Do consumers invest in green supply chain management? An empirical assessment

Dara Schniederjans
Schniederjans@mail.uri.edu
University of Rhode Island-Kingston

Christopher Starkey
University of Connecticut- Storrs

Abstract

Drawing from theory of planned behavior, a conceptual model is developed which shows the impact of attitude, perceived behavioral control and peer pressure on an individual's intention to purchase a green supply chain product. We also assess the moderating role of ability to pay on the relationship between intention and willingness to purchase a product. A survey method was used to collect data from a random selection of United States citizens. The findings of this research provide important and relevant implications to both marketers and researchers in green supply chain management.

Keywords: Green supply chain management, Theory of planned behavior

Introduction

The topic of ethical and environmental procurement is vital in that it has the potential to both harm and improve an organization's reputation and competitive performance (Hoejmose and Adrien-Kirby 2012). Along with government pressure, consumer pressure also persists in being a strong force encouraging firms to engage in ethical and green purchasing activities (Hoejmose and Adrien-Kirby 2012). Green supply chain management (GSCM) is thus beginning to emerge as a vital corporate environmental strategy for various organizations (Zhu et al. 2012).

Yet, despite increasing organizational adoption of GSCM activities, as well as evidence from studies regarding pressure to adopt GSCM, the research showing whether GSCM leads to greater performance is varied. Studies like Zhu and Sarkis (2004) and Iraldo et al. (2009) found a strong positive association between GSCM adoption and environmental performance, whereas Testa and Iraldo (2010) found adoption of GSCM does not necessarily produce profitability tightly linked to varied market response. Understanding how consumer behavior is impacted by GSCM adoption might help alleviate the potential problem witnessed in varied GSCM performance research results. Yet, very little research investigates whether GSCM impacts the consumer's intention to buy a particular product. In short we have insight as to why GSCM is adopted, but do not have clarity regarding whether or not this leads to consumer purchasing

behavior. Without understanding whether GSCM impacts a consumer's intention to purchase a product, we cannot accurately perceive the importance of GSCM adoption. Our aim and contribution for this study are three-fold. First, we will use previous research, as well as the theory of planned behavior, to build a conceptual model analyzing the intricate relationships between attitude toward GSCM, perceived behavioral control, peer pressure, intention to purchase and willingness to pay (WTP) for a GSCM product. Secondly, we will empirically assess this model using a survey of 113 U.S. consumers. Finally, we will outline both research and managerial contributions of our results.

Literature review

Attitude

Attitudes develop from beliefs that link behavior to outcomes positively or negatively valued by a particular individual (Ajzen 1991). Attitudes themselves are basically evaluations of behaviors by an individual over time (Cordano et al. 2010). If an individual believes the consequences of a particular behavior are negative or bad, he or she forms a negative attitude toward that behavior (Ajzen 1991). Moreover, positive consequences form positive attitudes. The more favorable the attitude, the more likely the individual intends to perform it.

Perceived behavioral control

Perceived behavioral control refers to a subjective perception of control over the performance of a particular action (Ajzen 2002). Basically, it is a consumer's ability to act (Schuler and Cording 2006). When an individual does not feel a particular consequence is possible to achieve, he or she is unlikely to form an intention (Schuler and Cording 2006). Moreover, an intention is formed when an individual feels it is possible to achieve a particular consequence. Revised from Ajzen (1991), Ajzen (2002) provides evidence that perceived behavioral control has two dimensions: self-efficacy and controllability. Self-efficacy is defined as "an individual's judgments of a person's capabilities to perform a behavior" (Pavlou and Fygenson 2006). Controllability refers to "an individual's judgment about the availability of resources and opportunities to perform the behavior" (Pavlou and Fygenson 2006).

Peer pressure

Peer pressure refers to an internal drive to conform to peers with whom an individual socializes (Gil et al. 2012). The intensity of peer pressure on an individual depends on a myriad of factors, including age (Sumter et al. 2009). self-concept (Gil et al. 2012) and a concern for ridicule (Wooten 2006). Most individuals have some sense of peer pressure at some point in their lifetime. Michell and Amos (1997) found that even individuals with high self-esteem and self-confidence are still subject to peer pressure. Thus, peer pressure has the potential of being a very strong determinant of an individual's behavior.

