A Study of Consumers' Willingness to Pay for Green Products

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***Abstract*—In the past decade a huge number of studies have explored consumers' willingness to pay across different product categories. However the intention to pay the premium for green products had remained unexamined to a large extent in the context of emerging economies of the east. The present paper tries to prognosticate the drivers for green purchase decisions and willingness-to-pay. Structured questionnaires are used for data collection and ordinary least square regression and analysis of variance have been used for analysis of data. Results suggest the dominance of consumers' perception about the functional aspects of green products on their willingness-to-pay.**

***Index Terms*—perceptual factor, contextual factor, corporate environmental performance, willingness to pay, green products**

I. Introduction

Unprecedented economic growth triggered by technology revolution, globalization has led to market-driven growth in consumption pattern in the emerging economies. Change in consumption pattern has led to over-consumption or unsustainable consumption and over-exploitation of resources. In the present era the concern over environmental downturn, reduction of environmental impact and sustainable development has become the cynosure of research among the academicians, practitioners and even industrial entities [1]-[3]. Consumer research recognizes that their perceptions for a product, attitude, knowledge about the product and its manufacturer and various contextual factors play a dominant role in their decision making process [3]. Willingness-to-pay which denotes the maximum price that a consumer is willing to pay for a particular or a bundle of products, play a decisive leverage on their choice behaviour [4]. Thus in the juncture of environmental deterioration, adoption of environment-friendly practices inclusive of green product consumption depends on their inclination to pay the green price premium. The present study tries to analyse the factors prognosticating consumers' intention to pay the green price premium for products with green credential. The environmentally sustainable or environmental compatible or green products entails a list of potential benefits to the environment as they are made of environmental-friendly resources, have resource-conservation potential, can be recycled and have least environmental impact at all stages of its lifecycle [1]-[3]. In section two a brief description of the constructs has been provided, followed by research methodology in the third section. The analysis of data with the findings of the study and conclusion are presented in the fourth and fifth section. The last section provides the managerial implications of the study.

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II. Brief Literature Review

Constructs	Definitions
Willingness to pay (WTP)	Willingness to pay encompasses individuals' maximum willingness to pay for availing a particular service or for consumption of a particular product [4].
Perceptual factor (PF)	This represents sense of environmental responsibility based on the probable causal effects of environmental deterioration measured upon individual perceptions, beliefs, and behavioural commitment [1], [2],[5],[6].
Contextual factor (CF)	Contextual factors such as product characteristics, quality standard, availability of recycling facilities, market supply of goods, physical infrastructure, policy incentives can leverage environmental behaviour and consequent intention to pay the green price premium [7]-[9].
Corporate environmental Performance (CEP)	CEP ameliorates companies' environmental performance through impact reduction and amendment of consumers' evaluations and attitudes towards the firms, leveraging consumer satisfaction [10]-[12].

A. Perceptual Factor (PF)

Enhancement of individual environmental responsibility triggers green purchase decisions [1], [2]. Environmental perception refers to individuals' environmental concepts and subsequent action strategies to solve environmental problems [13]. Consumers' environmental perception is representative of their environmental values. Recent studies suggest that respondents with high NEP (New Environmental Paradigm) scores are more likely to exhibit strong environmental behaviors in the form of enhanced recycling, conservation of resources and energy and green purchase intentions. Consumers' perception of the positive impact of their green product purchase decision

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on the environment strongly leverages the pro-active adoption of green consumption behaviour [14]-[15].

B. Contextual Factor (CF)

The theories and perspectives discussed in the section of perceptual factors define human motivations towards environmental behavior. However behavior doesn't depend on motivations alone. Many contextual factors may motivate or constrain environmental behavior [8]-[9]. Few studies have weighed on the consideration of contextual factors apart from intra-personal factors like attitudes, habits and perceptions in assessment of choice behaviour [9]. Behavioral change would at times be so cost-ineffective that it would hinder environmental motivations, thus necessitating consideration of contextual factors such as physical infrastructure, product pricing and quality apart. Past researches have focused little on contextual factors affecting green purchase decisions [16].

C. Corporate Environmental Performance (CEP)

Enhanced pressures over environmental and social sustainability factors have ignited the concern of corporate entities. Corporate Environmental Performance has emerged as a weapon to alleviate these pressures which instigates firms socially and environmentally responsive operations while maximizing stakeholders' value and firms' value creation. Influence of firms' activity on different social groups and firms' consideration and responsiveness to issues beyond the purview of economic, technical and legal requirements. These activities ameliorate companies' performance by virtue of fulfillment of responsibility towards various stakeholders, undertaking environmental initiation, fostering social development and resorting to philanthropic means thereby swaying consumers' evaluations and attitudes towards the firms with such credentials [10]-[12],[17]. In highly competitive market environment corporate environmental and social performance acts as an effective mean of differentiation by virtue of which environmental sensitivity are publicized. This study considers the environmental dimension of CSR, i.e., consumers' approach towards corporate environmental performance [18].

D. Willingness to Pay for Different Brands (WTP)

A huge number of studies have been considered in the context of willingness-to-pay for different product or service types in the backdrop of developed economies [19]-[21]. Few studies have concluded the inclination of consumers' to pay a higher price for products with environmental credentials [20]-[24]. The objective of measuring the WTP in this paper is to determine the comprehensive characteristics that connect consumers green purchase intentions across different product categories- compact fluorescent lamps, herbal food with eco-labels and A.C with energy stars.

E. Selected Categories of Green Products

1) Herbal food with eco-labels

The price premium for herbal food over its conventional substitutes is the major barrier to the development of the market for herbal food. Purchasing of herbal food is assumed to depend on consumers' perceived utility that would compensate for the green price premium.

2) Energy star qualified air-conditioners

Energy star qualified air-conditioners have high seasonal energy efficiency ratio and high energy efficiency ratio ratings, consuming about 15% less energy than the conventional models. They meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency. Saving energy helps to save money on utility bills and protects the environment from harmful carbon and greenhouse gas emissions.

3) Compact fluorescent lamps

A compact fluorescent lamp, designed to replace incandescent lamps saves about two-third energy over its eight to fifteen times longer lifetime in comparison to a normal incandescent lamps.

From the above review the following hypotheses have been derived:

H1: Perceptual factors impact willingness to pay for environmentally sustainable products positively.

H2: Contextual factor impacts willingness to pay for environmentally sustainable products positively.

H3: Consumers' responsiveness to corporate environmental performance impacts willingness to pay for environmentally sustainable products positively.

H4: Perceptual factor, contextual factor, responsiveness to corporate environmental performance and willingness to pay vary across different product categories.

III. Research Methodology

Multi-item scales were used to measure the model constructs. Due to the presence of multiple new questions the measurement model was assessed first. Assessment of unidimensionality of a scale was made before checking its reliability. To ensure comprehensibility and reliability of the content a pilot study was conducted with thirty consumers as the target group.

A. Data Collection

Sample was collected from the shoppers at large retail outlets in two different cities of India. During the period of data collection 215 respondents completed the questionnaire, after removing the incomplete responses from the sample, a valid response of 150 respondents were retained for the study. Consumers' who had experienced purchase of atleast either one of the three products were only considered as the focus group for this study.

B. Measurement Development

The questionnaire consisted of four sections:

The first section comprised of questions on consumer demographics.

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The second section consisted of twelve questions four of them assessing respondents' environmental perceptions; five questions on contextual factor assessing green purchase decisions and three questions on epistemic factor depicting consumers' responsiveness to corporate environmental performance. The participants were asked to respond with a five-point Likert scale from strongly disagree (represented by 1) to strongly agree (represented by 5). The average of the sum of the five questions made up the perception scale with min (1) to max (5) and subsequently the same for the other two. As WTP and environmental apprehension for Energy star qualified air-conditioners; herbal food with eco-labels and compact fluorescent lamps were tested, statements related to such product characteristics were included in the questionnaire.

The last section contained questions to measure consumers WTP for the three selected nominal purchase involvement eco-friendly products.

IV. Analysis and Results

A. Factor Analysis, Construct Validity and Reliability

TABLE I. Results of Factor Analysis and Reliability Test

Items	Loading	Alpha	AVE
Contextual factor		**0.88**	**0.65**
A.C. with energy stars are of expected standard quality.	0.92		
CFLs offer an economical value for price.	0.75		
Herbal food products and CFLs are readily available.	0.64		
Herbal health care foods are free from toxic substances.	0.75		
CFLs and A.C. with energy Stars are highly energy efficient.	0.92		
Perceptual factor		**0.88**	**0.71**
Purchase of green products will help in environmental sustainability.	0.79		
I buy environment friendly products with less environmental impact.	0.73		
Consumption of environment friendly alternatives will prevent environmental downturn.	0.92		
I buy products made from recycled materials to save resources and energy.	0.91		
Consumer responsiveness to corporate environmental practices		**0.76**	**0.66**
I prefer to buy products of ISO 14001 certified companies.	0.76		
I refrain from buying products of companies with poor environmental compliance.	0.86		
Between two substitute goods I prefer the one offered by a company with higher environmental responsiveness.	0.82		

An exploratory factor analysis was used for identification of the three underlying dimensions. The Kaiser-Meyer-Olkin criterion value of 0.743 indicated a medium sample adequacy. All the three factors had loadings higher than 0.60 (positive value) much higher than the minimum threshold value of 0.40 (Table I). Unidimensionality was assessed with factor analysis using principal component analysis with varimax rotation resulting in the three factors explaining 71.33% variance with respect to WTP the green premium.

The significant high standardized factor loadings demonstrated convergent validity and cronbach's alpha value (>0.70) signified high reliability [25]. Discriminant validity of the constructs was measured using AVE (Average Variance Extracted) accounting for the amount of variance explained by a construct in the items loaded against it comparison to the amount of subsequent measurement error. The AVE for all the constructs were above the recommended value of 0.50 and varied from 0.65 to 0.71 (Table I). Thus both convergent and discriminant validity ensured through high reliability and average variance extracted (AVE) have been supported.

B. Multiple Regression Analysis with WTP as The Dependent Variable

Multiple regression analysis was conducted with perceptual factors, contextual factors and consumer responsiveness to corporate environmental performance as explanatory variables to measure consumers' WTP the premium for environmentally compatible products. The model was statistically significant with F-value of 66.91 ($p < 0.001$) thus indicating the model fitness for the concerned data and adjusted R^2 of 0.57 depicting a considerable portion of variance in WTP intention that has been explained by the three constructs.

The regression for WTP for green products yields two significant variables- Contextual Factor and Perceptual Factor (Table II). Green products availability, pricing, quality standard, performance has the highest impetus on WTP followed by consumers' environmental apprehension. However corporate environmental performance or practices doesn't influence WTP thus highlighting consumers' lack of awareness or interest on companies environmental disclosures or other sustainability practices. Their individual perceptions and functional aspects of environment friendly products prognosticate their WTP. The VIF (Variance inflation factor) for the three constructs is less than 2, thus the problem of multicollinearity among the predictor variables have been subdued. Thus H1 and H2 have been supported.

TABLE II. Results of Regression Analysis with Willingness to Pay as the Dependent Variable

Variables	Coefficients	T-value	Sig.	VIF
Contextual factor	0.650	10.907	0.000***	1.230
Perceptual factor	0.176	2.980	0.003**	1.210
Responsiveness to Corporate environmental practices	0.083	1.519	0.131	1.043

C. Results of Analysis of Variance

One way Analysis of Variance was performed to measure variation in WTP, consumers' difference in perceptions, attitudes, contextual factor, and approach

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towards corporate environmental performance across three different consumer groups based on their purchase habits of the three products- herbal food with eco-labels; compact fluorescent lamps and A.C. with energy stars. Consumers' were classified as AOT (Any one product type) - individuals who had the purchase experience or inclination for either one of the three products; ATT (Any two product type) - individuals with purchase experience for any two types of the selected products; ATP (All three types of product) - consumers' who are highly apprehensive to buy or have purchased all the three types of products. Post-Hoc test was used to identify significant difference between the groups (Table III). Consumers' with purchase habit of all the three products (ATP) or willingness to purchase for all three exhibit higher environmental perceptions with greater reliance on the performance, efficiency, quality, price and availability of these products. Their exposition to corporate environmental performance and WTP is higher than those with experience of any one or two of the selected product types. Thus the ATP group are in stronger concordance with the three constructs and exhibit higher WTP than the other two counterparts. The three constructs and WTP the green premium differs significantly across the three consumer groups being supported by Post-Hoc analysis. Thus H4 has been supported.

