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A Cluster Analysis Approach for Segmenting Ecologically Conscious Consumers

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Abstract

Most consumers are at present realizing that their purchasing behavior, lifestyle, and living habits possess a noteworthy effect on the environment. Now, an important issue in green marketing is to segment the market for environmentally conscious consumers and determine their qualities, habits, and characteristics. The literature on ecologically conscious consumer behavior and concern towards the environment, attitude towards the environment, etc. were reviewed. Further, two focus group discussions (FGD) were carried out; each of the focus groups comprised twelve members. Fifty percent of the members of the focus group were male and fifty percent were female. They represented members from various age groups, occupations, and educational levels with varying household incomes. The purpose of this structured questionnaire was to measure Ecologically Conscious Consumer Behavior (ECCB), Environmental Concern (EC), Perceived Consumer Effectiveness (PCE), Altruism (ALT), Liberalism (LIB), and intention to purchase green products and attitude toward them. Following are the ANOVA results components that show variation across clusters: perceived consumer effectiveness, environmental concern, altruism, liberalism, attitude toward green products, and purchase intention for green items. The companies should adopt practices that assist in maintaining environmental balance and should promote the same through advertising. Also, the communication strategy of the government should include and focus on the key points of the various clusters that they are targeting.

Keywords: Cluster Analysis, Conscious Consumers, Green Marketing, Ecological conscious consumer, Eco-friendly consumer behavior

1. Introduction

Previously, the public interest in environment-related issues has been increased. There is a deterioration of oxygen levels in the atmosphere and a substantial increase in consumer worry about environmental problems (Wang et al., 2018). Most consumers are at present realizing that their purchasing behavior, lifestyle, and living habits have a significant impact on the environment. Views are being developed regarding things like eco-friendly products, recyclable materials, trash minimization, and the expense of pollution, etc. (Yadav & Pathak, 2017). Taking the environmental problem seriously, consumers have at the moment started purchasing eco-friendly products (energy-efficient household appliances, biodegradable paint, bleach-free coffee filters, and detergents having biodegradable ingredients) (Nekmahmud & Fekete-Farkas, 2020).

As a result, a “green consumer base” is developed, which is concerned more about the environment than just the purchase and consumption process (Khare, 2015). In a worldwide study, (Silvestre et al., 2022) 15% of customers nationwide are classified as green consumers overall, with 10% of those consumers being considered ardent green consumers (Shimul & Cheah, 2023). (Phau & Ong, 2007; Trivedi et al., 2015) consumers' environmental consciousness has grown significantly in 10 out of 17 nations over the past few years, according to a survey by the National Geographic Society and the international polling company GlobeScan. The survey ranked Indian Consumers as the “greenest” in the world followed by China and Brazil. In Indian context, consumers were found to be most concerned about environment when making decisions (Schroedel, 2023). In a similar line, the DuPont Green Living Study (P. Kumar & Ghodeswar, 2015) stated that the eco-system benefits from Indian consumers' acquaintance with green products; nevertheless, consumers' perceptions of what constitutes "greenness" differ greatly (Nguyen-Viet, 2023). Previous research on green marketing has also shown that buyers are prepared to pay a premium for environmentally friendly goods (Khare, 2015; Nekmahmud & Fekete-Farkas, 2020; Nguyen-Viet, 2023; Yadav & Pathak, 2017).

As the number of green consumers is increasing, marketers are trying to target the green segment of the population. In the current era of corporate competitiveness and sustainability, many companies have started to implement "GSTP" (green segmentation, green targeting, and green positioning) to obtain the strategic leverage of green differentiation as a significant source of eco-edge (Albayrak et al., 2013; Khare, 2014; Shahzad et al., 2022). The present study aims to identify the green consumers' segments and determine their characteristics, habits, and lifestyles. Previous research on green found that in the diverse cultural setting, customers' psychographic traits were more useful than sociodemographics (Mostafa, 2009; Do Paco and Raposo, 2009; Afonso et al 2018; Saleem et al., 2018, Jaiswal, et al 2020).

The present study is in the same line to segment and profile “ecological conscious consumers” using demographic, psychographic, and environmental criteria in India (Bansal et al., 2022; Malik et al., 2024; Maurya et al., 2023; R. K. Verma & Bansal, 2021). More precisely, the study seeks to define various eco-conscious customer segments and ascertain their attributes.