Intention and willingness to pay

Intention to perform a behavior is a person's subjective probability that he or she will perform that behavior (Fishbein and Ajzen 1975, Sykes et al. 2009). Intention is also the immediate antecedent to performing a particular behavior (Ajzen 1991). Previous research shows that

intention results in a willingness to try to perform a particular action (Warner and Aberg 2006). When intention is strong, it is likely one will be more willing to do whatever is necessary to perform that action.

Willingness to pay (WTP) is defined as the amount of money a person is willing to spend in order to keep his or her utility constant (Salman and Al-Karablieh 2004). Some studies consider intention and WTP as the same construct (i.e. Pouta and Rekola 2001). This study seeks to distinguish the two as separate entities. Intention is a subjective probability, whereas WTP presents a person's actual quantitative assessment of the price he or she will pay for a particular product. When a person has a strong intention to perform a behavior (i.e., buying a GSCM product) it stands to reason that he or she will be willing to pay more for that GSCM product. However, it is important to note that there are certain moderator variables that may come into play, which impact an individual's WTP for a product.

The theory of planned behavior suggests an individual's behavioral intention is influenced directly by his or her attitude toward that behavior, subjective norms and perceived behavioral control (Ajzen 1985). A person who is exposed to negative or positive experiences dealing with a particular product may positively impact his or her intention to purchase it (Li et al. 2012). Moreover, a person's intention to purchase is also positively reinforced by social pressure to engage in a behavior, as well as an individual's belief in control over his or her actions (Ajzen 1985, Ajzen 1991).

Previous literature has used the theory of planned behavior to depict the various relationships between attitude, perceived behavioral control, peer pressure, intention and willingness to pay. However, no study to our knowledge has assessed the impact of these variables in an environmental context specifically using WTP for a green supply chain management product. Further past literature has found conflicting results with the impact of each of these factors with WTP due to the way WTP is measured (Auger & Devinney, 2007).

Based on the previous research, we have formulated the following hypotheses:

H1. Attitude toward GSCM product is positively associated with intention to buy a GSCM product.

H2. Perceived behavioral control is positively associated with intention to buy a GSCM product.

H3. Peer pressure is positively associated with intention to buy a GSCM product.

H4. Intention to buy a GSCM product is positively associated with WTP for a GSCM product.

H5. Ability to pay moderates the relationship between intention to buy a GSCM product and WTP for a GSCM product.

Methodology

Measure development and sample

After collecting and performing an extensive literature review to identify appropriate scales for our constructs, the survey was pre-tested to assess both face and content validity using various experts. These experts in the field of supply chain management provided guidance for minor changes in the wording of certain items. After this, a random subset of customers was surveyed in the Northeast area of the United States. Specific demographics of our respondents are presented in Table 1.

Table 1 – Demographics of Respondents

Demographic	Percentage
Gender	
Male	60.7
Female	39.3
Age	
18-20 years	25.0
21-30 years	24.1
31-40 years	6.3
41-50 years	12.5
51-60 years	17.0
61 years old and above	15.2
Birth Country	
Canada	0.9
Japan	1.8
China	5.4
Korea	2.7
United States	84.8
Other	4.5

Customers were randomly selected and chosen to participate in a short ten minute survey. Each customer was given the option to sit and write down answers on a paper survey, put the results in an envelope and mail it back to the researchers without providing any identifiable information regarding his or herself. With 125 surveys distributed 116 were returned of which 112 were useable. The survey consisted of 18 questions measuring six constructs: attitude, perceived behavioral control, peer pressure, intention and WTP for GSCM product. Each question, as well as its item designation, is depicted in Table 2.

Table 2 - Survey items and designations

Designation	Survey items
Attitude	
ATT1	For me, purchasing the green transportation t-shirt would be…very good idea to very bad idea.
ATT2	For me, purchasing the green transportation t-shirt would be…very undesirable to very desirable.
ATT3	For me, purchasing the green transportation t-shirt would be… very foolish to very wise.
Perceived behavioral control	
PBC1	If I wanted to, I would be able to help the environment by buying the green transportation t-shirt.

PBC2	If I wanted to, I am confident I could help the environment by buying the green transportation t-shirt.
PBC3	Helping the environment by buying the green transportation t-shirt is completely under my control.
PBC4	I have the ability to help the environment by buying the green transportation t-shirt.
Peer pressure	
PP1	My peers are concerned about energy efficient fuel usage by corporations and their supply chains.
PP2	My peers are increasingly demanding products that are made from firms using green transportation.
PP3	Green transportation is a major social trend today.
PP4	Generally my peers would prefer a cheaper price to a product from a firm who uses green transportation.
Intention	
I1	Based on the information given in this scenario and if I had to buy one t-shirt, I would intend to buy the green transportation t-shirt instead of the other t-shirt.
I2	Based on the information given in this scenario, and if I had to purchase one t-shirt, I would purchase the green transportation t-shirt instead of the other t-shirt.
Willingness to pay	
WTP1	I am willing to pay a higher price for the green transportation t-shirt than for the other t-shirt.
WTP2	Even if the other t-shirt is priced lower, I will still buy the green transportation t-shirt.
WTP3	Even though the green transportation t-shirt seems comparable to the other t-shirt I am willing to pay more for the green transportation t-shirt.
WTP4	Would you buy the green transportation t-shirt instead of the other t-shirt if it were more expensive?
WTP5	How much more would you be willing to spend in dollars for the green transportation t-shirt if the other t-shirt was priced at $20? That is how much more than $20 would you spend for the green transportation t-shirt?

First respondents were given a scenario detailing the choice of making a decision between two equally enjoyed color, style and fit t-shirt products: (1) A t-shirt with a label that says, “This product was made from materials that were transported using an energy efficient fuel,” (i.e., green transportation t-shirt) and (2) the same t-shirt without that label (other t-shirt). Subjects were then asked to take a moment to think about purchasing both products. After reading this scenario, subjects were asked to answer a myriad of questions pertaining to the six constructs presented in our model

Attitude toward the GSCM product was measured using a three item scale derived and refined from Pavlou and Fygenson (2006). Perceived behavioral control was measured using four items also derived from Pavlou and Fygenson (2006). Each question dealt with both self-efficacy and controllability dimensions of perceived behavioral control. Peer pressure was measured using four items borrowed and revised from Park-Poaps and Rees (2010). Intention is measured using two items borrowed and revised from Pavlou and Fygenson (2006). Ability to pay was measured based on household income. Using household income to measure ability to

pay has been used in a variety of studies (i.e. Garfinkle and Oellerich 1989). Finally, WTP was measured using five items derived and revised from Miller and Mills (2012) and Auger and Devinney (2007). Following Auger and Devinney (2007) advice for developing reliable WTP questions, we created a context which closely resembled a typical consumer decision when purchasing a product. In addition, we used variation in response alternatives, as well as open-ended frequency reports.

Data analysis

To verify our hypotheses of our structural equation model we chose to use the software package SmartPLS 2.0 to analyze our data using partial least squares (PLS) (Chin 1998, Lohmoeller 1988). Since we have a small sample size, PLS is a preferable method to use because estimates of individual path coefficients are more conservative than in covariance-based techniques (Bagozzi and Yi 1988, Chin 1998). Further, PLS is component-based and does not require normal data (Chin 1998, Chin and Newsted 1999). Previous research recommends that to have good model fit, there needs to be high construct reliability and significant path coefficients (Chin 1998). To assess reliability, we looked at the Cronbach's alpha of each construct. All constructs had Cronbach's alphas well above the 0.70 range indicating good reliability (Nunnally 1978). The Cronbach's alpha scores ranged from 0.7576 to 0.9707. Further, our composite reliability scores all exceeded a suggested minimum of 0.7 (Bagozzi and Yi 1988, Fornell and Larcker 1981) ranging from 0.8569 to 0.9856.

Common method variance

We employed exploratory factor analysis for assessing common method bias (Harman 1967). Using Kaiser-Meyer-Olkin (KMO) criterion to assess the sampling adequacy for a factor analysis, we found all values in the diagonal of the matrix were above 0.5 and the KMO coefficient was at 0.853. Next, we applied the Kaiser-Guttman criterion and the scree test to assess the number of factors present. The assessment revealed five factors with eigenvalues greater than one that accounted for 60.776% of the variance, and the first factor accounted for 41.6% of the variance. Finally, we conducted a common method bias test recommended by Podsakoff et al. (2003) for PLS. After adding a marker variable and a common factor with each item, we found that the average variance explained by the methods factor was less than 1%. These results suggest that common method bias was not an issue in our sample.

Construct validation

Using exploratory factor analysis (Chin 1998), we empirically assessed the content validity with varimax rotation in SPSS 20. All factor loadings with the exception of PP4 and WTP 4 were greater than the cut-off point of 0.50 (Hair et al. 2005). Thus, these two items were deleted from the analysis.

All items showed statistically significant standardized loadings confirming convergent validity and uni-dimensionality (Anderson and Gerbing 1988, Fornell and Larcker 1981). As seen in Table 3, all scale items except WTP 5 (item loading 0.610) and PP3 (item loading 0.640) loaded on their construct above the minimum threshold of 0.7 (Chin 1998). However, since Chin (1998) suggests that in the early stages of scale development loading of 0.5 or 0.6 may be acceptable with other indicators having high loadings (Fritzsche and Oz 2007), we kept the

items. We also found that cross-loadings did not exceed the critical values, and the items explained the respective construct and did not share high variance with other constructs.

Table 3 - Items and loadings

Item	Loading
PA1	0.940**
PA2	0.915**
PA3	0.888**
PBC1	0.894**
PBC2	0.927**
PBC3	0.794**
PBC4	0.875**
PP1	0.888**
PP2	0.903**
PP3	0.640**
I1	0.985**
I2	0.986**
WTP1	0.948**
WTP2	0.946**
WTP3	0.938**
WTP5	0.610**
** Significant at p-value < 0.001 level	

Convergent validity is supported when the average variance extracted (AVE) is greater than 0.5 (Chin 1998, Fornell and Larcker 1981). All constructs in our model had AVE's greater than 0.5 and ranged from 0.6710 to 0.9716. To test for discriminant validity, the square root of the AVE should be greater than its correlation (Chin 1998, Fornell and Larcker 1981). Table 4 shows that the square roots are all above the correlations for each construct thus, supporting discriminant validity.

Table 4 - Correlations and square roots of AVE

Constructs	ATT	PBC	PP	I	WTP
ATT	0.9144				
PBC	0.646	0.9857			
PP	0.293	0.321	0.8738		
I	0.667	0.584	0.333	0.8191	
WTP	0.379	0.381	0.405	0.408	0.8722
The square root of the construct's AVE is provided along the diagonal					

Results

Table 5 presents the results of our hypotheses testing. We found support for hypotheses 1, 2, 3 and 4. Overall, we found attitude toward GSCM products is positively associated with intention to buy a GSCM product (path coefficient: 0.8681, t-statistic: 6.139). Perceived behavioral control over environmental activities is positively associated with the intention to buy a GSCM product (path coefficient: 0.3988, t-statistic: 2.652). Peer pressure to buy a GSCM product is positively associated with intention to buy a GSCM product (path coefficient: 0.2108, t-statistic: 2.140).

Finally, intention to buy a GSCM product is positively associated with a person's willingness to pay for that GSCM product (path coefficient: 0.2108, t-statistic: 7.869).

Table 5 - Hypotheses results

	Path Coefficient	Total Effects	T-Statistic	SE
H1. ATT → I	0.8681***	0.4817***	5.8488	0.0824
H2. PBC → I	0.3988**	0.2249**	2.6969	0.0834
H3. PP → I	0.2108*	0.1406*	1.9750	0.0712
H4. I → WTP	0.2926***	0.5170***	6.4156	0.0804
H5. I x ATP → WTP	0.0718	0.0748	0.6410	0.0811
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$				

Our PLS analysis also contains an interaction term. Interaction terms often increase multicollinearity. Therefore, we standardized all items reflecting the predictor and moderator constructs (Chin 2003). We did this to assess the interaction effect on whether a person's ability to pay (i.e., income) impacts the relationship between intention to buy a GSCM product and WTP for a GSCM product. Following Chin's (2003) PLS method for testing interaction effects, we analyzed the interaction effect of the path coefficient (I x ATP) to the dependent variable (i.e., WTP). We found no significant interaction effect (ability to pay does not moderate the relationship between intention to buy a GSCM product and WTP for a GSCM product).

Discussion and conclusions

This study attempts to address the broad question, "Do GSCM practices really matter to consumers?" The results of this study provide strong results that green practices in transportation does matter to consumers when making decisions on intention to buy the product as well as their willingness to pay for that product. These results provide further empirical support for the theory of planned behavior applied to a green supply chain context. They also reinforce for organizations the importance of marketing the use of GSCM in transporting materials throughout the supply chain.

One surprising finding was that ability to pay does not moderate the relationship between intention to buy a GSCM product and WTP for a GSCM product. Although it seems reasonable to assume a person with a lower income will have a lower WTP than a person with a higher income, values play a pertinent role in an individual's decision to buy. Perhaps values toward green transportation might outweigh a person's limitation of income. Further research should address this question.

References

Ajzen, I. 1985. From intentions to actions: A theory of planned behavior. In Kuhl, J., J. Beckmann, eds. *Action Control: From Cognition to Behavior.* Springer, Heidelberg, 11-39.

Ajzen, I. 1991. The theory of planned behavior. *Organisational behavior and human decision processes* **50**: 179-211.

Ajzen, I. 2002. Perceived behavioral control, self-efficacy, locus of control and the theory of planned behavior.

