



EFFECTS OF ENVIRONMENTAL CONCERNS AND GREEN KNOWLEDGE ON GREEN PRODUCT CONSUMPTIONS WITH AN EMPHASIS ON MEDIATING ROLE OF PERCEIVED BEHAVIORAL CONTROL, PERCEIVED VALUE, ATTITUDE, AND SUBJECTIVE NORM

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received 04 February 2019 Received in revised form 04 April 2019 Accepted 15 April 2019 Available online 19 April 2019</p> <p><i>Keywords:</i> Green consumption; Path analysis; Green purchase intention; Green purchase attitude; Environmental behavior.</p>	<p>This study examined the effects of environmental concerns and green knowledge on green product consumption with an emphasis on the mediating role of perceived behavioral control, perceived value, attitude, and subjective norm. This study was applied research using descriptive survey. The participated population included 359 customers of Shahrvand stores in Tehran. This study used path analysis in LISREL® to test the measurement model and hypotheses. The results showed that the effects of environmental concerns were significant and positive on green purchase attitude, subjective norm, perceived behavioral control, perceived value, and green purchase intention. Effects of green knowledge were significant and positive on green purchase attitude, subjective norm, perceived behavioral control, perceived value and green purchase intention. Effects of green purchase attitude, subjective norm, and perceived behavioral control were positive and significant on green purchase intention, while the effect of perceived value was not significant on green purchase intention. The indirect effect of environmental concerns and green knowledge was positive and significant on green purchase intention through green purchase attitude, subjective norm and perceived behavioral control. The findings supported the effect of environmental concerns and green knowledge on green product consumption focusing on the mediating role of perceived behavioral control, perceived value, attitude and subjective norm.</p> <p>© 2019 INT TRANS J ENG MANAG SCI TECH.</p>

1. INTRODUCTION

Green consumption may be achievable by encouraging people to use green products. The term green product is defined as products which will not pollute the earth or destroy natural resources, products which are recyclable or sustainable (Shamdasani *et al.*, 1993). According to Bat (1993), green products are biodegradable and recyclable products with the least amount of packaging and produced organically. Other green behaviors include the purchase of products made or packaged by recycled materials and the purchase of products in refillable packages (Zhao *et al.*, 2014). To promote

green products, marketers must focus on consumer preferences and decision-making processes (Cherrier *et al.*, 2011). However, marketers are not successful in selling green products; considering environmental concerns, priorities of consumers to purchase these products is fluctuating (Ha & Janda, 2012). Despite significant growth in the number of consumers of green products, Barber (2010) recommends that theorists address adaptability of consumers with sustainable methods, attitudes and their purchase intention to buy green products. Given the importance of green product consumption by consumers, therefore, this study investigates the effect of environmental concerns and green knowledge on green product consumption with an emphasis on mediating role of perceived behavioral control, perceived value, attitude, and the subjective norm.

Environmental concerns are one of the most important variables in the green marketing literature (Wiernik *et al.*, 2013). The term environmental concerns refer to values, attitudes, emotions, perceptions, knowledge, and behaviors related to the environment (Ogle, 2004). In general, a positive relationship has been found between environmental concerns and eco-friendly behavior. Higher behavior and attitude towards this is followed by stronger intention to avoid purchase from companies polluting the environment and sacrifice for slowing down this pollution, finally leading to more eco-friendly behavior (Minton & Rose, 1997). Thus, environmental concerns predict environmental behaviors of people (Chen & Tang, 2014; Paul, Mody & Patel, 2014).

Green knowledge refers to customer awareness of products produced eco-friendly and storage of energy and important resources (Wang & Hazen, 2015). Research has shown that consumers who are aware of the environmental effect of produced products tend to buy products with the least harmful effects on natural resources and the environment (Mohd Suki & Mohd Suki, 2015; Michaud & Llerena, 2011).

Another effective variable on green purchase intention is green purchase attitude. Ajzen (1991) defines attitude as previous preparedness to respond favorably or unfavorably to an object, person, event, organization or other distinguishable aspects of the environment. The reasoned action theory is the most important classic theory for the relationship between attitude and behavior proposed by Fishbein and Ajzen (1975). Based on the reasoned action theory, behavioral intention is the close cause of the behavior. Behavioral intention is defined as a conscious decision to engage in certain conduct. Two major determinants of behavioral intention are the attitude towards behavior and subjective norm (Chang *et al.*, 2016). Attitude toward a behavior is defined as a product of expectation by value. Each of these products includes a subjective probability (expectation) that behavior has a certain consequence multiplied by the value associated with that consequence (Huang, Liu & Yeh, 2014). Research shows that consumer attitude to green consumption is effective on their green purchase intention (Paul & Patel, 2016; Han & Yoon, 2015; Teng *et al.*, 2014; Han *et al.*, 2011).

One advantage of reasoned action theory is the inclusion of subjective norms and evaluation of their roles in some situations. Subjective norm is defined as a reaction to perceived social pressure to perform or not perform the considered behavior (Yasa *et al.*, 2014). Subjective norms measure the effect of others on behavior. If the social expectation is that people should perform the discussed behavior, then people are more likely to conduct that behavior (Alam & Sayuti, 2011). Previous research has concluded that subjective norms regarding attitudes play a greater role in predicting behavioral intentions of a consumer (Papadopoulos *et al.*, 2010). If consumers believe that others

have positive ideas towards green products, they are more likely to purchase these products (Kim et al., 2009). Research suggests that subjective norms influence green purchase intention (Paul & Patel, 2014; Ha & Janda, 2012; Teng *et al.*, 2014; Dean et al., 2012).

Planned behavior theory, which is an extension to reasoned action theory, considers perceived behavioral control as the third predictor of behavioral intention and behavior (Chang et al., 2016). Perceived behavioral control refers to the extent to which one feels that behavior is under voluntary control. Perceived behavioral control may directly or indirectly influence behavior through behavioral intentions (Zandhesami & Parvinchi, 2011). Research shows that perceived behavioral control is effective on green purchase intention (Paul & Patel, 2014; Chen & Tang, 2014; Teng *et al.*, 2014; Han *et al.*, 2010).

Green product value increases the customer perceived value of products (Chen & Chang, 2012). One of the main challenges of marketing managers is to increase the value of their products or services continuously through improving benefits of the product or service and reducing costs because the superior value of a product or service creates an important competitive advantage for the organization and induces profitability and customer satisfaction (Choi & Kim, 2013). Perceived value in marketing is defined as customer assessment of costs and benefits of the purchase of a product or service (Leroi-Werelds *et al.*, 2014). Customers initially tend to consume services which reduce costs or have earnings for them (Yu *et al.*, 2014). Therefore, one of the primary goals of firms should be a focus on continuous improvement of customer-related values and deployment of mechanisms which increase customer perceived value for green products. Important marketing consequences regarding perceived value include an increase in customer satisfaction (Yu *et al.*, 2014), further purchase and repurchase intention (Modig & Rosengren, 2014; Wang & Hazen, 2015).

In summary, environmental problems and environmental protection are one of the most important criteria considered by consumers when purchasing. Environmental protection has led consumers to rethink about the products that they purchase. Many consumers are ready to pay more for real protection of the environment for products which meet environmental standards (Doaei *et al.*, 2012). The environment has become a crucial problem for all classes of people, whether customer or manufacturer. Since traditional marketing focuses excessively on customer demands and does not consider social welfare and environmental problems, this has been included in all aspects of organizations and it has influenced marketing, leading to the emergence of green marketing. Few studies have been conducted in Iran on effective factors on the success of green marketing. Thus, it is important to conduct studies to predict green consumption behaviors. Therefore, the main problem of this study is whether environmental concerns and green knowledge are effective on green product consumption through perceived behavioral control, perceived value, attitude and subjective norm.

2. CONCEPTUAL MODEL

Considering the theoretical framework and literature, a conceptual model of the study is depicted in Figure 1. Obviously, environmental concerns and green knowledge are independent variables, green product attitude, subjective norm, perceived behavioral control and perceived value are mediating variables and green purchase intention is the dependent variable. Therefore, hypotheses

can be developed as follows:

1. Environmental concerns influence green purchase attitude.
2. Environmental concerns influence subjective norm.
3. Environmental concerns influence perceived behavioral control.
4. Environmental concerns influence perceived value.
5. Environmental concerns influence green purchase intention.
6. Green knowledge influences green purchase attitude.
7. Green knowledge influences subjective norm.
8. Green knowledge influences perceived behavioral control.
9. Green knowledge influences perceived value.
10. Green knowledge influences green purchase intention.
11. Green purchase attitude influences green purchase intention.
12. Subjective norm influences green purchase intention.
13. Perceived behavioral control influences green purchase intention.
14. Perceived value influences green purchase intention.

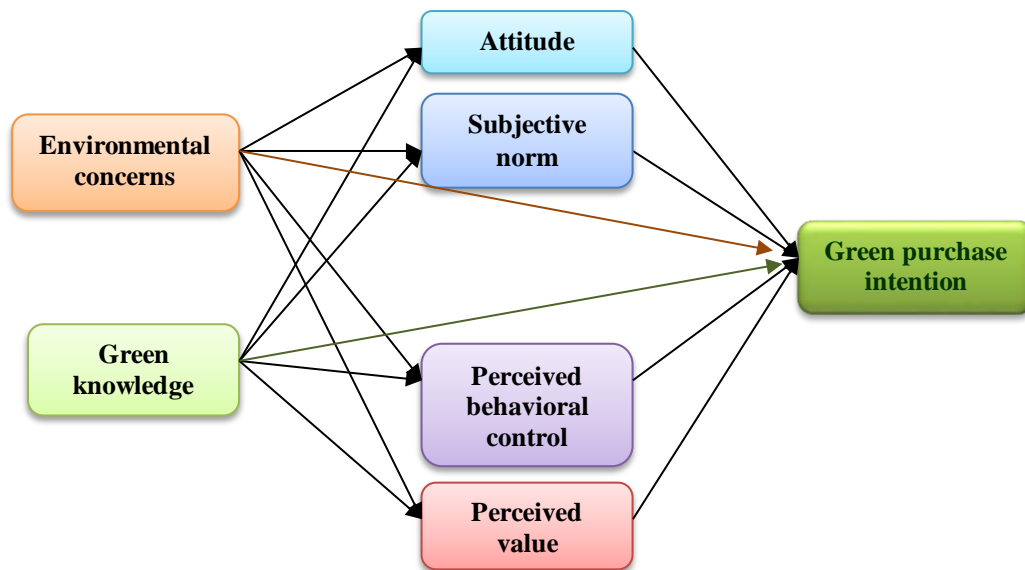


Figure 1: Conceptual model

3. MATERIALS AND METHODS

This was a descriptive-survey and correlational research using path analysis; this study examined the relationship between variables through a causal model.

3.1 POPULATION AND SAMPLE

The studied population included customers of Shahrvand Store in Tehran; 400 questionnaires were distributed among customers, of which 376 questionnaires were returned. Of these, 17 questionnaires were incomplete; thus, they were excluded from the analysis. Finally, 359 questionnaires were included in the analysis.

3.2 INSTRUMENTS

This study used environmental concerns, green knowledge, subjective norms, green purchase attitude, perceived behavioral control, perceived value and green purchase intention questionnaires to measure variables. Confirmatory analysis and Cronbach's alpha coefficient were used to examine the validity and reliability of variables. Confirmatory factor analysis is a theory-testing model, in which the researcher begins the analysis with a previous hypothesis. This model, which is based on a strong theoretical and empirical foundation, determines the correlation between variables and

factors. It also provides a reliable method to evaluate construct validity in order to test hypotheses on factor construct of data resulting from a predetermined model with a certain number and combination of factors. By determining pre-experimental factors, confirmatory analysis tests optimal consistency of the observed and theoretical factor constructs for dataset through determining the fit of the predetermined factor model. This study used χ^2/df , RMSEA, GFI, and AGFI to evaluate confirmatory factor analysis. χ^2/df lacks a constant criterion for an acceptable model; however, smaller χ^2/df indicates a better fit of the model (Chehrehpak et al., 2018; Houman, 2008).

Brown and Kadk suggested using root mean square error of approximation (RMSEA) presented by Steiger (1990) as the size of difference for each degree of freedom. For good models, $RMSEA \leq 0.05$; $RMSEA < 0.08$ indicates a reasonable error for approximation in the population. The models of which $RMSEA \geq 0.10$ have weak fit. In LISREL, Jarzka and Svrbovm (1989) presented goodness of fit index (GFI) and adjusted goodness of fit index (AGFI); these indexes indicate the extent to which the model has better fit compared to its absence. GFI and AGFI should be equal to or greater than 0.90 to accept the model (Houman, 2008; Noruzy et al., 2013).

Environmental concerns: the questionnaire developed by Kilbourne and Pickett (2008) was used to measure environmental concerns. This five-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Green knowledge: the questionnaire developed by Mohd Suki and Mohd Suki (2015) was used to measure green knowledge. This three-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Attitude: the questionnaire developed by Paul, Mody, and Patel (2016) was used to measure green consumption attitude. This three-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Subjective norms: the questionnaire developed by Paul, Mody, and Patel (2016) was used to measure subjective norms. This four-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Perceived behavioral control: the questionnaire developed by Paul, Mody, and Patel (2016) was used to measure perceived behavioral control. This seven-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Perceived value: the questionnaire developed by Cronin (2000) was used to measure perceived value. This three-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Green purchase intention: the questionnaire developed by Paul, Mody, and Patel (2016) was used to measure green purchase intention. This five-item questionnaire is scored on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

3.3 Data Analysis

By calculating descriptive indexes of variables, path analysis was used to examine the causal relationship between variables. SPSS® and LISREL® were used to analyze data.

4. RESULTS

Given that analysis of causal models is based on a matrix of correlation, Table 1 shows a matrix of correlation, mean and standard deviation of variables.

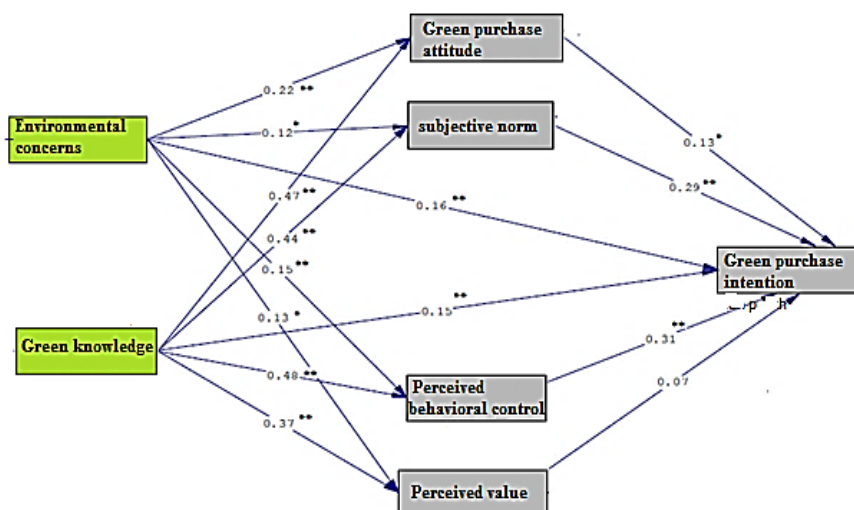
Table 1: Matrix of correlation

Variable	1	2	3	4	5	6	7
1. Environmental concerns	1						
2. Green knowledge	0.59 **	1					
3. Green purchase attitude	0.49 **	0.60 **	1				
4. subjective norm	0.38 **	0.51 **	0.42 **	1			
5. Perceived behavioral control	0.43 **	0.57 **	0.51 **	0.44 **	1		
6. Perceived value	0.35 **	0.44 **	0.38 **	0.36 **	0.54 **	1	
7. Green purchase intention	0.46 **	0.49 **	0.45 **	0.53 **	0.57 **	0.42 **	1
Mean	3.46	3.04	2.98	2.74	2.84	2.92	2.95
SD	0.76	0.94	0.87	0.86	0.98	0.97	0.87

Note: * P<0.05; ** P<0.01

As shown in Table 1, the correlation between environmental concerns and green purchase attitude ($r=0.49$), subjective norm ($r=0.38$), perceived behavioral control ($r=0.43$), perceived value ($r=0.35$) and green purchase intention ($r=0.46$) is positive and significant ($P<0.01$). The correlation between green knowledge and green purchase attitude ($r=0.60$), subjective norm ($r=0.51$), perceived behavioral control ($r=0.57$), perceived value ($r=0.44$) and green purchase intention ($r=0.49$) is positive and significant ($P<0.01$). The correlation between green purchase intention and green purchase attitude ($r=0.45$), subjective norm ($r=0.53$), perceived behavioral control ($r=0.57$) and perceived value ($r=0.42$) is positive and significant ($P<0.01$).

Figure 2 shows the fitted model for predicting green purchase intention. The numbers on routes are standardized parameters. According to Figure 2, all routes are significant, other than the effect of perceived value on green purchase intention.



Chi-Square=14.23, df=6, P-value=0.00000, RMSEA=0.062

Figure 2: The fitted model for predicting green purchase intention

Since this study tended to examine the effect of environmental concerns and green knowledge on green consumption focusing on mediating role of perceived behavioral control, green purchase attitude, subjective norm and perceived value by using path analysis, Table 2 lists coefficients of direct effect, indirect effect, variance explained and significance of variables. The numbers in

parentheses are t-values for evaluating the significance of path coefficients.

Table 2: The estimate of standardized coefficients of direct effect, indirect effect and variance explained of the model

Route	Direct effect	Indirect effect	Variance explained
On green purchase intention vie:			
Perceived value	0.07 (1.60)	-	0.49
Perceived behavioral control	0.31 ** (6.32)	-	
Subjective norm	0.29 ** (6.20)	-	
Green purchase attitude	0.13 ** (2.25)	-	
Green knowledge	0.15 ** (2.81)	0.36 ** (7.12)	
Environmental concerns	0.16 ** (3.09)	0.12 ** (3.44)	
On perceived value vie:			
Green knowledge	0.37 ** (6.31)	-	0.21
Environmental concerns	0.13 * (2.23)	-	
On perceived behavioral control vie:			
Green knowledge	0.48 ** (8.97)	-	0.34
Environmental concerns	0.15 ** (2.76)	-	
On subjective norm vie:			
Green knowledge	0.44 ** (7.89)	-	0.27
Environmental concerns	0.12 * (2.11)	-	
On green purchase attitude vie:			
Green knowledge	0.47 ** (9.08)	-	0.39
Environmental concerns	0.22 ** (4.27)	-	

* P<0.05; ** P<0.01

As shown in Table 2, the effect of environmental concerns is positive and significant on green purchase attitude ($\beta=0.22$), subjective norm ($\beta=0.12$), perceived behavioral control ($\beta=0.15$), perceived value ($\beta=0.13$) and green purchase intention ($\beta=0.16$). Effect of green knowledge is positive and significant on green purchase attitude ($\beta=0.47$), subjective norm ($\beta=0.44$), perceived behavioral control ($\beta=0.48$), perceived value ($\beta=0.37$) and green purchase intention ($\beta=0.15$). Effect of green purchase attitude ($\beta=0.13$), subjective norm ($\beta=0.29$) and perceived behavioral control ($\beta=0.31$) is positive and significant on green purchase intention, while the effect of perceived value is not significant on green purchase intention. The indirect effect of environmental concerns and green knowledge is positive and significant on green purchase intention through green purchase attitude, subjective norm and perceived behavioral control. As shown in Table 3, the model predicts 49% variance in green purchase intention, 21% variance in perceived value, 34% variance in perceived behavioral control, 27% variance in subjective norm and 39% variance in green purchase attitude. Table 3 lists fit indexes of the path analysis model, $\chi^2/df=2.37$, GFI=0.94, AGFI=0.91 and RMSEA=0.062 indicate a good fit of the prediction model.