2. Literature Review

Several research have been conducted to conceptualize and operationalize the “ecological consciousness” constructs. By definition, environmentally conscious customers are individuals who buy goods and services that benefit the environment (Maurya, et al. 2023; Kumar et al 2021). Also (Tilikidou & Delistavrou, 2014; Yilmazsoy et al., 2015) furthermore, the term "green" or "ecologically conscious" refers to a consumer that attempts to conserve energy, minimizes waste, steers clear of things that hurt the environment, and makes as many environmentally friendly product choices as they can (Greendex survey, 2012). There is substantial evidence supporting the growth of ecologically favorable consumers worldwide. The Greendex survey shows that the eco- friendly consumer behavior has been increased from 2008. The Survey also reported that people (73% people in China, 65% in Russia, 69% in Brazil, 57% in India, and 54% in America) are prepared to pay extra for goods that use less energy (Singh et al., 2022).

Now, an important issue in green marketing is to segment the market for environmentally conscious consumers and determine their qualities, habits and characteristics of them (Cheah & Phau, 2011; R. Kumar et al., 2024). A wide range of metrics have been used in several research to profile the green customer (Maurya, PK Rohit Bansal, Yasmeen Ansari, 2023; Mishra, Bansal, Maurya, et al., 2023). These measures can be classified into different categories:

demographics/socio-demographic, environmental (environmental concern, knowledge and effect, attitudes), cognitive and psychographics (values and lifestyle, perceived consumer effectiveness, liberalism, altruism, etc.), and behavioral (recycling the product, etc.) (Kwok & Lin, 2024; Laheri et al., 2024; Mishra, Bansal, & Maurya, 2023) Here is an overview of some research that points to various markers of a person's inclination to make environmentally friendly purchasing decisions (Kar et al., 2022).

Demographic criteria:

Using sociodemographic factors including age, gender, education, income, and social status, among others, several studies have attempted to divide the green consumer market (Gil et al., 2024; Karim et al., 2024; S. Kumar et al., 2024; Kwok & Lin, 2024; Nikseresht et al., 2024) Choudhari and Bisai 2018; Afonso et al., 2018). Many scholars have looked into the relationship between age and green consumer behavior, including (Cole et al., 2024; Eid et al., 2024; Reim et al., 2021; Varshney et al., 2024). However, the relationship did not achieve much agreement from researchers (Do Paco and Raposo, 2009) emphasizing the uneven results of previous studies on the relationship between age and environmental attitude. As cited in Diamantopoulos et al. (2003), among 33 studies, only two have reported a significant correlation between age and environmental measures (Gruert and Kristensen, 1992) while others suggest a significant but negative relationship (Charnley et al., 2022; Reuter, 2022; Xia-Bauer et al., 2022) These results suggest that younger people are more sensitive about environmental issues. The same results indicating environmentally concerned consumers, are generally younger are also found in the work of (Broccardo & Zicari, 2020; Muranko et al., 2021; Slávik et al., 2021). On the other hand, some research revealed a favorable relationship between age and behavior and environmental sensitivity (Gächter et al., 2022; Möller et al., 2022). Thus mixed results have been reported in the literature for age (Ansari et al., 2024; Bansal et al., 2021; Gupta et al., 2024; Kar et al., 2022; Maurya et al., 2024; Zahera & Bansal, 2018).

Studies on gender revealed a substantial disparity between males and females for many environmental parameters, for example, Gendall and Smith (1995) evaluated the six countries' collective understanding of environmental facts. Men tended to know more than women did in each of the six nations. (Barravecchia et al., 2021; Curtis, 2021; Sigüenza et al., 2021; Zufall et al., 2020). The work of Hanson (2013) shows that environmental concern is significantly more for males than females in the U.S. However, when it comes to environmentally conscious attitudes and behavior in other countries, women were found to have more positive attitudes and behavior (recycling behavior, energy conservation) toward the environment than men as found by (Barravecchia et al., 2021; Curtis, 2021; Reim et al., 2018; Ritala et al., 2018; Sai et al., 2023; Santa-Maria et al., 2021; Sigüenza et al., 2021; Zufall et al., 2020). According to studies on the environment, women may care more about the environment than men do (Lee 2009, Mostafa 2007). Further women are more ecologically conscious compared to men as found in the work of Roberts (1996). Furthermore, there were no discernible differences between men and women when it came to joining and engaging with the green community. (Piontek et al., 2020).

Compared to age and gender measures, a consistent (positive) relationship (Nelson & Allwood, 2021) who has reported a negative relationship has been reported between an individual’s education level and environmental attitude/behavior (Paul et al., 2016; Afonso et al., 2018). The work of Roberts (1996) showed education and income were found to be positively correlated with ECCB.

