

Exploring Price Sensitivity of a Green Brand: A Consumers' Perspective

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Global warming has warmed up debates not only in scientific community, but also among brand leaders. Brands are trying to find avenues to differentiate and sustain in the market by adding newer dimensions, thereby attract and sustain customers. "Green Brand" has been the latest buzz in branding, attracting attention of numerous brand management practitioners, and academics as well. Green brands can be defined in many ways, which has been examined in this paper. The paper follows an exploratory approach to define green brand, find out its differentiating proposition to customers, and finally, the extent to which a particular category of green brand will be susceptible to price changes. Therefore, we attempted to see the claim(s) of green brands to customers, and how much extra return it would generate by claiming such proposition. We already know that, branding is all about differentiation and sustainable identity that ultimately leads to buyers' loyalty. Branding by such means result in inelastic pricing scheme by manufacturers. Thus, making the price of green brands inelastic will be a major achievement for brand managers. This is why, measurement was conducted in field survey to find out the price elasticity of a green brand. This will immensely help brand managers to grasp the point of pricing, keeping in mind whether green brand actually yield any desirable effect in branding.

Field of Research: Green Marketing, Green Brand, Price elasticity, Buyers' loyalty

1. Introduction

Globally, there has been a growing concern on issues pertaining to environment. A heightened awareness has dawned on the minds of the consumers that their purchasing behavior can actually wreak a serious dent to the ecological balance of the planet (Rahbar, 2008). Coupled with this realization, the shifting demands and preferences of consumers are exerting pressure on the companies in transforming their business activities in order to cater to the environmental needs in a more responsible way (Olson, 2009). Being socially responsible by offering environmentally sustainable products and services, therefore, becomes of prime importance to those companies striving to attain a competitive advantage in the business world (Wahid *et al.*, 2011).

Now-a-days, sustainable development takes precedence in materializing the divergent goals of multiple stakeholders in a society, and is inextricably linked with the human

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well-being (Čiegis *et al.*, 2009). Business organizations tend to voice their concern about environmental issues due to a host of reasons, such as, environmental degradation, governmental regulations, competitive pressure, cost or profit potential, etc. (EPA, 2000). This situation is encouraging firms to undertake an environmental transformation process with a view to lessening the effect of detrimental consequences stemming from their economic activities (Fraj-Andrés *et al.*, 2009). Within this context, a change in the discourse of marketing issues that dominate scientific literature can be discerned (Banyté & Gadeikienė, 2008), where an increasing amount of attention is paid to the problems and prospects of green marketing (Grundey & Zaharia, 2008).

Green or environmental marketing has been viewed as a tool towards sustainable development and for strengthening brand image (Banyte *et al.*, 2010). As rising environmental concerns are encouraging consumers to have greater awareness of their purchase decisions, firms are implementing measures geared to offering green substitutes for traditional products. Consumers and companies alike are consequently more willing to pay premium prices for green alternatives (Laroche *et al.*, 2001) This would concur well with what Maxwell *et al.* (2000) mentioned that all things being equal, consumers would prefer a green product over the one that is less friendly to the environment with a growing number of people willing to pay a premium for the former – from organic foods to energy-efficient appliances (D'Souza *et al.* 2004).

Notwithstanding the significance of encouraging green consumer behavior, this issue of environmental marketing has, however, yet to be adequately addressed in current literature. In particular, in the context of Bangladesh, there is an acute dearth of studies done in this respect. Under these circumstances, further study vis-à-vis the buying behavior of a green consumer with its various demographic attributes is in order. Aside from it, issues relating to the propensity (or the lack of it) on the part of a consumer in paying a premium price for a green product need to be urgently addressed. Thus the purpose of this study is to gain an empirical insight into the buying motivations of consumers for green products.

1.1 Organization of the Paper

Following this introduction, the objectives of the study are spelt out. This is followed by a discussion on the definition of green marketing, the importance of life cycle approach of green products and the impact of demographic variables on them as presented in the extant literature. Next, the issues of methodological challenges as well as addressing them for the two methods (Ordinal Logistic Regression and Gabor-Granger) applied in the study, adequacy of sample size are highlighted. Data gleaned from a questionnaire survey are then analyzed. This is followed by presenting the conclusion and implications of the findings. Finally, limitations of the study and the future areas of research work are presented.

1.2 Objectives of the Study

The objectives of the study are three-fold:

- (i) To offer a brief overview vis-à-vis green marketing as well as the life cycle approach of a green product
- (ii) To gauge the impact of demographic attributes of the consumers on the purchase of a green product
- (iii) To measure the price elasticity of a particular product (using a modified version of Gabor-Granger method)

2. Literature Review

This section will shed light on green marketing as defined by various authors and on the product's life cycle approach followed by a discussion on their effect of consumers' demographic variables on their willingness to pay price premium for a green product.

2.1 Green Marketing

Green marketing has been defined in a number of ways as presented below:

Polonsky (1994) argues that a majority of people believe that green marketing refers solely to the promotion or advertising of products having environmental characteristics with terms such as, recyclable, refillable, ozone-friendly, being some of the things consumers most often associate with green marketing. While these terms are green marketing claims, in general, it is a much broader concept, one that can be applied to consumer goods, industrial goods and even services (Roberts & Bacon, 1997).

Green marketing incorporates a broad range of activities that include modification or changes into the design, production process, packaging as well as advertising of the product (Polonsky, 1994). Elaborating further, he stated that green or environmental marketing consists of all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants with minimal detrimental impact on the natural environment. This was echoed by Peattie (1995), who defined green marketing as the holistic management process tailored to identifying, anticipating and satisfying the requirements of various stakeholders in a profitable and sustainable way.

2.2 Life Cycle Approach

The concept of life cycle approach incorporates existing consumption and production strategies, thereby superseding a piece-meal approach. Such approach seeks to satisfy human needs by providing basic necessities, such as, food and shelter, through optimized consumption and production systems contained within the ecosystem (de Haes & van Rooijen, 2005). In a life cycle economy, product decisions made by the companies hinge upon obtaining information at all stages of its life cycle – from cradle to grave. In this economy, consumers will make their decisions vis-à-vis different brands of a product, after balancing its different attributes, such as, price, environmental impacts (climate change), social consequences (rights of workers), etc. Supported by

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government incentives, the companies seek to produce, reuse, and recycle products and services with the optimum energy and resource efficiency and with the minimum environmental impact possible.

Similar to a living being, products have a life cycle as well. In this cycle, raw materials are first extracted and processed and transformed into products, which are then packaged and distributed for the consumers to use and reuse and eventually disposed of. At each phase in their life cycle, products come into contact with the environment economic, and social systems (de Haes & van Rooijen, 2005).

2.3 Effect of Demographic Variables

According to various studies, consumers' willingness to pay is affected by their demographic characteristics such as age, education, gender etc. (Straughan & Roberts, 1999; Ottman & Reilly, 1998; Getzner & Grabner-Krauter, 2004).

Gender. Empirical studies suggest that women are more sensitive to environmental issues and perceive them better than men do; and therefore, they more often become green consumers (Ottman & Reilly, 1998; do Paço *et al.*, 2009). On the other hand, other studies argue that men possess deeper knowledge on environmental issues, whereas women care about the quality of environment more (Mostafa, 2007; D'Souza *et al.*, 2007).

Age: The average age of a green consumer is considered to be lower than that of a typical consumer, i.e. younger people are more likely to be sensitive to environmental issues (Memery *et al.*, 2005; D'Souza, *et al.*, 2007). However, findings from other studies are at variance with the above with the age group of green consumers belonging usually in the range of 30 to 44 (Ottman and Reilly, 1998).

Education. Empirical studies mentioned above show that better educated consumers perceive environmental issues better and are more sensitive to them (Ottman & Reilly, 1998; (Memery *et al.*, 2005; D'Souza *et al.*, 2007; do Paço *et al.*, 2009).

Purchasing power. Consumers having higher than average purchasing power are more sensitive to environmental issues compared to those who receive average or low income (Ottman & Reilly, 1998); however, there exist the studies that present contrary findings as well (do Paço *et al.*, 2009).

In a series of experiments conducted by Wall Street Journal, Howard (2008) mentioned that consumers were willing to pay a premium for ethically sourced goods; while they agreed to buy known unethically made products only after their prices were slashed significantly. The current literature suggests that strong environmental motivations may result in a greater willingness to pay a price premium of up to 10% (Bang *et al.*, 2000; Paladino, 2006).

3. Methodology

This section presents the two methods – Ordinal Logistic Regression and Gabor-Granger – applied in the study. First the methodological challenges and the means of addressing those are highlighted. It specifically discusses the adequacy of the sample size of the respondents, sampling technique and data collection procedure.

3.1 Methodological Challenges

The central issue of measuring price elasticity of a green brand requires a demand schedule of customers, depicting various quantities bought at different prices. However, “green brand”, being a new and emerging concept in Bangladesh, has not seen many exemplary products that are actively sold and bought in the market. A few promising brands, that propose themselves as green brands to customers, are less than a year old in the market. Because of this introductory stage in the market, almost all of them either did not have enough time to change its price, or did not actually intend to do so because of initial teething problems associated with marketing of any new type of product category. This level of infancy of green brands poses two types of methodological challenges.