TABLE III. RESULTS OF ANALYSIS OF VARIANCE

Constructs	AOT	ATT	ATP	F-value
CF	1.98	2.95	3.70	81.559***
	AOT≠ATT; AOT≠ATP; ATT≠ATP			
PF	2.02	2.51	2.86	15.217***
	AOT≠ATT; AOT≠ATP; ATT≈ATP			
CRCEP	2.96	3.07	3.62	4.633**
	AOT≈ATT; AOT≠ATP; ATT≠ATP			
WTP	1.85	3.00	4.17	594.180***
	AOT≠ATT; AOT≠ATP; ATT≠ATP			

***p <= 0.001; **p <=0.01
≠ Significant difference; ≈ No significant difference
CF [Contextual factor]; PF [Perceptual factor]; CRCEP [Consumer responsiveness to corporate environmental practices]; WTP [Willingness to pay]; AOT [Any one product type]; ATT [Any two product type]; ATP [All three types of product]

V. DISCUSSION AND CONCLUSION

The paper tried to explore the association and interaction of consumers' perceptual or behavioral factors, external contextual factors and responsiveness to corporate environmental performance on willingness to pay price-premium for both nominal and extended purchase involvement green products [26]. The results of regression suggest that products price, availability, performance and quality have the highest impetus on consumers' intention to pay the green price premium. Thus price and quality concern are the major antecedents for the market augmentation of green products. Consumers WTP will increase with their reliance on the offered value of green products; thus necessitating enhanced need for green product innovation with improved performance, quality consideration and economical pricing strategy. Consumers' environmental apprehension governs their WTP with a positive instinct thus suggesting spread of enhanced environmental awareness with reference to the current scenario of environmental downturn and measures taken to substantiate sustainable development, one most significant being sustainable consumption practices or consumption of environment-friendly products. Even though corporate environmental practices doesn't have significant impact on WTP but significantly influences consumers' purchase decision or expenditure on environment friendly alternatives like CFLs; which necessitates the incorporation of environmental measures in companies' strategic action plans. For the buyers of most varieties of green products as being considered in this study, the impact of companies' environmental actions on their choice behaviour is high. This necessitates that sustained disclosures of environmental reports; audits; practices like process stewardship; product stewardship; enhanced recycling; eco-product designs to the consumers' or the stakeholders' groups will help in creating awareness which will eventually lead to a prosperous future for these industries and their products. Marketers and producers of products with green credential should thus promise a superior value-for-money through improvement in products' functional aspects as to enhance consumers' perceived value from product usage to combat competition with traditional market substitutes being usually offered at a lower rate.

VI. POLICY RECOMMENDATIONS

The findings of this study have useful implications for public policies. First, the study discovers that environmental perceptions and contextual factors such as availability of green products impart strong influence on sustainable consumption behaviors, and stronger the environmental perceptions stronger will be the intention to pay the price premium incurred by companies for resorting towards clean technology, process or product stewardship practices.

Second, willingness to pay the green price premium can be fostered through enhanced environmental awareness programs. Environmental education campaigns closely linked with daily life, having a more participatory approach can help in the promotion of environmental knowledge, strengthening the perceptual factor.

Third, Corporate entities may undertake communication strategies that should focus on explaining their environmental measures to various stakeholders. This would help in the justification of price escalation for products with zero environmental impact. This will help in knowledge propagation among consumers which may tilt their consumption habits towards greener, cleaner and energy saving alternatives. The portrayal of companies' behavior contributing

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towards welfare of the community might effectively encourage people to act pro-environmentally.

Fourth, the emphasis on personal benefits from green consumption in the form of recurring saving in energy expenses, despite initial high investment should be capitalized. Stress on the energy efficiency of A.C. or CFLs and herbal foods as best alternative for revitalizing health will greatly increase consumers' willingness to pay for the same.

Fifth, coherent sustainable consumption policies across government departments are also needed apart from consumer awareness. Better waste disposal practices, recycling and subsidies on greener alternatives should be provided. Like at present, in order to propagate the demand for energy-efficient lighting products, a project has been implemented in China for promotion of energy-efficient products for benefit of people and Government duly provided subsidies on electronics and energy efficient vehicles.

Consumers' manifestation of intention and quantum of willingness to pay the green price premium will open future avenues of research.

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