Journal of Applied Social Psychology **32**: 665-683.
Anderson, J.C., D.W. Gerbing, 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin* **103**(3): 411-423.
Auger, P., T.M. Devinney. 2007. Do what consumers say matter: The misalignment of preferences with unconstrained ethical intentions. *Journal of Business Ethics* **76**: 361-383.
Bagozzi, R.P., Y. Yi. 1988. On the evaluation of structural equation models. *Journal of the Academy of Marketing Science* **16**(1): 74-94.
Bitran, G.R., J.C. Ferrer. 2009. On pricing and composition of bundles. *Production and Operations Management* **16**(1): 93-108.
Chin, W.W. 1998. The partial least squares approach to structural equation modeling. In: G.A. Marcoulides, ed. *Modern methods for business research.* Mahwah, NJ, Lawrence Erlbaum Associates, 295-336.
Chin, W.W., P.R. Newsted. 1999. Structural equation modeling analysis with small samples using partial least squares. In: R.H. Hoyle, ed. *Statistical strategies for small sample research.* Thousand Oaks, CA, Sage, 307-336.
Chin, W.W. 2003. A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research*, **14**(2): 189-217.
Cordano, M., R.S. Marshall, M. Silverman. 2010. How do small and medium enterprises go "green"? A study of environmental management programs in the U.S. wind industry. *Journal of Business Ethics* **92**: 463-478.
Ferguson, M.E. L.B. Toktay. 2006. The effect of competition on recovery strategies. *Production and Operations Management* **15**(3): 351-368.
Fishbein, M., I. Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research.* Reading, MA, Addison-Wesley.
Fornell, C., D.F. Larcker. 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* **18**(2): 39-50.
Fritzsche, D.J., E. Oz. 2007. Personal values' influence on the ethical dimension of decision making. *Journal of Business Ethics* **75**(4): 335-343.
Garfinkle, I., D. Oellerich. 1989. Noncustodial fathers' ability to pay child support. *Demography* **26**(2): 219-233.
Gil, L.A., K.N. Kwon, L.K. Good, L.W. Johnson. 2012. Impact on self on attitudes toward luxury brands among teens. *Journal of Business Research* **65**: 1425-1433.
Hair, Jr., J.F., W.C. Black, B. Babin, R. Anderson, R. Tatham. 2005. Multivariate Data Analysis. Prentice-Hall, Upper Saddle River, NJ.
Harman, H. 1967. *Modern factor analysis.* University of Chicago Press, Chicago.
Hoejmose, S.U., A.J. Adrien-Kirby. 2012. Socially and environmentally responsible procurement: A literature review and future research agenda of a managerial issue in the 21st Century. *Journal of Purchasing and Supply Chain Management* **18**(4): 232-242.
Iraldo, F., F. Testa, M. Frey. 2009. Is an environmental management system able to influence environmental competitive performance? The case of the eco-management and audit scheme (EMAS) in the European union. *Journal of Cleaner Production* **17**: 1444-1452.
Li, M., T.Y., E. Rabinovich, A. Crawford. 2012. Self-service operations at retail stores: The role of inter-customer interactions. *Production and Operations Management.* **18**: 1-27.
Lohmoeller, J.B. 1988. The PLS program system: Latent variables path analysis with partial least squares estimation. *Multivariate Behavioural Research* **23**(1): 125-127.
Michell, L., A. Amos. 1997. Girls, pecking order and smoking. *Social Science & Medicine*, **44**(12): 1861-1869.
Miller, K.W., M.K. Mills. 2012. Contributing clarity by examining brand luxury in the fashion market. *Journal of Business Research* **65** (10): 1471-1479.
Nunnally, J.C. 1978. *Psychometric theory.* New York, McGraw-Hill.
Park-Poaps, H., K. Rees. 2010. Stakeholder forces of socially responsible supply chain management orientation. *Journal of Business Ethics* **92**(2): 305-322.
Pavlou, P.A., M. Fygenson. 2006. Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *MIS Quarterly* **30**(1): 115-143.
Podsakoff, P.M., S.B. MacKenzie, J.Y. Lee, N.P. Podsakoff. 2003. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology* **88**(5): 879 -903.
Pouta, E., M. Rekola. 2001. The theory of planned behavior in predicting willingness to pay for abatement of forest regeneration. *Society & Natural Resources: An International Journal* **14**(2): 93-106.

Salman, A.Z., E. Al-Karablieh. 2004. Measuring the willingness of farmers to pay for groundwater in the highland areas of Jordan. *Agricultural Water Management* **68**(1): 61-76.
Schuler, D.A., M. Cording. 2006. A corporate social performance- Corporate financial performance behavioral model for consumers. *Academy of Management* **31**(3): 540-558.
Sumter, S.R., C.L. Bokhorst, L. Steinberg, P.M. Westenberg. 2009. The developmental pattern of resistance to peer influence in adolescence: Will the teenager ever be able to resist. *Journal of Adolescence* **32**(4): 1009-1021.
Sykes, T.A., V. Venkatesh, S. Gosain. 2009. Model of acceptance with peer support: A social network perspective to understand employees' system use. *MIS Quarterly* **33**(2): 371-393.
Testa, F., F. Iraldo. 2010. Shadows and lights of GSCM (Green Supply Chain Management): Determinants and effects of these practices based on a multi-national study. *Journal of Cleaner Production* **18**(10-11): 953 -962.
Warner, H.W., L. Aberg. 2006. Drivers' decision to speed: A study inspired by the theory of planned behavior. *Transportation Research Part F: Traffic Psychology and Behaviour* **9**(6): 427-433.
Wooten, D.B. 2006. From labeling possessions to possessing labels: Ridicule and socialization among adolescents. *Journal of Consumer Research* **33**(2): 188-198.
Zhu, Q., J. Sarkis. 2004. Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management* **22**: 265-289.
Zhu, Q., J. Sarkis, K.H. Lai. 2012. Examining the effects of green supply chain management practices and their mediations on performance improvements. *International Journal of Production Research* **50**(5): 1377 -1394.