- First, sufficient historical data are not available, therefore, price elasticity cannot be measured based on only one price point.
- Second, most green brands are priced almost as same as its non-green substitutes, specifically the brand (Green Tissue paper) that we have taken into account for our study. Therefore, even if historical data were available, it would not be valid to measure price elasticity because consumers’ choice of a new brand might just be the outcome of a “novelty” effect (Kahn, 1995).

3.2 Addressing the Challenges

To address these measurement challenges, as well as to find a statistical model to relate price premium to consumers’ demographic variables, we have used two quantitative methods:

- The first one is Ordinal Logistic Regression, where “willingness to pay price premium” is considered as an ordinal response variable, and respondents’ gender, age, occupation, income, education, and marital status are treated as explanatory variables. A sample size of 48 was achieved through random mall-intercept survey, targeting Agora, Meena Bazar, PQS, and Swapna chain stores. Apart from parameter estimates from ordinal regression, spearman correlation and test of independence are also used to further clarify the underlying relationship in the statistical model.
- The second quantitative tool is Gabor-Granger method, for simulating a demand schedule of respondents (Richard, 1993). This method asks the respondents of their willingness to buy a product at various hypothetical prices, thereby builds a simulated demand schedule. From this demand schedule, the tentative price elasticity can be measured. However, the Gabor-Granger method is used in this case with minor modification, based on existing research findings explored

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through literature survey. Before applying Gabor-Granger method, the two assumptions were made. First, based on existing literature, it was found that customers are willing to pay more for environmentally friendly brand, rather than an average non-green brand. So, we assume that, green brands are price inelastic across the board. Now the question is narrowed down to its magnitude, i.e., the extent of inelasticity. Thus, consumers were exposed to various price ranges and asked about their “willingness to buy”, rather than saying plain “yes” or “no”. Second, for Gabor-Granger results to be valid, we need to include the classic “ceteris paribus” in our assumptions. Thus, we assume that, the results should be interpreted under a fixed time frame where there would be no change in consumers’ tastes and preferences, prices of substitutes and complementary products, promotion efforts from brands, and all other exogenous variables in the referenced time frame.

3.3 Adequacy of the Sample Size

Apart from theoretical considerations, there are many qualitative factors involved in sample size determination. They are: availability of prior research data, cost consideration, time available for the survey, etc. There are many approaches to determine sample size, and for the purpose of this study, we followed power analysis approach to determine our desired sample size.

Since test of independence is extensively used in this research, we have anchored our sample size calculation on the assumption that, the sample size must be sufficient enough to yield a meaningful test of independence. By assigning effect size of 0.5 (which means, based on available research data, we expect that almost half of our respondents will be positive about green brand), alpha value of 0.05, and power of sample at 0.80, degree of freedom at 6 (based on Table 2, model fitting information), we calculated that the sample size would be 55 (Faul et al., 2009) using G-Power, version 3.1.2. However, while attempting to administer, we have been able to collect about 48 meaningful responses that could be used for further analysis.

4. Data Analysis and Modeling

Since our dependent variable is ordinal, and independent variables contain both ordinal and interval level data, we have run Ordinal regression procedure in SPSS. The results are presented below:

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Table 1: Case Processing Summary

Case Processing Summary		N	Marginal Percentage
willingness to pay premium	Highly agree	10	20.8%
	Agree	23	47.9%
	Somewhat agree	13	27.1%
	Disagree	2	4.2%
Valid		48	100.0%
Missing		0	
Total		48	

It is evident from case processing summary that, about 68.7% of respondents are either highly or at least, just willing to pay a premium price for a green brand.

Table 2: Model Fitting Information

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	102.761			
Final	85.554	17.207	6	.009

Link function: Logit.

H_0 : Explanatory variables do not explain variance in the response variable

H_a : Explanatory variables explain variance in the response variable

In this test, significance level stand at $0.009 < 0.05$, that means, we can reject the null hypothesis in this case, when $\alpha = 0.05$.

Table 3: Pseudo R-square Values

Pseudo R-Square	
Cox and Snell	.301
Nagelkerke	.334
McFadden	.154

Link function: Logit.

For Cox and Snell pseudo R-square, we can say that, through iterative process, we ended with a ratio of 0.301 (which is less than 1), may indicate for inclusion of other exogenous variables for a better fit. Nagelkerke and McFadden pseudo R-squares can also be interpreted in a similar way.

Table 4: Parameter Estimates from Logistic Regression

		Parameter Estimates						
		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[WILLING = 1]	-4.140	2.938	1.985	1	.159	-9.899	1.619
	[WILLING = 2]	-1.450	2.902	.250	1	.617	-7.139	4.238
	[WILLING = 3]	1.722	2.879	.358	1	.550	-3.921	7.365
Location	GENDER	-.146	.702	.043	1	.835	-1.523	1.231
	AGE	-.224	.337	.442	1	.506	-.883	.436
	OCCUPAT	.360	.262	1.896	1	.169	-.153	.873
	INCOME	.568	.276	4.218	1	.040	.026	1.109
	EDU	-1.659	.551	9.067	1	.003	-2.739	-.579
	MARITAL	.870	.920	.893	1	.345	-.934	2.674

Link function: Logit.

It is evident from table 4 that, assuming $\alpha = 0.05$, parameter estimates of only Income and Education are significant. These estimates (for example, income has a parameter estimate of 0.568) are the ordered log-odds (logit) regression coefficients. Standard interpretation of the ordered logit coefficient is that, for a one unit increase in income, the response variable level is expected to change by its respective regression coefficient in the ordered log-odds scale while the other variables in the model are held constant.

To further look into the relationship between “willingness to pay a price premium” and other explanatory variables, we have run a non-parametric correlation analysis, whose results are summarized in the following table with their respective levels of significance:

Table 5: Spearman Correlation (rho) between Response and Explanatory Variables

Willingness To pay Premium		Gender	Age	Occup.	Income	Education	Marital
		rho	0.112	-0.60	0.194	0.068	-0.471*
	Sig	0.450	0.685	0.186	0.648	0.001	0.828

* The correlation analysis shows that, only “education” has significant correlation with the “willingness to pay premium for environmentally friendly products”.

We will now examine whether respondents’ willingness to pay a premium is independent of their demographic variables. Usually, Pearson chi-square statistic is used to test these hypotheses. Since many of the cells in tables have counts that are less than 5, Pearson Chi-square statistic would not be appropriate. In these cases, instead, we would use Likelihood ratio for testing independence, at $\alpha = 0.05$.

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Table 6: Test of Independence, Response Variable vs. Gender

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.756 ^a	3	.860
Likelihood Ratio	.776	3	.855
Linear-by-Linear Association	.583	1	.445
N of Valid Cases	48		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .83.

H_0 : Willingness to pay premium is independent of gender

H_a : Willingness to pay premium is not independent of gender

Asymptotic significance of likelihood ratio is 0.855 which is greater than 0.05. Therefore, we cannot reject null hypothesis. We may infer that, gender difference does not significantly affect respondents' willingness to pay premium.

Table 7: Test of Independence, Response Variable vs. Age

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.178 ^a	12	.290
Likelihood Ratio	16.589	12	.166
Linear-by-Linear Association	.134	1	.715
N of Valid Cases	48		

a. 19 cells (95.0%) have expected count less than 5. The minimum expected count is .29.

H_0 : Willingness to pay premium is independent of age

H_a : Willingness to pay premium is not independent of age

In table 7, we see that, asymptotic significance of likelihood ratio is 0.166 which is greater than 0.05. Therefore, we may infer that, age difference does not significantly affect respondents' willingness to pay premium. Based on asymptotic significance of likelihood ratio, cannot reject null hypothesis.

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Table 8: Test of Independence, Response Variable vs. Occupation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.084 ^a	15	.445
Likelihood Ratio	16.120	15	.374
Linear-by-Linear Association	1.735	1	.188
N of Valid Cases	48		

a. 22 cells (91.7%) have expected count less than 5. The minimum expected count is .04.

H_0 : Willingness to pay premium is independent of occupation

H_a : Willingness to pay premium is not independent of occupation

Based on asymptotic significance of likelihood ratio, cannot reject null hypothesis.

Table 9: Test of Independence, Response Variable vs. Monthly Income

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.956 ^a	12	.620
Likelihood Ratio	11.920	12	.452
Linear-by-Linear Association	.247	1	.619
N of Valid Cases	48		

a. 18 cells (90.0%) have expected count less than 5. The minimum expected count is .17.

H_0 : Willingness to pay premium is independent of monthly income

H_a : Willingness to pay premium is not independent of monthly income

Based on asymptotic significance of likelihood ratio, cannot reject null hypothesis.

Table 10: Test of Independence, Response Variable vs. Education

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.322 ^a	9	.023
Likelihood Ratio	19.207	9	.023
Linear-by-Linear Association	9.202	1	.002
N of Valid Cases	48		

a. 12 cells (75.0%) have expected count less than 5. The minimum expected count is .08.

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H_0 : Willingness to pay premium is independent of education

H_a : Willingness to pay premium is not independent of education

Based on asymptotic significance of likelihood ratio, reject null hypothesis.

Table 11: Test of Independence, Response Variable vs. Marital Status

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.044 ^a	3	.563
Likelihood Ratio	2.038	3	.565
Linear-by-Linear Association	.033	1	.856
N of Valid Cases	48		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .71.

H_0 : Willingness to pay premium is independent of marital status

H_a : Willingness to pay premium is not independent of marital status

Based on asymptotic significance of likelihood ratio, cannot reject null hypothesis.

Having results of a series of hypothesis tests and parameter estimates, the central issue of price sensitivity is now addressed. Since the respondents were exposed to a real product (a green tissue brand) with its real price, Gabor-Granger method is applied to test their price sensitivity with Tk. 5 increment at each step. Price sensitivity is nominally measured in a Likert-type scale, with evidence of increasing resistance to higher prices. It is assumed that, in a fixed time-scale, all the respondents will have identical consumption rate, therefore, variation in frequency in Likert-type responses would identically represent their units of consumption in a given time-scale. Then, “the change in quantity” is represented by the “change in positive agreement”, while the “change in price” is arbitrary by Tk. 5 increment at each measurement stage. By dividing the percentage change in quantity demanded by the percentage change in price, we arrive at the measurement of price elasticity.

Four “point price elasticity” were identified for four steps of price increases. The result is summarized in the following table:

Table 12: Measurement of Price Elasticity

Price	(a) Highly agree	(b) agree	(c) somewhat agree	(d) disagree	(e) highly disagree	(a+b+c) Positive agreement	Price elasticity
30	46	2	0	0	0	48	
35	21	19	7	0	1	47	-0.125
40	11	18	12	5	2	41	-0.893
45	6	5	16	18	3	27	-2.731
50	4	5	10	17	12	19	-2.667

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It is evident that, for the first step of price increase, demand is inelastic since price elasticity is less than 1 (about -0.125). Demand is also inelastic for the second step of price increase, as the price elasticity stands at -0.893. Interestingly, price elasticity goes up at the third level of price increase, and continues to be elastic at the fourth level of price increase.

It may be concluded that, while consumers are willing to pay a price premium for a green brand, this willingness to pay has a price ceiling. Price elasticity of demand is no more inelastic beyond this price ceiling. Brand professionals need to know this ceiling while pricing their categories of products.

5. Conclusion and Implications of the Findings

From the foregoing analysis, the following conclusions with implications for the brand managers can be drawn:

- The ordinal regression model, with “willingness to pay price premium” as response variable, and demographic factors as independent variables, appears to be a good fit with “income” and “education” as significant parameter estimates.
- Considering the strengths of parameters, “education” appears to be stronger than “income” of respondents. This is evident both through parameter estimates and Spearman Correlation coefficients. This is also supported by test of independence by using maximum likelihood estimation.
- Our core concern was to examine whether the demand for green brands are price inelastic. It was found that, price inelasticity exists up to a certain level of price increases. While consumers are willing to pay a price premium for a green brand, their price inelasticity holds good only up to a certain price ceiling. In our case, it was found that, the price of green tissue may be increased up to Tk. 40 (about 33.33% increase in original price), since demand is price inelastic up to this price limit (holding other things constant, like- time frame, promotional efforts by green brands, income, education, consumers’ tastes and preferences, and price of substitute and complementary goods).
- Understandably, the rate of price increase and maximum price ceiling would be different in other cases, depending on types of product and the profile of target customers. This finding will have tremendous implication for brand practitioners. Since price elasticity of demand is no more inelastic beyond this price ceiling, brand professionals need to know this ceiling while pricing their categories of products.

6. Limitations of the Study and Areas of Further Research

In this study, the survey is conducted in a few grocery chain stores located only in the affluent areas of the capital city. In order to capture a more conclusive evidence of the buying motivations of the consumers for the purchase of green products, further studies are in order and can highlight the following:

- Grocery stores in both affluent and non-affluent areas are selected thereby offering a comparative picture of the buying intentions of the respondents.

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- Various other green products can be chosen that would give an insight into the buyers' intentions of their purchase of these products
- Besides demographic variables, other attributes of the respondents, such as, values, beliefs, knowledge, attitudes, etc. towards their willingness to pay a price premium for the purchase of a green product can be gauged using a larger sample size.

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