

Exploratory Study on Consumer Perception of Energy and Building Technology Brand



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This research is an attempt to understand the theoretical overview of energy and building technology in India and to study the perception of four brands in the field of energy and building technology. The methodology used for the research is descriptive and exploratory research. primary and secondary data was used to collect data about consumer perception. The sampling method used was stratified sampling. The statistical tools like descriptive statistics and inferential statistics was used to make further analysis about the awareness about energy and building technology used by four brands like Bosch, Siemens, Samsung and Tata.

1. Introduction

India is staying true to its ambitious renewable energy targets by showing a steady growth in renewable energy installations in India, which as of April 2017 account for 17.5 percent of the total energy source. In Layman terms, Energy is the amount of force or power when applied can move one object from one position to another or Energy defines the capacity of a system to do work. Energy can have many forms: kinetic, potential, light, sound, gravitational, elastic, electromagnetic or nuclear. According to the law of conservation of energy, any form of energy can be converted into another form and the total energy will remain the same Energy is broadly classified into two main groups: Renewable and Non-renewable. Renewable energy is generated from natural sources and non renewable energy is taken from the sources that are available on the earth in limited quantity. As it cannot be regenerated within a short span of time so it is called a nonrenewable energy. Non-renewable sources exist in the form of fossil fuels, natural gas, oil and coal. The term '**building technology**' refers to the technical processes and methods used in the constructing buildings. This has become an increasingly important aspect of the construction industry, as buildings have moved from being evolutions of standard types to becoming one-off prototypes, building performance requirements have become more demanding, and the number of products and specialist suppliers has increased. The basic process of construction has remained relatively unchanged since the middle ages, however construction technology has changed significantly.

Objective of a company in undertaking study about Consumer perception is purely to understand the decisions made by the consumer and take appropriate measure to influence them. It is a theory undertaken by companies prior to launch a specific product or brand or to study the existing brand. The success/failure and sustainability of a business to a great extent is influenced by consumer perception. Hence, a study of the same is very much necessary in today's time of when consumers are the king in the market. The attempt made to understand how a consumer's insight about a specific product or service can influence his or her behavior can be termed as consumer perception this research paper deals with understanding the four different brands, introduced and the consumer perception about the same. It includes the consumer perception of four brands i.e. Bosch, Samsung, Siemens and Tata.

2. Literature Review

(Sergio Andrés Osuna Ramírez,2017) has enhanced the theoretical foundation of brand commitment construct by elaborating on its definitions, importance of its implications, and differentiating it from other concepts and talks about the nine definitions of consumer brand commitment are analyzed and the main difference of the construct with other concepts are also clarified in the given literature.

(Shahid Z Hussian 2017) reviews about the impact of brand equity and awareness on the purchasing intentions of the consumer also elaborate the relation between awareness of a brand and the intention of consumer of buying that brand.

(Kantamneni 1996) identified 27 variables that could help conceptualize and develop an understanding of how consumers perceive value, a scale of 27 items is developed and administered to 750 respondents. The results of the survey support a four factor model of value: Core Value, Personal Value, Sensory Value and Commercial Value.

(Eun-Ju Lee 2008) has presented studies of energy feedback measures and their effectiveness on the basis of a literature review of academic papers, technical reports and website sources. Energy feedback measures can be as effective (10-20% reduction rate) as innovative energy systems which require substantial capital investment.

(Patel Jatin) has focused on green design as a vital transformation of contemporary architecture practiced in developing nations. He endeavours to present some environmental and physical design approaches for green buildings in promptly developing countries chiefly India. In this regard, his study presents hands on analysis of basics and principles of green

architecture, theories and viewpoints outlined in the field and also the analysis of efficacious cases of environment friendly buildings in India.

(Kemi Adeyeye 2007) has investigated the potential impact of energy conservation policies and legislation on building design; examined energy conservation practices in the building industry; and identified associated barriers to an integrated low energy architectural design process. The results reveal that building design is affected by existing legislation but often not by policies. Additionally, there is a lack of incentives for the building industry to adopt and implement low energy design strategies that are outlined in existing policies and guidance.

(Andrew Eastwell 1990) intended a briefing note to those not directly involved with the application of building controls, but who work with those who are. He focused on the technical aspects of the system, and discussed both schemes for future development and the system's relevance to structural engineers.

(Pat Herbert 1998) focused on a new, low-energy, environmentally advanced building at the Building Research Establishment's (BRE's) site near Watford, UK. He described the building's innovative design, its computerised management system and the use of recycled materials in its construction.

(Visar Hoxha 2017) developed the empirically tested framework about the knowledge and perception about sustainability of building materials in Prishtina, Kosovo from the perspective of users, construction industry and facility managers. His results of quantitative research found that embodied energy, durability and low energy consumption are used as key criteria that influence the materials selection process on the part of users.