The work of Diamantopoulos et al. (2003) further demonstrated that those with higher levels of education have a better understanding of ecological issues and behave responsibly

toward the environment (Pratiwi et al., 2018). As is known environmentally concerned products are expensive, therefore with increased income, their demand goes up. According to certain research, income with environmental attitudes and behaviors are positively correlated (Mendoza & Ibarra, 2023; Monticelli & Costamagna, 2023) while others reported a negative relationship between income with environmental concern (Lüdeke-Freund et al., 2019; Martin et al., 2021). This finding contradicts most existing research on the subject. (Lüdeke-Freund et al., 2018) found no relationship between ECCB and Income (Bansal & Singh, 2021; Mishra et al., 2024; R. K. Verma & Bansal, 2023; Zahera & Bansal, 2019).

The other demographic measure that received attention in green marketing literature is the social class of the consumers. It has been argued that a person who belongs to a high social class shows more concerns about environmental qualities as reported by Diamantopoulos et al. (2003). Newell and Green (1997) demonstrate how education and wealth levels affect how much of an impact race has on environmental concerns when buying. It has been observed that when income and education levels rise, there is a decline in the disparity between the perceptions of environmental issues held by white and black customers (Prakash et al., 2024).

Overall, the review of the above studies suggests a limited utility of socio-demographic variables to predict ecologically conscious consumers. It has also been noted that (Jain and Kaur, 2006; Khare, 2015; Kirmani and Khan, 2016) in the Indian context, using demographic parameters as a segmentation base to isolate environmentally conscious consumers is inappropriate and insignificant as a predictor of green consumption behavior (Jaiswal et al, 2020).

Environmental criteria:

Green consumer behavior is greatly influenced by a few environmental elements in the literature, including environmental concern, knowledge, and attitudes (Chaudhary and Bisai, 2018; Gaspar et al., 2017; Niedermeier et al., 2021). (Linder & Williander, 2017) Being strongly committed to protecting the environment is what is meant by environmental concern. Consumers who are sensitive to environmental issues think that human intervention is not necessary to solve the problems; conversely, consumers who are less sensitive to environmental issues think that environmental problems can be resolved on their own without assistance from humans (Laroche et al., 2002). Numerous research has looked at how choosing eco-friendly products is positively impacted by environmental concerns (Barr, Ford and Gilg, 2003; .Juwaheer et al. 2012; Jaini et al., 2020). Moreover, it was also found that consumers buying organic food showed high concern for their environment (Tondon et al. 2020). Overall environmental concern was identified as an important predictor of pro-environmental purchasing behavior (Lee, 2008). The investigation demonstrated a favorable association between sensitivity to environmental concerns and the buying of eco-friendly products (Van Live and Dunlop, 1981; Roberts, 1996; Roberts and Bacon, 1997; Bacanli, 2002; and Ay and Ecovit, 2005).

Environmental knowledge can be defined as “a general knowledge of facts, concepts, and relationships concerning the natural environment and its major ecosystems” (Fryxell and Lo, 2003). Several studies support the argument that a high degree of knowledge about environmental issues separates green consumers from non-green consumers (Roberts, 1996; Mustafa, 2009; Do Paco and Raposo, 2010; Nguyen et al., 2018; Afonso et al., 2018; Amoako et al, 2020). Moreover, (Koide et al., 2022; Lang & Zhang, 2019) highlighted the importance of abstract and concrete knowledge while measuring environmental actions. The former relates to

consumers' awareness of environmental issues, including their causes and effects, while the latter relates to their behavioral understanding of how to address those issues.

Research has demonstrated a positive relationship between behavior and environmental knowledge, meaning that people who possess both concrete and abstract environmental information are more likely to behave in an environmentally responsible manner than people who lack this knowledge (Verma 2017; Dhir, et al 2020, Kusuma, et al 2018). These findings were further supported by Amoako, 2020, Sio et el 2021, Dhir, 2020, Hariyanto, & Alamsyah, 2019). On the contrary, some studies have reported non-significant findings for the relationship between environmental knowledge and eco-friendly behavior (Kerdlap et al., 2021; Kjaer et al., 2019; Klint & Peters, 2021). For example, Watson, Murphy, and Moore, (1992) found no link between knowledge and behavior and knowledge and intention with regards to water conservation. It can be concluded, notwithstanding these inconsistent results, that environmental awareness is a useful predictor of environmentally beneficial behavior (Taufique et al., 2017, Jaiswal and Singh, 2018; Khare, 2015).

Researchers have looked at the connection between environmental affection and environmentally sensitive conduct in addition to the relationship between environmental knowledge and behavior (Singh et al., 2021). The level of emotionality that a person exhibits regarding environmental issues is referred to as environmental affection. (Carlson et al., 2017) defined environmental sensitivity as having human empathy that includes individual discovery, inquiry, gratitude, admiration, and worries for the environment (Gossen & Kropfeld, 2022; Johnson & Plepys, 2021). Research indicates that customers who have a high degree of ecological concern and attachment are more likely than those who have a low level of worry and affection to show good attitudes toward the environment (Laskova, 2007; Singh et al 2021). Studies also showed that people have some emotional connection with the environment, though they have little knowledge of it.

Researchers have also been interested in perceived consumer efficacy, which is a gauge of the subject's assessment of each consumer's capacity to influence issues with natural resources (Dentchev et al., 2018; Goffetti et al., 2022) (Jang et al., 2015). Furthermore, the perception of consumer efficacy is mirrored in the customer's conviction that their involvement could have a positive impact on environmental preservation (Jang and Kim, 2015). There is a high and positive correlation between PCE and environmentally conscious behavior, according to several research (Straughan and Roberts, 1999; Yilmazsoy et al., 2015; Nguyen et al., 2018; Afonso et al., 2018,). All things considered, it was discovered that one of the key indicators of pro-environmental conduct was perceived customer effectiveness (Chaudhary and Bisai, 2018; Niedermeier et al., 2021; Wang et al., 2018).

Psychographic Criteria

With regards to psychographic criteria, Fraj and Martinez, (2006) identified certain values and lifestyles that exceptionally explain the eco-friendly behaviors. Their findings indicate that environmental pattern and self-fulfillment values greatly characterize the ecological market segment (Curtis & Mont, 2020; Das et al., 2022). Furthermore, it was discovered that higher ecological behavior is more common among those with high self-fulfillment ideals. Numerous scholars employed personality and cultural factors to discern eco-friendly customer groups. Cornwell and Schwepkeper (1995) described green consumers as self-controlled, well-organized, and goal-oriented. Mostafa (2009) profiled green consumers according to their altruistic values, environmental concern, skepticism towards environmental claims, and attitude toward green consumption. Their findings demonstrated that, in terms of distinguishing traits and behavioral

patterns, green consumers differed significantly from non-green customers (Budde Christensen et al., 2012; Chun & Lee, 2017; Corona et al., 2024).

Green Consumers in India

Indian consumers are the "greenest" in the world, according to the National Geographic Society and the international polling firm Glob Scan's report Greendex 2010: Consumer Choice and the Environment. According to the survey, Indian consumers were most inclined to attribute their decision-making to environmental concerns (R. Kumar et al., 2024; S. Kumar et al., 2024; Laheri et al., 2024; Varshney et al., 2024). To reduce the environmental impact of their mobility, Indian consumers, for instance, stated that they live near to their destinations or even closer to their place of employment. The survey also revealed that customers in emerging nations, especially China and India, were more likely to shun environmentally unfriendly products (Chaudhary & Bisai, 2018; Danish & Naved, 2016; Jaiswal et al., 2021; Joshi & Rahman, 2015; Mehta & Chahal, 2021; S. Verma, 2017).

Furthermore, Indian consumers achieved highest scores (58) for environmentally sustainable consumption. Manaktola and Jauhari, (2007) surveyed 66 Indian consumers in the lodging industry. They discovered that Indian consumers were quite aware of eco-friendly policies. They stay at hotels that use green methods without sacrificing the caliber of the services. Moreover, 40 percent of the consumers feel that they could pay 4-6% more for staying in green hotels if the company provided reward points to the most frequent guests. Nath et. al. (2013) has discovered several facilitators that promote the use of environmentally friendly products. It was discovered that the most effective way to promote green sustainability was through teaching, which was followed by green advertising and legal enforcement (adoption of green products mandatory). Concerning social enablers, peer group influence and cultural values were found to help shape pro-environmental attitudes (Budde Christensen et al., 2012; Chun & Lee, 2017; Corona et al., 2024; Misra & Panda, 2017; Trivedi et al., 2015).

Chitra (2007) based on their perception of eco-friendly aspects, divided Indian consumers into four groups: aspirants (who are aware of the ecological imbalance and its negative effects), addicts (who have a strong positive attitude toward eco-friendly products), adjusters (who don't see much of a difference between eco-friendly and non-eco-friendly products and are happy with any product that meets their needs), and avoiders (who believe that ecological imbalance is inevitable and that they cannot personally prevent it from happening). (Khare, 2014; P. Kumar & Ghodeswar, 2015). She also reported that 55% of consumers have given their preference to buy organic food products while 45% prefer to buy eco-friendly cosmetics in the future. Some work by Singh (2011) divided Indian consumers of green products into four groups: comfort zone users, true environmentalists, undecides, and ecologically conscientious. Overall, 75% of the consumers fall into ‘environmentally conscious’ and ‘true environmentalist’ clusters indicating that Indian consumers are very environmentally conscious and ready to take steps to protect the environment. Jaiswal et al (2021) classified green consumers as “keen green” “moderate green” and “reluctant green” based on the eight cognitive variables. Mehta and Chahal (2021) identified four segments “Core Brown” “altruistic green, “dynamic green” and “price conservative”. The present work also attempts to segment the ecologically conscious consumer based on environmental criteria and profile the same on demographic variables (Amasawa et al., 2020; Annarelli et al., 2016). It also looks at the differences between the different sectors in terms of psychographic traits, attitudes, and intentions to buy green products.

Research Objectives

The objective of this paper is

(i) To segment the ecologically conscious consumers in India.
(ii) To profile the various segments obtained with demographic variables.
(iii) To examine how environment, psychographic variables and attitude and purchase intention for green products vary across segments.

Methodology

The literature on ecologically conscious consumer behavior and concern towards the environment, attitude towards the environment, etc. were reviewed. Further, two focus group discussions (FGD) were carried out each of the focus groups comprising of twelve members each. Fifty percent of the members of the focus group were male and fifty percent female (Boons & Lüdeke-Freund, 2013; Boyer et al., 2021). They represented members from various age groups, occupations, and educational levels with varying household incomes. The output of FGD was subjected to content analysis. Both the review of the literature and FGD output were used to prepare a scale on

A structured questionnaire was prepared to measure Ecologically Conscious Consumer Behavior (ECCB), Environmental Concern (EC), Perceived Consumer Effectiveness (PCE), Altruism (ALT), Liberalism (LIB), and Attitude and purchase intention to Green Products. The scales to measure these constructs were borrowed from the literature of green marketing and modified for the present study. These are reported in Appendix A of the paper.

The items were measured using a five-point Likert scale where 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. There were some negative statements for which reverse coding was done. These statements end up with (R). Convenience sampling was used to approach the respondents. The data was collected by distributing the questionnaire in the physical form as well as through an online Google survey. A total of 306 useable forms were available for further analysis (Böckin et al., 2020; Bonilla-Alicea et al., 2020). There were fifteen statements on ECCB, nine statements for environmental concern, four for perceived consumer effectiveness, three for altruism, and four for liberalism. Further, there were six statements regarding attitudes towards green products. Besides, the environmental and psychographic constructs, the data was collected for demographic variables like gender, marital status, work experience, age, occupation, and income level. The data was subjected to screening and editing which resulted in the omission of three ECCB statements. Therefore, for further analysis, only twelve statements of ECCB were used (Baldassarre et al., 2017; Ritala et al., 2018; Sarasini et al., 2024).

The twelve statements on ECCB were subjected to factor analysis with varimax rotation. The factor scores of the factors as obtained above were subjected to cluster analysis using both hierarchal clustering and k means cluster methods. The clusters were profiled with demographic variables. Further, environmental and psychographic variables like environmental concern, perceived consumer effectiveness, altruism, liberalism, attitude towards green products, and purchase intention towards green products were subjected to Cronbach's alpha reliability. The variations of various clusters among these variables were analyzed using one-way ANOVA and Tukey post-hoc test wherever applicable.

