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Demographical determinants and energy efficient technology marketing

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ABSTRACT
Public concern for ecological issues has shown an increase over the past three decades. In this modern era of social marketing, ethics in business have become strategic decisions in marketing. Marketers have started responding to consumers' growing ecological consciousness by developing environment friendly products. Consumers have positive attitudes towards green buzz but this positive attitude in environment issues is not translated fully into the interest consumer show in their scrutiny behaviours. This study determines to find the impact of demographic factors upon green perception. A survey was conducted to gather responses from respondents of Amritsar and Jalandhar region (Indian cities). A total of 119 respondents, responded to a 10 questions questionnaire. The result indicated that *Gender* plays a significant role in formation of green perception.

Introduction

The year 1990s saw significant increase in green buzz. This rise in environmental affinity and responsiveness has lead to green conscious and selective product purchase. Society and consumers rising concern for ecological issues has lead to enhanced green consumption patterns amongst developing economies lately nevertheless, but intensively. The purchase intention for eco-friendly product is governed by concern for the consequences of the purchase on the environment. Companies, government and various societal bodies are developing environmental strategies to address this enhanced ecological consumption behaviour by means of various educational and promotional campaigns.

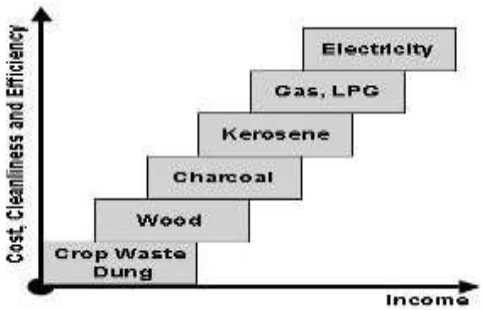
Emerging economies have now identified the untapped potential in environmental elements for energy substitution and are focusing on harnessing and developing ecologically innovative technologies. Global recognition of sustainability issues have provided the much needed impetus for the marketers as well as government to take measures to promote sustainable consumption habits. Added to this, marketers recognized consumers' growing ecological consciousness and thereby manufacturing and marketing environment friendly products. Still the intensive marketing alone could not reap the desired sustainable consumption behaviour.

Economic Prosperity and Energy

The Energy ladder describes transitional fuel usage and household switch from traditional sources to modern clean energy sources up the ladder in contrast to factors like income, fuel costs etc. With growing pace of Indian economy, rising standard of living and Indian government's energy equity objectives for its residents, need for clean energy is clearly visible. Provision of such energy parameters not only calls for higher investment but also development of sustainable energy substitutes.

India – Energy Sustainability Reforms

Emerging economies like India today face twin challenge of meeting the energy needs of its people, who still lack access to basic energy services while at the same time being participatory at global front towards developing and using low-carbon energy systems. Two major steps in the initiation of sustainable energy were creation of the Department of Non-conventional Energy Sources (DNES) in 1982 and in 1992 formation of Ministry of Non-conventional Energy Sources. Both these bodies govern, assist, plan and promote renewable sources across various industries in the nation. Addressing this sustainability issue, in India durable goods industry saw a transitional phase with the establishment of The *Bureau of Energy Efficiency* under Ministry of Power, Government of India, on *March, 1st, 2002*, which aims to promote the efficient use of energy and its conservation.



Source: The Energy ladder (adapted from Holdren and Smith, 2000).

Bureau has initiated a wide range of energy efficiency initiatives via launching energy labelling scheme for appliances (energy star labels), Energy Conservation Building Code for commercial buildings (to be constructed from the date onwards), the development of energy consumption norms for industries etc. Developing energy efficient technologies will aid in fuel import reduction and CO_2 emissions. The Standards &Labelling Program added to the consumer knowledge about the energy saving technology of the marketed household appliances.

BEE's Initiatives

I) Labelling Equipments / Appliances:

- Replacement of incandescent bulbs in households by CFLs. Provision of CFLs at the price similar to that of incandescent.

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- Energy STAR rating ranging from 1 to 5 stars in the increasing order of energy efficiency. Currently four appliances/equipments are under mandatory labels those include Frost Free Refrigerator, Tubular Florescent Lamps, Room Air-conditioners, and Distribution Transformers. Other equipments/appliances are being brought under in a phased manner that include Direct Cool Refrigerator , Colour TV, Induction Motors , Washing Machines Agricultural Pump Sets, Ceiling Fans, LPG Stoves, Electric Geysers.

II) Education and Training

- Disseminating energy efficiency information to the consumers and helping them to make sensible purchase decisions (eg. pictorial images on appliances)
- Education and awareness about labels through multimedia campaigns (print and audio/video).
- Training of distributors and retailers –Dealers training camps etc for educating them as to working of energy efficient technology.
- National Educational / Awareness Program on Standards and Labelling for the sales executives.