(M. Yang 2013) presented background information on the potential for energy efficiency, global energy efficiency investment gaps, and market barriers that cause the gaps. He discussed how the Global Environment Facility (GEF) has addressed these trends and considered key issues while financing energy efficiency projects in developing countries over the past 20 years.

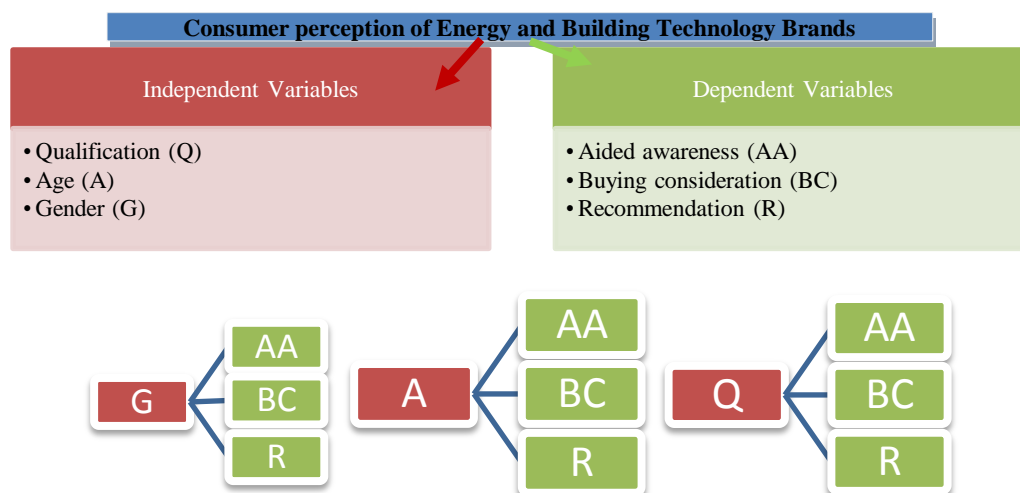
(Prof. Patil Hemant Chudaman) identified the effect of world trend on construction technique and discuss the evolution of building construction with respective of time scale.

(Merschbrock 2012) presented a review of the research on Building Information Modeling (BIM) in construction, with the aim of identifying areas in this domain where IS research can contribute. Through a review of 264 research articles on BIM, he found that this research spans a wide area of technological and organizational topics, of which many have a clear resonance to focal areas in IS research.

3. Research Objective

- To understand the overview of Energy and Building Technology in India.
- To study the consumer perception of four different brands in the field of Energy and Building Technology, namely; Bosch, Samsung, Siemens and Tata.
- The variables identify to study the consumer perception includes the following
 - a. Aided Awareness
 - b. Recommendation
 - c. Buying consideration

Conceptual Model of Research



Hypothesis

Research Methodology

Type of research : Descriptive research
 Research Approach : Survey
 Research Instrument : Questionnaire

Target Group : B2C
 Sample segment : Mumbai
 Sample size : 100
 Sample Method : Stratified Random Sampling

Source of Data

Primary Data and Secondary Data: Primary data was collected by asking questions to respective consumer of either of the four brands. The data was collected through survey, interview and questionnaire. Secondary data was collected through two types, Internal source- Periodicals or websites or records of the Organization itself and External Source- Reports provided by website or internet.

Validity and Reliability: Construct validity is a more sophisticated technique for establishing the validity of the instrument. It is determined by ascertaining the contribution of each construct to the total variance observed in a phenomenon.

Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
.909	201

Interpretation

The Cronbach’s Alpha value has shown strong co linearity among the selected items for the questionnaire and thus presents strong Reliability statistics. The reliability of this instrument in the existing table is .90 which states the contribution of each construct to the total variance is very positive.

Data Analysis

Analysis is based on the hypothesis framed. The data was analyzed in the form of descriptive statistics and inferential statistics. Statistical package for social sciences was used to analyse the data. The statistical tools like Chi-square test, logic regression was used for further analysis.

Hypothesis 1

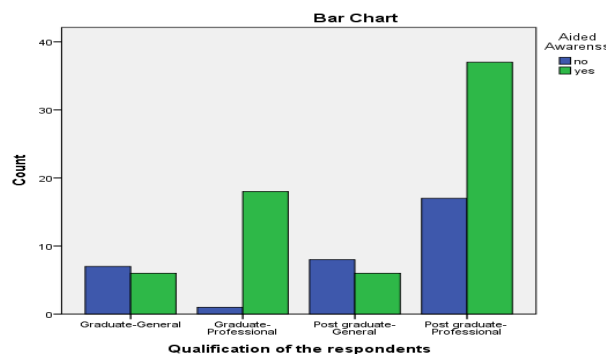
Table 1.1 Qualification of the Respondents * