ENVIRONMENTAL PERCEPTION OF THE CONSUMERS TOWARDS GREEN PRODUCT – SEM APPROACH

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Abstract
Consumers concern about the environment has been on the rise in India. However, the understanding of 'Greenness' varies widely among the consumers. Manufacturers make various claims about greenness of their product but there is little the consumer can do to authenticate such claims. While in many countries government, industries and civil society organization are working together to promote green products there has been no such focused initiative in India. Although India has been amongst the first few countries to initiate schemes like eco-labelling aimed at promoting green products, but there has been little impact on the green products market. Hence the study focused to examine the overall perception of the consumers towards green products.

Introduction
Evaluating a complex set of product information simultaneously is a complex process and environmental information is not considered in isolation to other information, such as price, quality, branding etc. (Newell et al, 1998). In some cases 'environmental goods' are seen as having intrinsic value, which consumers are willing to pay for .E.g., eco-tourism is frequently seen as a more specialized and higher quality experience (Font and Tribe, 2001) possibly justifying higher prices. In other cases, even proven economic value does not encourage consumer purchases (Meijnders et al,2001), e.g. consumers do not desire to 'invest' in long life light bulbs that have a significantly higher return on investment, as consumers traditionally only consider the 'purchase price' of the bulb and ignore the operating costs. As mentioned earlier consumers generally do not want to give up ownership of a car, even though it can be demonstrated that using public transportation and /or other private transportation (such as shared cars) is less environmentally harmful and less expensive. Thus consumers value their convenience, flexibility and possibly the prestige more than any environmental value (Byrne and Polonsky, 2001).

The study has been conducted on the overall perception of the consumers towards awareness, attitude, pro-environmental concern, buying behavior and level of satisfaction. It was analysed using the model and the overall hypothesis was framed to determine the overall perception of the consumers on green products. The study proposed the following theoretical model. The following terms refers,

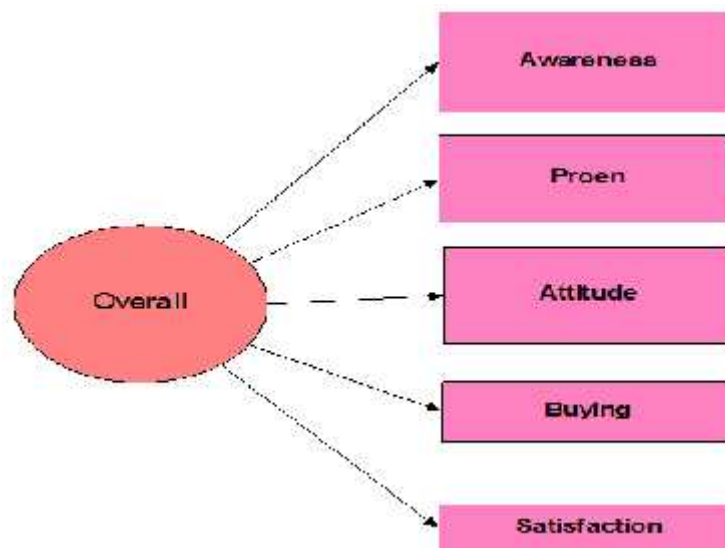|		
Overall	-	Overall perception towards green products
Awareness	-	Awareness of the respondents towards green products
Proen	-	Pro-environmental concern of respondents towards green products
Attitude	-	Attitude of the respondents towards green products
Buying	-	Buying behaviour of the respondents towards green products
Satisfaction	-	Level of satisfaction of the respondents towards green products

Figure 1: Determinants of Overall Perception towards Green Products

The purchase decision is based on direct involvement in consumption of the products, whereas knowledge and attitude are at the other end in the consumption of products. Hence, the study focuses on examining the following problems in the consumption of green products.

1. How far the consumers are aware of green products?
2. To what extent does the consumer has positive attitude towards green products?
3. Does the customer believe in pro-environmental concern while preferring green products?
4. Does consumer behaviour have any impact on environment (green products)?
5. Whether the consumer's intention / buying behaviour have significant influence in purchasing green products?
6. Have the consumers needs been met? If so, what is the level of satisfaction derived after consuming green products?