Table 3: Fit index of the path analysis model

χ^2/df	RMSEA	GFI	AGFI	CFI	NFI
2.37	0.062	0.94	0.91	0.97	0.95

5. DISCUSSION

The results showed that the effect of environmental concerns is positive and significant on green purchase attitude, perceived behavioral control, subjective norm, perceived value, and green purchase intention. This finding is consistent with Paul *et al.* (2016). Environmental concerns of consumers, their tendency to reduce consumptions which are environmentally harmful in order to protect the

environment, their contributions in making major political and social changes for environmental protection, and strict anti-pollution laws lead to positive green purchase attitude, increase effect of beliefs of peers and people who are effective on their green purchase behavior, increase ability and allocation of sufficient resources and time for green purchase, highlight green products and thus increase green purchase.

The results showed that the effect of green knowledge is positive and significant on green purchase attitude, perceived behavioral control, subjective norm, perceived value, and green purchase intention. This finding is consistent with Mohd Suki and Mohd Suki (2015), Wang and Hazen (2015), Belz and Schmidt-Riediger (2010) and Michaud and Llerena (2011). As consumers become aware of environmental problems related to their consumption, they are more likely to purchase eco-friendly products for the benefit of future generations (Michaud & Llerena, 2011). Increased awareness and interest in sustainable consumption is effective in purchasing decisions (Wang & Hazen, 2015). Therefore, increase in green knowledge of consumers leads to positive green purchase attitude, increase in effect of beliefs of peers and people who are effective on green purchase behavior, increase in ability and allocation of sufficient resources and time for green purchase, a higher value of green products and thus green purchase.

The results showed that the effect of green purchase attitude is positive and significant on green purchase intention. This finding is consistent with Paul *et al.* (2016), Han and Yoon (2015), Teng et al (2014), and Han et al (2011). Thus, the idea of green product purchase and the tendency for green purchase increase green purchase intention.

The results showed that the effect of the subjective norm is positive and significant on green purchase intention. This finding is consistent with Paul *et al.* (2016), Han and Janda (2012), Teng et al (2014), and Dean et al (2012). Therefore, the subjective norm is an important factor in predicting one's behavior to purchase green products. If important people ask one to purchase green products, people whose beliefs are valuable to prefer one to purchase green products and positive beliefs of peers are effective on the green purchase, one will be more likely to purchase green products.

The results showed that the effect of perceived behavioral control is positive and significant on green purchase intention. This finding is consistent with Paul *et al.* (2016), Chen and Tang (2014), Teng et al. (2014), and Han *et al.* (2010). Green purchase intention will increase when one believes that he can purchase green products, makes sure that he purchases green products, considers himself able to purchase green products, have sufficient resources, time and tendency to purchase green products, when green products are available in shopping centers, there are many opportunities to purchase green products, when one feels that he can control green purchase.

The results showed that the effect of perceived value is not significant on green purchase intention. Therefore, the perceived value of green products does not increase green purchase. In this study, the perceived value had lower predictability compared to other predictors.

6. CONCLUSION

This study tended to examine the effects of environmental concerns and green knowledge on green consumption focusing on the mediating role of perceived behavioral control, green purchase

attitude, subjective norm, and perceived value by using path analysis. Path analysis showed that the suggested model is well fitted to data and can explain 49% variance in green purchase intention, 21% variance in perceived value, 34% variance in perceived behavioral control, 27% variance in subjective norm and 39% variance in green purchase attitude.

In conclusion, the results showed that environmental concerns and green knowledge influence green purchase intention through perceived behavioral control, perceived value, attitude and subjective norm. These findings highlight the role of environmental concerns and green knowledge in green purchase intention. This study only studied a sample of customers of Shahrvand Stores; therefore, findings cannot be generalized to other consumers easily. Moreover, findings are based on self-report data. It is suggested to use qualitative and hybrid methods for future studies.

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