Results

The results of Cronbach alpha for Environmentally conscious consumer behavior (ECCB), Perceived consumer effectiveness (PCE), Altruism (ALT), Liberalism (LIB), Attitude towards green products (ATGP), and Purchase intention (PI) are reported in Table 1 below:

Table – 1: Cronbach Alpha for the various constructs used in the study

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S.No.	Scale	No. of Items	Cronbach alpha
1.	Environmental Concern	9	0.768
2.	Perceived consumer Effectiveness	4	0.509
3.	Altruism	3	0.741
4.	Liberalism	4	0.694
5.	Attitude towards green products	6	0.930
6.	Purchase intention	5	0.949

It is seen that except for perceived consumer effectiveness, the value of cronbach alpha for other constructs is approximately 0.7 and above which is considered to be satisfactory.
The demographic profile of the respondents is presented in Table 2 below:

Table – 2 : Demographic Profile of the Respondents
(n = 306)

S.No.	Variable	Grouping	Frequency	Percentage
1	Age	18 - 24 years	53	17.3
		25 - 34 years	154	50.3
		35 - 44 years	84	27.5
		45 - 54 years	15	4.9
2	Gender	Male	229	74.8
		Female	77	25.2
3	Marital Status	Single	134	43.8
		Married	172	56.2
4	Occupation	Student	73	23.9
		Self-employed professional	15	4.9
		Working in public/private sector	194	63.4
		Business	18	5.9
		Others	6	2.0
5	Education Level	Graduate	50	16.3
		Post-graduate	194	63.4
		Professional qualification	61	19.9
		Others	1	0.3
6	Annual Household Income	Less than Rs. 5 lakh	18	5.9
		Rs. 5 lakh to less than Rs.10 lakh	81	26.5
		Rs.10 lakh to less than Rs.15 lakh	69	22.5
		Rs.15 lakh and above	138	45.1

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As is evident from the data presented in the above table, 50.3% of the respondents are in the age group 25 to 34, 74.8% are male, 56.2% are married, 63.4% are working in the public/private sector, 63.4% are post-graduate and 45.1% have an annual household income of Rs.15 lakh and above.

The twelve statements of ECCB were subjected to factor analysis with varimax rotation. The value of KMO worked out to be 0.851 and Bartlett's Test of Sphericity was significant thereby justifying the application of factor analysis. The results of factor analysis with varimax rotation resulted in three factors. The cut-off point for factor loading was taken as 0.50. The results of the rotated component matrix are given in Table 3 below:

Table 3: Results of Rotated Component Matrix

List of Statements	**Component**		
	1	**2**	**3**
Factor – 1 (Environmental Degradable Resources)			
I prefer to buy products from a shop which uses recycled papers for packing.	.636		
I buy those products which are less polluting.	.663		
I use paper napkin made of recycled papers.	.514		
If I have a choice to buy one product from two equal products, I will buy the one which is less polluting.	.546		
I avoid buying products made by those companies which are irresponsible towards keeping ecological balance.	.846		
I buy products in refillable containers to keep environment safe.	.608		
Factor – 2 (Resource Conservation)			
I try to minimize the use of electricity to save energy.		.768	
I conserve energy by turning off lights and electrical appliances when I am not using them.		.823	
I try to reduce the amount of water I use.		.687	
Factor – 3 (Energy Efficient Resources)			
I use those bulbs which use very little of electricity.			.804
The use of energy efficient household appliances is very common with us.			.692
I don't mind paying more for products that are more expensive but use little energy.			.627
Eigenvalues	4.271	1.401	1.082
Percentage Variance Explained	35.589	11.678	9.020
Reliability (Cronbach Alpha)	.785	.686	.633

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The three factors account for 56.3% of the variation. The contributions of three factors to the variances explained are 35.59%, 11.68%, and 9.02% respectively. Factor 1 comprises the statements - *I prefer to buy products from a shop that uses recycled papers for packing; I buy those products which are less polluting, I use paper napkins made of recycled papers; If I have a choice to buy one product from two equal products, I will buy the less polluting one; I avoid buying products made by those companies which are irresponsible towards keeping ecological balance; I buy products in refillable containers to keep environment safe*. This factor is named "Environmental Degradable Resources". The second factor comprises three statements viz.: *I try to minimize the use of electricity to save energy; I conserve energy by turning off lights and electrical appliances when I am not using them; I try to reduce the amount of water I use*. The second factor could be named "Resource Conservation". The third factor comprises of the statements - *I use those bulbs which use very little electricity; The use of energy-efficient household appliances is very common with us; I do not mind paying more for products that are more expensive but use little energy*. This factor could be named "Energy Efficient Resources". The reliability of these three factors was computed using Cronbach alpha and is reported in the last row of Table 3. The values of Cronbach alpha for the three factors are 0.785, 0.686, and 0.633 respectively which is considered to be satisfactory.

The factor scores obtained from the three factors were subjected to hierarchical clustering that resulted in deciding that the three-factor solution was appropriate. Therefore the factor scores were subjected to k-means cluster analysis (Comin et al., 2019; Weking et al., 2020). The results of ANOVA indicated that the second and third-factor scores were statistically significant at a 1% level of significance across the three clusters whereas the scores for the first factor were significant at a 10% level across the three clusters. The results of the final cluster center are presented in Table 4 below:

Table – 4: Final Cluster Center

Name of the Factors	**Cluster**		
	1	**2**	**3**
Environmental Degradable Resources	.11561	-.19437	-.05326
Resource Conservation	.46185	-1.43990	.36058
Energy Efficient Resources	.57957	.14650	-1.23566

The first cluster has 155 (50.65%) members whereas the second and third clusters have 70 (22.87%) and 81 (26.47%) members. The table above shows that cluster one is high on all three factors whereas cluster two is high on the third factor (Energy Efficient Resources) and very low on the second factor (Resource conservation) and cluster three is high on the second factor (Resource Conservation) and very low on the third factor (Energy Efficient Resources). This means the members in the first cluster like to use all means to protect the environment i.e. they want to use recycled products, economize the use of resources, and make use of energy-efficient household appliances (Evans et al., 2017; Nosratabadi et al., 2019). This cluster could be named "All into environment saving". Cluster number two likes to make use of energy-efficient household appliances but is not concerned with resource conservation and therefore may be named as the one who is "users of energy-efficient products" whereas the third cluster wants to economies the use of resources but does not make use of energy-efficient and could be named as

"resource-saving consumers". To validate the cluster solution, a three-group discriminant analysis was conducted, and it was found that there was 99.3% accuracy. This means that our cluster solution is a valid one (Schroedel, 2023; Silvestre et al., 2022).

To examine if there is any relationship between three segments and demographic variables (age, gender, marital status, occupation, education level, and annual household income) a chi-square analysis was carried out and the results are reported in Table 5. To examine how perceived consumer effectiveness, environmental concern, altruism, liberalism, attitude towards green products, and purchase intentions vary across three clusters, a one-way analysis of variance was conducted. The results of one-way ANOVA are reported in Table 6. Moreover, the mean score of the above construct across three clusters is reported in Table 7.

Table 5: Cross Tabulation of Segmentation with Demographic Variables *(figures in percentages)*

S. No.	Variable	Grouping	Cluster 1	Cluster 2	Cluster 3
	Market Share		**50.65**	**22.87**	**26.47**
1	Age(p = 0.048)*	18 - 24 years	14.2	15.7	24.7
		25 - 34 years	45.8	60.0	50.6
		35 - 44 years	34.8	21.4	18.5
		45 - 54 years	5.2	2.9	6.2
2	Gender (p = 0.097)**	Male	76.8	78.6	67.9
		Female	23.2	21.4	32.1
3	Marital Status (p = 0.162)	Single	26.1	48.6	54.3
		Married	63.9	51.4	45.7
4	Occupation(p = 0.176)	Student	21.3	27.1	25.9
		Self-employed professional	4.5	5.7	4.9
		Working in the public/private sector	67.1	57.1	61.7
		Business	6.5	8.6	2.5
		Others	0.6	1.4	4.9
5	Education Level (p = 0.139)	Graduate	14.8	18.6	17.3
		Post-graduate	61.3	65.7	65.4
		Professional qualification	23.9	15.7	16.0
		Others	0.0	0.0	1.2
6	Annual Household Income (p = 0.145)	Less than Rs. 5 lakh	4.5	4.3	9.9
		Rs. 5 lakh to less than Rs.10 lakh	25.2	24.3	30.9
		Rs.10 lakh to less than Rs.15 lakh	22.6	28.6	17.3
		Rs.15 lakh and above	47.7	42.9	42.0

* and ** indicate significance at 5% and 10% levels, respectively.

Table – 6: The Results of One-way ANOVA with Three Clusters as Factors

ANOVA

variables		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Perceived Consumer Effectiveness	Between Groups	10.395	2	5.197	14.463	.000
	Within Groups	108.884	303	.359		
	Total	119.279	305			
Environmental Concern	Between Groups	7.170	2	3.585	11.973	.000
	Within Groups	90.718	303	.299		
	Total	97.888	305			
Altruism	Between Groups	9.728	2	4.864	15.914	.000
	Within Groups	92.611	303	.306		
	Total	102.340	305			
Liberalism	Between Groups	1.407	2	.704	1.005	.367
	Within Groups	212.197	303	.700		
	Total	213.604	305			
Attitude towards green products	Between Groups	10.684	2	5.342	13.533	.000
	Within Groups	119.607	303	.395		
	Total	130.290	305			
Purchase Intention	Between Groups	13.155	2	6.578	9.829	.000
	Within Groups	202.760	303	.669		
	Total	215.915	305			

Table – 7: Mean Values of Various constructs across three clusters

	Cluster – 1	**Cluster – 2**	**Cluster – 3**
Perceived Consumer Effectiveness	4.10	3.64	3.96
Environmental Concern	4.18	3.79	4.07
Altruism	4.56	4.11	4.38
Liberalism	3.69	3.55	3.73
Attitude towards green products	4.45	4.04	4.13
Purchase Intention	3.92	3.64	3.44

The result shows that three segments are related to age at five percent level of significance whereas there is a significant relationship with gender at ten percent level of significance. The ANOVA results indicate that except for liberalism, all other constructs vary across three clusters. The detailed interpretation of the clusters is discussed below:

Cluster 1 – All in to environment savings (51%) This segment has largest number of people as compared to cluster 2 and 3. The consumers in this segment are mostly adult and married people belong to age group of 24 to 44 years with high education level and working in either private or public sectors. This cluster consist 77% of male with annual income more than 15 Lakh. As Table 3 indicates that these consumers are high on all the three factors namely, Environmental degradable resources (.12), Resource conservation (.46) and Energy efficient resources (.58).Consumers in this segment are highly committed to protect the environment and like to take all necessary steps to save the environment thus they could be named as "All in to Environment Savings". These consumers are highly concerned about environment (4.18) and feel that each household should grow at least one tree in six months to save environment. They also believe that we must live in harmony with nature and should not abuse the environment. People in this cluster strongly believe that the government should regulate the growth of industries as industries are main cause for global warming. This cluster have high scores on perceived consumer effectiveness (4.2), and altruism variables (4.6) indicating that it is individual responsibility to protect the environment and they should fight together for green environment because rising pollution harm all people on earth. This cluster is high on the mean values of all the constructs except for liberalism. This is the most crucial segment as it is the largest and therefore marketers need to concentrate on the same.

Cluster 2 – Users of Energy Efficient Products (23%): This segment composed of people whose age ranges between 25 to 34 years. They are having higher educational background and working in public/private sectors. In terms of gender, no significant difference was observed between cluster 1 and cluster 2. The cluster 2 is found to be high in the use of energy efficient products but low on the side of resource saving behavior. These consumers do not try to use less amount of water; minimize the use of electricity and try to conserve energy to save resources. These consumers try to protect the environment by using energy efficient products i.e. by using those bulbs which use very little electricity and make use of energy efficient appliances. However, compare to cluster 1, this segment have low scores on environmental concern (3.79), perceived consumer effectiveness (3.64), and altruism (4.11). This segment seems to be very curious about environmental issues but less devoted towards it. They try to save resources by using energy efficient products. They feel that it is government responsibility to take necessary action to save the environment. Their attitude towards green product (4.04) is less as compared to cluster 1 and so is the purchase intention for green product.

Cluster 3 – Resource Saving Consumers (26.47%) This segment includes consumers with age of 18 to 34 years having higher education and working in public/private sectors. People in this cluster are true savers of energy resources. They try to save environment by minimizing the use of electricity and water. They also behave in a very responsible way by turning of lights and electrical appliances when not using them. This segment has high environmental concern (4.07), perceived consumer effectiveness (3.96) and altruism (4.38) as compare to cluster 2. This segment has higher attitude towards green product but less purchase intention as compared to segment 2.

The ANOVA results for Perceived consumer environment, Environmental concern, Altruism, Liberalism, Attitude towards green products and purchase intention for green products indicate that except for liberalism, these constructs vary across clusters.

Recommendations

The companies should adopt practices that assist in maintaining environmental balance and should promote the same through advertising. It is very important that they create awareness about it to the consumers by advertising that they do so. This will make consumers more willing to purchase green and environmental friendly products.

They should concentrate on segment 1 because it has more than 50% of the market share. The companies should come up with more refillable packs and refillable containers wherever possible. These companies should also use recycled paper for packaging and may come up with variants of the products that are less polluting. The company should try to clearly communicate the messages through various avenues including online advertisements as most of respondents are educated and should be using internet. Further as the male respondents have more concern for environment therefore they should be targeted. The communication strategy of the government should include and focus on the key points to the various clusters which they are targeting.

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