The study is a niche attempt to find the level of acceptability and reach of Green products among consumers in the market.

Objective
1. To study the overall perception of consumers towards green product.

Methodology of the Study
• **Period of the Study**
The study conducted for a period of December 2014 - May 2015.

• **Sources of Data**
To accomplish the objectives of the study, the researchers have depended on both primary data and secondary data.

• **Primary Data**
The study is based on primary data that were collected through a questionnaire.

• **Secondary Data**
It was taken from published journals, magazines and from internet.

• **Sample Technique**
The research was carried out in and around Coimbatore city. Convenient sample method was used to select the sample.

• **Sample Size**
Sample size considered for the study was 500 respondents.

• **Tools Used for Analysis**
The tools used for the study is Structural Equation Modeling.

Review of Literature
Saxena and Khandelwal (2008) in their study on "'Consumer attitude towards green marketing: an exploratory study" analyzed the consumer attitude towards green marketing. The researchers analyzed the preference of consumer from non-green product to green product, environmental awareness, willing to buy green product and companies initiative towards green image in the market place. The study used primary data, collected from 400 consumers. The study concluded that the consumers had a positive attitude towards green marketing. Their environmental awareness level was high, their willingness to pay for green product preferably to buy was expected to be high in mere future.

Christopher Gan et al. (2008) in their study on "Consumer purchasing behaviour towards green products in Newzealand" aimed to analyse the purchasing behaviour of green products of Newzealand consumers. The paper analysed the impact of price, quality, environment, consciousness and brand loyalty on consumers purchasing decision towards green products. The study found that there was significant relationship between quality and price for green product. The study also highlighted the significant effect on product attribute and personal factors on consumer's purchasing behaviour towards green products. High price and unfamiliar brand had a negative impact on purchasing green products whereas Green labels had no effect on purchasing green products. The study concluded that the consumer who were more conscious towards environment were likely to purchase green products.

Lim Li Chen (2009) in his study on "Green Products Buying Behavior and General Environmental Beliefs" focused the factors influencing the buying behavior of green products. The researcher highlighted the socio economic factors and environmental beliefs in determining the buying behavior of the consumers towards the green products. An environmental belief in each aspect was measured using HEP and NEP General Environmental Beliefs questionnaires. Buying behavior was measured using ecological consciousness consumer behavior questionnaire. The results showed that the customers having green beliefs about the green products had positive relationship towards buying behavior of green products. The researcher concluded that the marketer should create more awareness about green belief to increase the buying behavior of the green products.

Yu-Shan Chen (2010) in his study on "The Drivers of **Green** Brand Equity: **Green** Brand Image, **Green** Satisfaction, and **Green** Trust" discussed four constructs like green brand equity with green brand image, green trust, and green satisfaction on electronic products in Taiwan. The study found that green brand equity has positive relationship between green brand image, green trust and green satisfaction on electronic products in Taiwan. The study used structured equation model and found that the products with high green brand image, green satisfaction and green trust could not meet the international environment regulation but also to enhance the green brand equity.

Tan Booi Chen and Lau Teck Chai (2010) in their study on "Attitude towards the environment and green products: consumers' perspective" examined consumers attitude on green products, consumers attitude on environment, consumers attitude towards government's role and personal norms of consumers in environmental issues. The study used t-test and found that there was no relationship between environmental attitude and attitude on green product. The study also used multiple linear regression to highlight that environmental protection had no significant contribution on consumer attitude on green products, where government role and personal norms had significant contribution of consumer attitude on green products.

Overall Perception of the Respondents towards Green Products - Structural Equation Modelling
Structural Equation Modeling is a very general statistical modeling technique, which is widely used in the behavioural sciences. It can be viewed as a combination of factor analysis and regression or path analysis. The interest in SEM is often on theoretical constructs, which are represented by the latent factors. The relationships between the theoretical constructs are represented by regression or path coefficients between the factors.

Structural Equation Modeling provides a convenient framework for statistical analysis that includes several traditional multivariate procedures, for example factor analysis, regression analysis, discriminant analysis, and canonical correlation, as special cases. Structural equation models are often visualized by a graphical path diagram. The statistical model is usually represented in a set of matrix equations.

Structural equation models (SEM) allow both confirmatory and exploratory modeling, meaning they are suited to both theory testing and theory development. Confirmatory modeling usually starts out with a hypothesis that gets represented in a causal model. The concepts used in the model must then be operationalized to allow testing of the relationships between the concepts in the model. The model is tested against the obtained measurement data to determine how well the model fits the data. The causal assumptions embedded in the model often have falsifiable implications which can be tested against the data. With an initial theory SEM can be used inductively by specifying a corresponding model and using data to estimate the values of free parameters. Often the initial hypothesis requires adjustment in light of model evidence. When SEM is used purely for exploration, this is usually in the context of exploratory factor analysis as in psychometric design. Among the strengths of SEM is the ability to construct latent variables: variables that are not measured directly, but are estimated in the model from several measured variables, each of which is predicted to 'tap into' the latent variables. This allows the modeler to explicitly capture the unreliability of measurement in the model, which in theory allows the structural relations between latent variables to be accurately estimated. Factor analysis, path analysis and regression all represent special cases of SEM.

In SEM, the qualitative causal assumptions are represented by the missing variables in each equation, as well as vanishing co variances among some error terms. These assumptions are testable in experimental studies and must be confirmed judgmentally in observational studies.

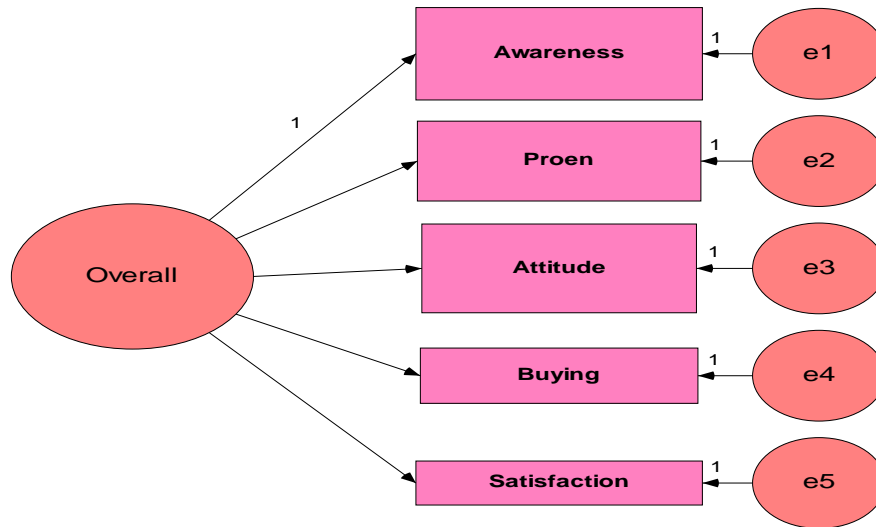**Consumer Awareness, Attitude and Buying Behaviour of Green Products**

**Figure 2 : Structural Equation Model Showing Overall Perception of Respondents towards Green Products:
Model Structure**

Where,

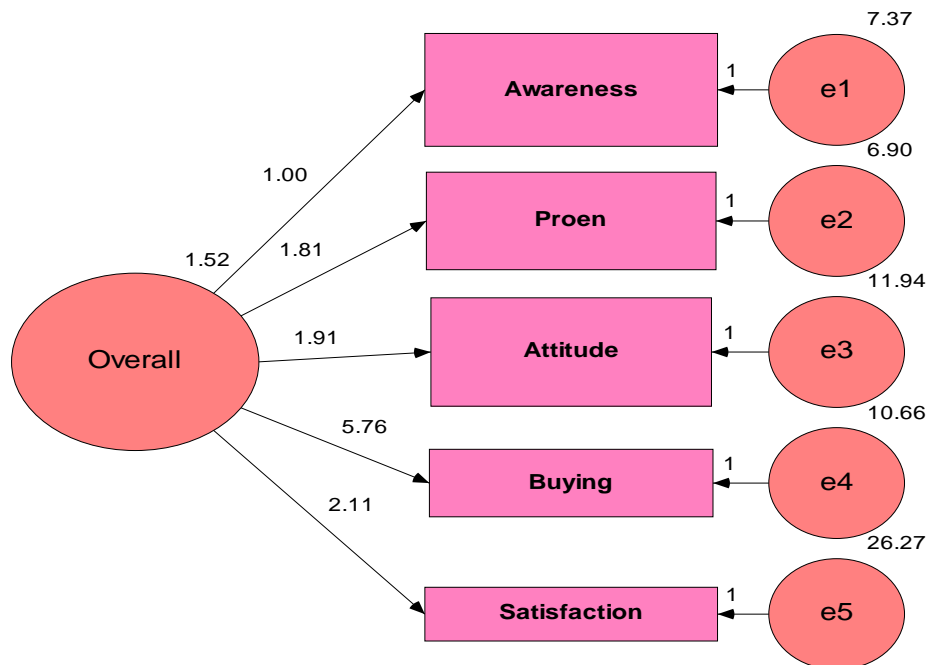|		
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Model: Estimates

**Figure 3: Structural Equation Model Showing Overall Perception of Respondents towards Green Products :
Unstandardized Model**

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Table 1: Overall Perception of the Respondents towards Green Products - Regression Weights: (Group Number 1 - Default Model)

			Estimate	S.E.	C.R.	P	Result
Awareness	<---	Overall	1.232	.138	8.905	***	Sig. @ 1%
Proen	<---	Overall	2.227	.153	14.556	***	Sig. @ 1%
Attitude	<---	Overall	2.358	.189	12.505	***	Sig. @ 1%
Buying	<---	Overall	7.101	.335	21.202	***	Sig. @ 1%
Satisfaction	<---	Overall	2.602	.265	9.822	***	Sig. @ 1%

The above table shows the regression coefficient of the exogenous variables. It is noted that the critical ratio is found to be high at 21.202 and 14.556 for Buying Behaviour and Pro-Environmental concern of the respondents towards the green products and it is significant at 1 percent level. However, among the selected five variables, the other three variables namely, awareness, attitude and level of satisfaction towards green products revealed the critical ratio of 8.905, 12.505 and 9.822 respectively which is also found to be significant at 1 per cent level.

Model Fit Summary
CMIN
The following shows that CMIN for the 'default model'. A significant Chi-Square indicates satisfactory model fit.

Table 2: Overall Perception of the Respondents towards Green Products – CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	10	10.152	5	.071	2.030
Saturated model	15	.000	0		
Independence model	5	552.891	10	.000	55.289

CMIN is a chi-square statistics comparing the default model and the independence model with the saturated model. The above table infers that the default model has been associated as 2.03 percent with saturated model while on the other hand, the independence model has been associated at 55.29 percent with saturated model.

RMR, GFI
The Root Mean Square Residual (RMR) is the mean absolute value of the covariance residuals, which reflect the difference between observed and model- estimated covariance. Specifically, RMR is the co-efficient which results from taking the square root of the mean of the squared residuals. The closer RMR is to 0, the better the model fit. The Goodness of Fit (GFI) of a statistical model describes how well it fits a set of observations. Measures of goodness of fit typically summarize the discrepancy between observed values and the values expected under the model in question.

Table 3: Overall Perception of the Respondents towards Green Products - RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.513	.992	.975	.331
Saturated model	.000	1.000		
Independence model	8.457	.644	.467	.430

From the above table it is indicated that the model is good fit by the influence of RMR value which is found to be 0.513. GFI (Goodness of Fit Index) value is 0.992, which is indicative of the fact that 99 percent has been fitted in Default model for the proportion of variance-covariance matrix, and GFI value of 0.644 for the independence model suggests 64.4 per cent fit for the same.

Baseline Comparisons
The NFI, Normed Fit Index, also known as (Δ_1), was developed as the alternative to CFI, Comparative Fit Index, is also known as the Bentler Comparative Fit Index, compares the existing model fit with the null model which assumes the latent variables correlates with the independent variables. The normed fit index (NFI) analyzes the discrepancy between the chi-squared value of the hypothesized model and the chi-squared value of the null model.

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Table 4: Overall Perception of the Respondents towards Green Products - Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.982	.963	.991	.981	.991
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

From the above table, it is noted that the model fit indices are good fit with the evidence of NFI (0.982) and CFI (0.991) which is greater than 0.9.

RMSEA
RMSEA is a frequently used measure of the differences between values predicted by a model or an estimator and the values actually observed. Root Mean Square Error of Approximation is the popular measure of fit, because it does not require comparison with the null model. It is one of the fit indexes less affected by sample size. There is good model fit if RMSEA less than or equal to 0.05.

Table 5: Overall Perception of the Respondents towards Green Products : Root Mean Square Error of Approximation

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.045	.000	.086	.512
Independence model	.330	.307	.354	.000

It could be noted from the above table that the RMSEA value is 0.045 which is found to be significant at 5 per cent level and hence we can conclude that the model resulted as good fit.

Results

Table 6: Overall Perception of the Respondents towards Green Products : Bootstrapping

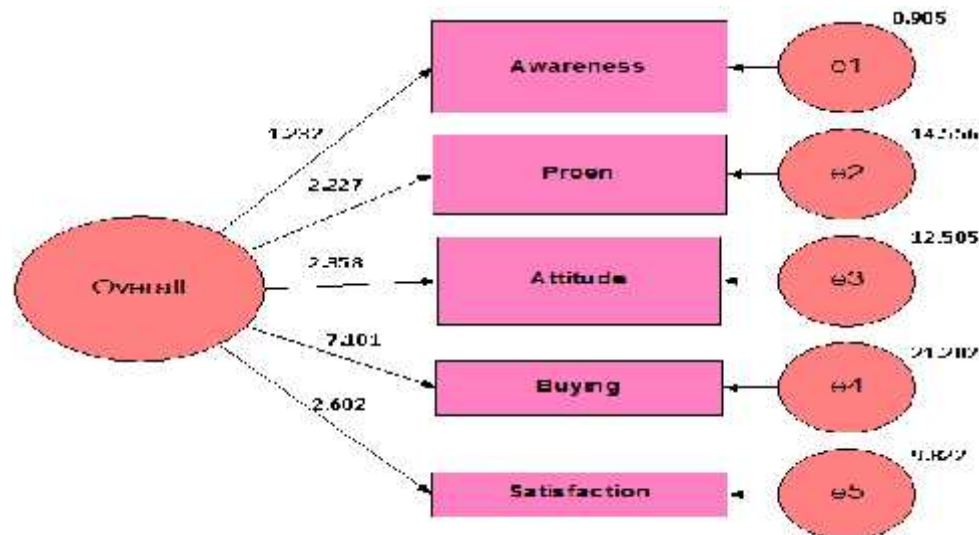| Paths			Estimate	S.E.	C.R.	P	Result
Awareness	--->	Overall	7.365	.484	15.202	***	H_1 Accepted
Proen	--->	Overall	6.904	.531	12.990	***	H_1 Accepted
Attitude	--->	Overall	11.936	.840	14.209	***	H_1 Accepted
Buying	--->	Overall	10.656	2.929	3.638	***	H_1 Accepted
Satisfaction	--->	Overall	26.275	1.749	15.026	***	H_1 Accepted

Standardized Model Estimates

Figure 4 : Structural Equation Model Showing Overall Perception of Consumers Towards Green Products : Standardized Model

Testing of Hypothesis

H_0 : There is no significant relationship between the dimensions and overall perception towards green products.

Table 7: Overall Perception of the Respondents towards Green Products Testing of Hypothesis

Hypothesis	Hypothetical Relationship	Result
H_1: There is a positive impact of respondents Awareness and the overall perception towards Green Products.	Positive	Confirmed
H_2: There is a positive impact of respondents Attitude and the overall perception about Green Products	Positive	Confirmed
H_3: There is a positive impact of respondents Pro-Environmental concern and the overall perception towards Green Products.	Positive	Confirmed
H_4: There is a positive impact of respondents Buying Behaviour and the overall perception towards Green Products.	Positive	Confirmed
H_5: There is a positive impact of the respondents on level of Satisfaction and the overall perception towards Green Products.	Positive	Confirmed

Discussion of the Result

From the path diagram, measured variables with latent variables based on awareness, attitude, buying behaviour is having positive relationship and are also significant at 1per cent level. The analysis of the model, from the view point of the consumers, suggests that all the measured variables are significantly associated and have impact on overall perception towards green products.

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