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## UNDERSTANDING THE EFFECT OF ENVIRONMENT FRIENDLY TECHNOLOGY USAGE ON CONSUMER PURCHASING PREFERENCES IN KOLKATA CITY

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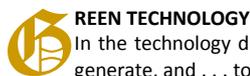
### ABSTRACT

*Interest in developing and using environment friendly, or "green," technology in production process is on the increase. Consequentially use of environment friendly technology as a marketing device is growing. Consumer attitudes towards environmental issues may influence their purchasing patterns and decisions, as well as they may be willing to pay premium prices for products that incorporate green technology. To see if a higher level of concern for environmental issues influences purchasing behavior, a survey of seventy people was conducted in the city of Kolkata. Respondents reported on their concern and awareness levels, their purchasing habits and patterns, and their willingness to pay more for greener products or for products which were relatively more friendlier to environmental concerns. Higher concern-level respondents were found to have a higher frequency of green purchasing behavior, as well as a greater willingness to pay more for green product.*

### KEY WORDS

Consumer Purchase Pattern, Green technology.

### CONSUMER ATTITUDE AND BEHAVIOUR TOWARDS GREEN TECHNOLOGY



#### GREEN TECHNOLOGY

In the technology driven industry, green technology involves manufacturers finding ways to "reduce the resources they consume and the waste they generate, and . . . to make their products more recyclable" (Goldberg, 1998, p. 16). Many of these same technologies can be applied to the manufacture, use, and disposal of cellular phones. For example, mobile giant Nokia uses components that self-disassemble under heat, and incorporates features in its chargers that indicate when a phone is charged so that users can disconnect the charger from the electrical source. The question is whether these environmentally friendly, or green, features have any influence over consumers' purchasing decisions.

Although environmental protection has been an important issue for many years, how awareness of environmental issues affects consumer purchasing decisions has not been examined in much depth until relatively recently. Due to the growing public concern over such environmental issues as global warming, some firms are investing in concepts such as green technology (Meyers, 2007) and researchers and marketers are now beginning to look into how to measure the affect of green labeling on purchasing decisions (Beck, 2007). Still, it is not clear how powerful an influence the use of green technology has on these decisions.

In their literature review, Saphores *et al.* (2007) point out that consumers make trade offs in their purchasing decisions, including whether or not they are willing to pay extra for "green" products (p. 115). Their study of California households (Saphores *et al.*, 2007) found that consumers are willing to pay only one to five percent more for green electronics than for equivalent non-green products (p. 115). Bang, *et al.* (2000), found a relationship between consumers willingness to pay more for renewable, "green," energy and their knowledge, beliefs, and concern over environmental issues; however, while their level of concern for the environment was high, their level of knowledge was often limited, leaving marketers, as well as government agencies interested in pursuing environmentally friendly policies, with the task of educating the public (p. 466). On the other hand, Laroche, *et al.* (2001) found those consumers' levels of environmental knowledge, or "eco literacy," were not good determiners of purchasing behavior, with both those willing and unwilling to pay more for environmentally friendly products having the same eco literacy score (p. 516).

A complication in understanding consumers' behavior is the observation that, despite a majority of Americans reporting that environmental issues are very important to them, skepticism towards manufacturers' claims of environmental friendliness has caused their purchasing behavior to have "lagged behind verbally-expressed concern for the environment" (Mohr, 1998). Research by Lane and Potter (2007) also found what they call "action-attitude gap" in UK residents' decisions in purchasing new cars. Although fuel efficiency is reported as a key factor in making car-purchase decisions, most car buyers put little effort into comparing fuel consumption when making their decisions. Whether due to skepticism or for other reasons, consumers' stated concerns about the environment don't appear to correspond with the purchase decisions they make.

### RESEARCH QUESTIONS

Does a consumer's stated level of concern about environmental issues affect his or her decisions whether or not to purchase products with environmentally friendly attributes?

Are consumers with a relatively high level of concern about environmental issues more willing to pay a premium for a higher-priced green product than those with a relatively low level of concern about environmental issues?

#### HYPOTHESIS 1

Consumers with a relatively high level of concern about environmental issues (greens) are more likely than those with a relatively low level of concern about environmental issues (reds) to purchase products with environmentally friendly attributes.

#### HYPOTHESIS 2

When given a choice between a higher-priced green product and a less expensive but otherwise equivalent product, consumers with a relatively high level of concern about environmental issues (greens) are more likely than those with a relatively low level of concern about environmental issues (reds) to be willing to pay a premium for the green products.

### METHODOLOGY

#### DESIGN

A survey was employed to examine the hypothesized relationships between environmental concern level and behavior in purchasing green products. The questionnaire was divided into four parts: section 1 was used to gather demographic information about the respondents, section 2 was used to determine the respondents' relative level of environmental concern, sections 3 and 4 were used to determine the respondents' general purchasing behavior in terms of environmentally friendly products, and section 3 was used again to gauge respondents' willingness to pay more for a green product.

After section 1, survey respondents were asked to respond to five questions regarding their level of concern about environmental issues. Each question was given on a five-point Likert scale, with 1 being strongly disagree and 5 being strongly agree. The questions were designed so that a higher mean score indicated a higher level of concern. This was done in order to divide the respondents into two groups: greens (relatively high-level of concern) and reds (relatively low-level of concern).

Respondents were then asked questions regarding their general purchasing behavior in terms of green product attributes. A Likert scale was employed again, this time based on the frequency of the purchasing behavior in question. The questions were designed so that a higher score indicated a greater propensity towards purchasing green products.

Finally, respondents were given a hypothetical situation in which they have the choice of purchasing a cellular phone that incorporates green technology, or a less-expensive but otherwise equivalent one that does not. They were asked how willing they would be, on a five-point scale (with 1 = not at all willing and 5 = very willing), to pay five percent more for a green phone. This question was also used to calculate the overall mean for purchasing behavior.

#### **PARTICIPANTS**

Due to a lack of time and resources, a non-probability convenience sample was chosen to respond to the questionnaire. Participants included friends, associates, and colleagues of the researcher. The research was confined to Kolkata city. A total of 100 questionnaires were distributed, of which 70 were completed and returned.

#### **APPARATUS**

The apparatus consisted of the questionnaire (see Appendix A), a computer, and software including Microsoft Excel and PHStat (a statistical analysis program).

#### **DATA COLLECTION PROCEDURE**

Surveys were distributed to respondents on a convenience basis, as the time available for selecting a sample was very limited. The researcher utilized the resources that were readily available within the allowable timeframe, including his friends, associates, and colleagues. Surveys were distributed in paper form. It is likely that this sample is not truly representative of a meaningful measurement parameter; however, it may provide valuable insight that could help guide further research.

#### **DATA ANALYSIS**

The surveys were gathered and divided into two groups (greens and reds) according to the mean levels of concern as determined by section 1 of the survey. The division was done by means of a median split. Those whose answers to the first group of questions averaged less than or equal to the median were put in the red group (relatively low-level of concern for the environment), while those answering with an average greater than the median were put in the green group (relatively high-level of concern for the environment).

Each group was then analyzed in terms of their past and potential future purchase behavior regarding green products according to their responses to sections 3 and 4 of the survey, and a mean level of propensity to purchase green products for each group was established. In addition, both groups were analyzed to determine a mean level of willingness to pay a five percent premium for a green cellular phone over a less-expensive but otherwise equivalent non-green phone (survey section 4). Each of the means of the last two sections (propensity towards buying green and willingness to pay more for green) were then subjected to t-tests to determine if there was a significant difference between the green and red groups in propensity towards purchasing green products, and in willingness to pay more for a particular green product (cellular phone) over an otherwise equivalent, but non-green product (for details of the statistical analysis, please see Appendix B).

#### **CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH**

The results of the statistical analysis of the data confirmed both hypotheses: that there is a relationship between levels of environmental concern and both propensity towards purchasing, and a willingness to pay more for environmentally friendly products. In both cases, a higher level of concern corresponded with a greater degree of present and potential future green purchasing behavior, as well as a greater willingness to pay more for a green product.

Due to possible bias in the selection of the sample, as well as in the formulation of the survey questions and the analysis of the results, these findings cannot be considered conclusive. They do, however, give some indication that a relationship exists between environmental concern and purchasing behavior and willingness to pay a premium for green products.

An interesting result of the survey was that, although responses to concern levels below 4 were placed in the red group (and therefore more than half of the possible mean scores), approximately twice as many of the participants received scores that placed them in the green group. In addition, a number of those in the green group made marginal comments indicating that they felt hypocritical regarding the difference between their stated level of concern and their actual behavior.

Future studies in this area could be pursued to correct for the limitations of the data collection and analysis in this research project. A larger and randomly selected sample would give more weight to the findings, as would improvements in the survey design. Other factors could also be looked at, such as environmental knowledge and skepticism toward green marketing claims. These factors could be analyzed to determine the degree of interaction, if any, and the relative weight each has in influencing consumer behavior. This kind of information could prove useful to firms interested in pursuing green marketing initiatives, as well as to groups interested in educating consumers and/or environmental protection. Limitations of the study and suggestions for future research are discussed.

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## APPENDIX

## APPENDIX A: SURVEY QUESTIONNAIRE

## SURVEY

Thank you for taking the time to complete this survey. There are four sections to the survey: information about yourself, and eleven questions regarding your attitudes toward environmental issues and how you make decisions about purchasing products. Please answer all the questions as honestly as possible. No personally identifiable information will be collected. There is no right or wrong answers, and your responses will remain anonymous. The purpose of this survey is to examine the relationship between people's concern for the environment and their purchasing behavior.