III) Normative Initiatives:

- Prohibition on sale (import/export) and manufacture of equipments/appliances not adhering to minimum energy standards.
- Checking and verification initiatives throughout the country.
- Mandatory energy efficiency labelling.

IV) Research and Development:

- Optimum energy performance standards establishment through engineering research.
- Laboratory testing and development of new and better energy efficient technology for commercial industrial appliances.
- Setting up of testing and calibration laboratory National Accreditation Board for Testing & Calibration Laboratories (NABL).

Theoretical Framework

Consumption patterns have markedly altered the manufacturing, marketing and delivery subsystems of a business. As a result increasing resource consumption has strained natural resources. Environmental deterioration is the outcome of rise in consumption and resource exploitation. Therefore, creating environmental awareness and the response to critical environmental issues without delay is immediately required.

Environmental Marketing to Green Marketing

Initially green marketing for consumers meant only Ozone friendly, environmental friendly, non polluting products etc. Narrowly, green marketing as defined by American Marketing Association refers to "the study of the positive and negative aspects of marketing activities on pollution, energy depletion and non-energy resource depletion."

Green Marketing to Sustainable Marketing

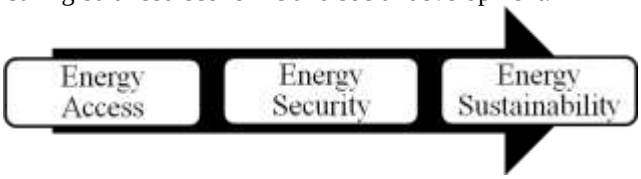
Sustainable consumption came into limelight in the Brundtland report 1987 (World Commission on Environment and Development 1987. Further, green products were defined as products that are less toxic, more durable and are reusable. For emerging economies, sustained development is subtle without environment sustainability. Presently, broader green perspective governs the business and global market and policy making bodies. (Polonsky (1994) defines green marketing as "consisting of all activities designed to generate and facilitate any exchanges intended to satisfy human needs, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment".

While much broader in its scope, this definition covers much of the traditional components of conventional marketing along with protection of natural environment. Sustainable development focuses on twin objectives of economic development and environmental protection. To keep abreast with the international policy reforms companies have developed environmental marketing strategies. These include green product, green logistic, philanthropy, green pricing, green positioning.

Overview of Problem

Energy and economic growth go hand in hand. Electricity the most flexible form of energy acts as an indispensible input for infra-structural development. Also as important primary input in the aggregate production function. Clean electricity is the basic input in the industrial and commercial sectors. This growth however, brought about development scenarios on one side and on other strained the natural resources. Environment degradation, depletion of resources and socio-economic disparity are the major negative outcomes of this expansion and accelerated economic growth.

India which is highly dependent upon natural resources for energy generation needs efficient management of its environmental resources to foster sustainable environment development. India ranks among the top ten countries in the world when it comes to energy consumption. Rising energy demand, growth prospects and environmental consequences have lead to pursuance of energy policy objectives. The main energy policy objectives are: First, access to clean energy with as near as one-quarter of the Indians still lacking access to electricity. Second, ensuring energy security, thirdly, mitigating climatic change. Fourthly, overcoming energy poverty and ensuring balanced economic and social development.



1) **Energy Access**

Economic development is hindered due to energy poverty. Thus, providing clean energy access has been a priority area for the government of India. Rural electrification scheme is one such step to expand energy access among its residents.

2**) Energy Security**

Enhanced dependency on imported energy resources added to governmental attention towards energy security. Owing to rising energy prices that add to national financial burden, energy security has been a priority area.

3) Energy Sustainability

A sustainable energy sector is crucial to maintain the pace and extent of growth of Indian economy. The Indian power sector as the most diversified sectors in the world generates electricity from varied commercial and non- conventional sources like coal, natural gas, hydropower, nuclear power wind, solar etc. Need of the hour is to create aware consumption behaviour with respect to renewable energy sources.

Green Perception- An Overview

Businesses have resolved to address the growing environmental concern of consumers by means of introduction of environment friendly products. Promotion of environment friendly products is much needed to influence green product purchase. However, manipulating consumer behaviour to the advantage of environment as well as firms is a tedious task. Green perception (positive/negative) is crucial variable in buying behaviour for green products. Consumers critical analysis of the product/green options available to them and their so formed perception, determine their 'willingness to pay' premium price for such green products. Green Marketing is not only associated with manufacturing green products but it includes marketing activities that are needed to develop and sustain consumers eco-friendly attitude and behaviour that has minimal detrimental impact on the environment. Along with perception environment certification (i.e. government assurance) and cost also contribute in green purchase behaviour intentions. Consumer perception is determined majorly by those green brands which are known and which appear safe in usage.

Demographic Variables And Green Purchase Behaviour

Researchers have studied the impact of demographic variables in creation of perception. W. Thomas Anderson, JR. and William H. Cunningham (1972) identified socially conscious consumption patterns based upon demographic variables. Their study revealed highly conscious social consumption behaviour by highly educated, pre middle age women with above average socio-economic status. For the purpose of the study eight item SRS (Social Responsibility Scale) was used to distinguish the respondents demographically and socio-psycho graphically. Thomas C. Kinnear, James R. Taylor, Sadrudin A. Ahmed (1974) in their work on ecological concern and demographic characters of green consumers considered the actual behavioural and attitudinal parameters that affect ecological consciousness/concern and that help in identifying ecologically concerned consumers. Further Characteristics of the Socially Conscious Consumers" are governed by behavioural, socio-economic and demographic variables. The personality traits of an individual are better predictors of social conscious consumption Frederick E. Webster, JR. (1975)

Mahmoud Manafi *et al* (2011) in their study found demographic characteristics, psychographic characteristics and environmental knowledge as three major factors significantly affecting green consumer perception. According to them the demographic factor of age, income, and gender has the strongest impact on green perception. Morteza Haghiri (2011) in his study on consumer perception of environment friendly products in New Foundland and Labrador showed that consumers are ready to purchase or show willingness to pay premium for green products which render them more of personal benefits as against environment.. According to him demographic factors of marital status and higher education level share a positive relation with willingness to pay.

Aysel Boztepe (2012) found that green promotional activities, green product features and green price have significant effect on ecological conscious purchase behaviour. For the companies it is important to set promotion, product and price features in relation to demographic characteristics. Kaufmann H.R et al (2012) in an attempt to study the factors affecting consumer's green purchasing behaviour concluded that demographic variables like age, income, education and occupation etc act as mediating variable between dependent (i.e. consumer green purchasing behaviour) and independent variable (i.e. environmental awareness and knowledge). According to them 8 set of independent variables considered for the study environmental knowledge, awareness, product availability, collectivistic behaviour, fair trade practices, environmental concern and attitude, availability of products and its safety and altruistic (selfless) behaviour have a greater impact on green purchase behaviour.

Shila Shahnaei (2012) analysed the relationship between demographic characteristics and green purchasing of Malaysian consumers that revealed important results, of not all demographic variables to have been significantly affecting green purchase behaviour. According to the study educational differences among green consumers majorly affect green purchasing. The study involved consideration of three major demographic variables namely educational qualification, age and gender collected across 200 Malaysian consumers. As per the analysis of gathered data consumers with Master or Higher educational qualification were more considerate towards environment and showed positive green purchase intentions.

Objectives

The study had the following objective:-

To study the relationship between demographic variables and green perception.

Hypotheses

Based upon the research objectives, following hypotheses are formulated

1) There is no significant relationship between gender and green buying behaviour.
2) There is no significant relationship between marital status and green buying behaviour.
3) There is no significant relationship between income and green buying behaviour.
4) There is no significant relationship between educational qualification and green buying behaviour.

Research Methodology

I) Data Collection

This study was based on both primary and secondary data.

a) Secondary data: The required secondary data were collected from various publications e.g. Census reports published by government of India, reports on consumer durable industry in India published by CCI (competition commission of India).

B) Primary data: The required primary data were collected through questionnaire. Questionnaire was administered to respondents of Amritsar and Jalandhar region

II) Sample Area. The study covers Amritsar and Jalandhar cities.

III) Sample Design and Sample Size

Two urbanized cities of Punjab (Indian State) were selected through multi-stage sampling. A sample of 119 respondents was selected for administering the questionnaire.

*Amritsar- 62
* Jalandhar- 57

Data Analysis:

The collected data were analyzed using various statistical tools. The hypothesis was tested using Independent t-test.

Questionnaire

A structured questionnaire was used for data collection. It includes questions on perception and demographic profile.

Reliability analysis - scale (alpha)
Number of Cases = 119
Number of Items of perception scale = 10
Cronbach Alpha = 0.84

The reliability coefficient of 0.84 indicates that the scale for measuring perception is reliable.

Findings And Interpretations

The demographic variables considered for the study were *gender, marital status, educational qualification and income.*

Amritsar (City 1)

1) Gender:

The two categories taken for gender description were:

* Male - 31
* Female - 31

Interpretation: From table 1 it was found that there is significant difference in green perception of male and female ($p<0.05$). The possible reasons for this could be the household expenditure budgeting handled by female and as a result they have made themselves more aware about energy efficient products available in the market.

2) Marital status: The two categories taken for marital status description were:

* Single - 24
* Married - 38

Interpretation: From table 2, observation shows that there is no significant difference in green perception of singles and married ($p>0.05$).

3*)* Income: The two categories taken for income description were:

* upto 3.5 lacs - 38
* 3.5 lacs and above - 24

Interpretation: Table 3 explained that there is no significant difference in green perception of respondents earning up to 3.5 lacs (per annum) and 3.5 lacs and above ($p>0.05$).

4) Educational qualification: The two categories taken for educational qualification description were:

* Upto PG - 38
* Pg and Above - 24

Interpretation: Table 4 explained Independent Sample t-Test for perception and educational qualification for respondents from Amritsar region and as such no significant difference was depicted in green perception of respondents who are post graduate and those which are post graduate and above ($p>0.05$).

Jalandhar (City 2)

1) Gender: The two categories taken for gender description were:

* Male- 39
* Female- 18

Interpretation: Table 5 showed that male and female respondents did not differ in their green perception ($p>0.05$).

2) Marital status: The two categories taken for marital status description were:

* Single - 14
* Unmarried - 43

Interpretation: Table 6 explained Independent Sample t-Test for perception and marital status for respondents from Jalandhar region. The analysis showed that single and married perceived green products similarly ($p>0.05$).

4) *Income*: The two categories taken for marital status description were:

* Upto 3.5 lacs - 16
* 3.5 lacs and Above – 41

Interpretation: Table 7 showed that two income groups considered did not differ in their green perception ($p>0.05$).

5) *Educational qualification*: The two categories taken for educational qualification description were:

* Upto PG - 16
* PG and Above - 41

Interpretation: Table 8 explained Independent Sample t-Test for perception and educational qualification for respondents from Jalandhar region. The analysis showed that education has no significant effect on green perception ($p>0.05$).

Conclusions & Suggestions

As per the outcomes of this study gender played a significant role in creation of green perception. Also female respondents perceived energy efficient appliances more as compared to males. Possible reasons for this could be due differences in the family spending orientation amongst females as compared to males. Females being responsible for conducting household affairs effectively are more into scrutiny and bargaining behaviour. As such they look for products which are economical (long term) and durable.

Hence, all possible efforts must be made to create more of positive purchase behaviour amongst consumers.

- Continuous reinforcement by means of energy efficient advertisements, educational demonstrations etc to convert the prospective green intentions into actual purchase behaviour.
- Also today consumers are more aware and sensible in their buying behaviour.
- The purchase intention for eco-friendly product is governed by concern for the consequences of the purchase on the environment, environmental awareness. Companies marketing strategies emphasize on the negative impact of products on the environment.

Therefore, companies/brands must invest in their brand positioning and market communication strategies to convert this negativity into an opportunity.

- It can be concluded that environmental attitude has a positive effect on green perception and hence green purchase behaviour.
- Positive attitudes towards environmentally friendly products influence consumer's willingness to pay the price for environmentally friendly products and ultimately the intention to buy green products also increases.
- "Energy efficient" products should be made mandatory in a phase wise manner in household segment.
- Use of descriptive labelling would also reduce purchase uncertainty among consumers even possessing eco-friendly product affinity, hence it must be adopted.
- Legislative assurance must be conferred upon so that consumers with environmental values can confidently choose green products.

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Table 1: Independent Samples Test (Gender) Amritsar region

Dependent variables		Statistics				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Equal variances assumed	average	6.855	.011	-2.539	60	.014
Equal variances not assumed	average			-2.539	50.016	.014

Table 2: Independent Samples Test (Marital Status) Amritsar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	.049	.826	-1.642	60	.106
	Equal variances not assumed			-1.600	44.915	.117

Table 3: Independent Samples Test (Income) Amritsar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	.860	.358	.539	60	.592
	Equal variances not assumed			.540	49.457	.592

Table 4: Independent Samples Test (Educational Qualification) Amritsar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	1.683	.200	-.337	60	.737
	Equal variances not assumed			-.357	57.235	.723

Table 5: Independent Samples Test (Gender) Jalandhar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	1.850	.179	.363	55	.718
	Equal variances not assumed			.378	36.783	.707

Table 6 : Independent Samples Test (Marital Status) Jalandhar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	.575	.452	1.189	55	.240
	Equal variances not assumed			1.204	22.573	.241

Table 7: Independent Samples Test (Income) Jalandhar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	.001	.971	.526	55	.601
	Equal variances not assumed			.523	27.042	.606

Table 8 : Independent Samples Test (Educational Qualification) Jalandhar Region

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
average	Equal variances assumed	.021	.886	2.898	55	.005
	Equal variances not assumed			2.839	26.316	.009

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