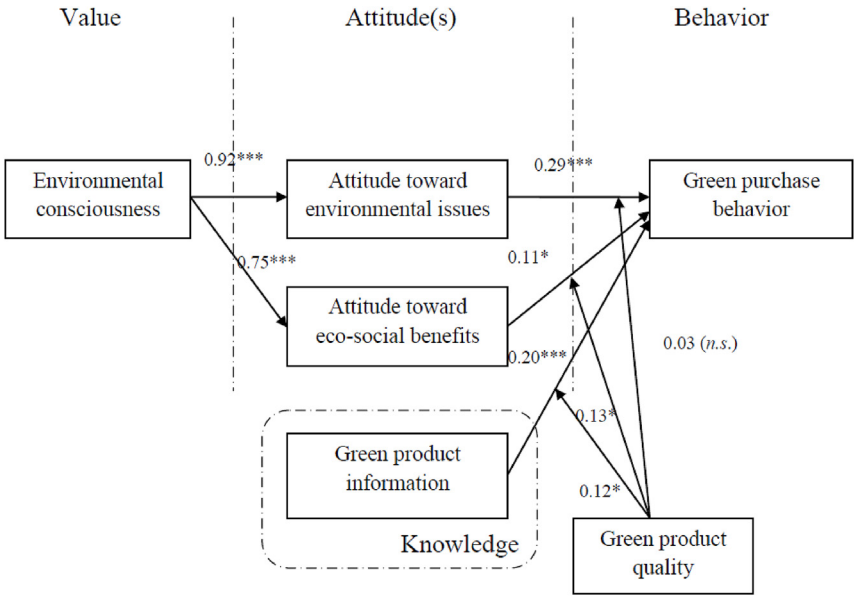

Fig. 4. Final model of the study.

Attitude towards environmental issues

- You have read newsletters or seen reports about environmental problems.
- You volunteer or contribute financially to organizations and projects focusing on environmental concerns
- If you knew that a company had harmed the environment, you would stop buying from it.

Attitude towards eco-social benefits

- By buying green products, you are contributing to society for the present and future.
- When buying green products instead of non-green products, you are acting morally.
- By buying green products, you are contributing to new businesses that focus on those products.

Green product information

- You would like more information about the green products that are available at the point of sale before buying them.
- More information about green products could help you make decisions about them.
- Labels and specifications describing the characteristics of green products could help you decide whether to buy them.

Green product quality

- Green products have ___ quality than conventional products. (much lower ←→ much higher)
- Green products have ___ function than conventional products. (much less ←→ much more)
- Green products have ___ aesthetic properties than conventional products. (much worse ←→ much better)

Green purchase behavior

- You ___ buy green products. (never; rarely; occasionally; frequently; always)
- You _____ green products. (do not buy; buy a few; buy some; buy many; buy a lot of)
- You spend ___ money on green products. (no; a little; some; quite a lot of; a lot of)

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jretconser.2019.04.006.

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