## SECTION 1

Before answering the questions, please provide some information about you.

Age \_\_\_\_\_ Sex \_\_\_\_\_ Nationality \_\_\_\_\_

Level of education (please check the highest level that applies):

- High school graduate  
 Some College  
 College graduate  
 Graduate student (M.A. or Ph.D.)  
 Master's degree  
 Doctorate degree  
 None of the above

How would you characterize your income level? (Please circle one)

Lower                      Middle                      High

## SECTION 2

Do you agree with the following statements? Answer the following questions by circling the appropriate number. The more you agree, the higher number you should circle (1 = strongly disagree, 5 = strongly agree).

i. Climate change is a serious issue.

1                      2                      3                      4                      5

ii. Governments should do more to encourage people to recycle.

1                      2                      3                      4                      5

iii. The environment is in danger due to human activity.

1                      2                      3                      4                      5

iv. I worry that the next generation will face serious problems regarding the environment.

1                      2                      3                      4                      5

v. Global warming is one of the most important issue in the world today.

1                      2                      3                      4                      5

## SECTION 3

How often do you do the following? Answer the following questions by circling the appropriate number (1 = never, 2 = seldom, 3 = sometimes, 4 = usually, and 5 = always). Remember that your answer should reflect your actual behavior, not your opinion about whether or not you should behave this way.

i. When making a purchase, I seek out information about the product's environmental impact.

1                      2                      3                      4                      5

ii. I try to purchase products that can be easily recycled.

1                      2                      3                      4                      5

iii. I try to purchase products that are energy efficient.

1                      2                      3                      4                      5

iv. I try to purchase products that have minimal packaging.

1                      2                      3                      4                      5

v. I try to avoid purchasing products that I know to have a negative effect on the environment.

1                      2                      3                      4                      5

## SECTION 4

Please answer this question by circling the appropriate number (1 = not willing at all, 5 = very willing).

If you were planning to purchase a new cellular phone, and had to choose between a phone that incorporated environmentally friendly technology (less packaging, easier to recycle, more energy efficient) and an identical phone that did not incorporate environmentally friendly technology, how willing would you be to pay 5% more for the environmentally friendly phone?

1                      2                      3                      4                      5

**APPENDIX B: STATISTICAL ANALYSIS**

**HYPOTHESIS 1**

Consumers with a relatively high level of concern about environmental issues (greens) are more likely than those with a relatively low level of concern about environmental issues (reds) to purchase products with environmentally friendly attributes.

**DIFFERENCE IN MEANS: GREEN AND RED PURCHASING BEHAVIOR**

$H_0: \text{mean}_{\text{green}} - \text{mean}_{\text{red}} = 0; H_a: \text{mean}_{\text{green}} - \text{mean}_{\text{red}} > 0$

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	34
Sample Mean	3.56
Sample Standard Deviation	0.8192
Population 2 Sample	
Sample Size	36
Sample Mean	2.86
Sample Standard Deviation	0.8518

Intermediate Calculations	
Population 1 Sample Degrees of Freedom	33
Population 2 Sample Degrees of Freedom	35
Total Degrees of Freedom	68
Pooled Variance	0.699127
Difference in Sample Means	0.7
t Test Statistic	3.500755

Upper-Tail Test	
Upper Critical Value	1.667572
p-Value	.000412
<b>Reject the null hypothesis</b>	

**Decision:** Reject null hypothesis at  $\alpha = .05$  because the test statistic falls in the rejection region above 1.668.

**Conclusion:** There is evidence that the mean for the green group is greater than the mean for the red group.

**HYPOTHESIS 2**

When given a choice between a higher-priced green product and a less expensive but otherwise equivalent product, consumers with a relatively high level of concern about environmental issues (greens) are more likely than those with a relatively low level of concern about environmental issues (reds) to be willing to pay a premium for the green products.

**Difference in Means: Green and Red Willingness to Pay More for Green Product**

$H_0: \text{mean}_{\text{green}} - \text{mean}_{\text{red}} = 0; H_a: \text{mean}_{\text{green}} - \text{mean}_{\text{red}} > 0$

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	34
Sample Mean	4.47
Sample Standard Deviation	0.8611
Population 2 Sample	
Sample Size	36
Sample Mean	3.36
Sample Standard Deviation	1.2684

Intermediate Calculations	
Population 1 Sample Degrees of Freedom	33
Population 2 Sample Degrees of Freedom	35
Total Degrees of Freedom	68
Pooled Variance	1.187921
Difference in Sample Means	1.11
t Test Statistic	4.25864

Upper-Tail Test	
Upper Critical Value	1.667572
p-Value	<b>3.23E-05</b>
<b>Reject the null hypothesis</b>	

**Decision:** Reject null hypothesis at  $\alpha = .05$  because the test statistic falls in the rejection region above 1.668.

**Conclusion:** There is evidence that the mean for the green group is greater than the mean for the red group.

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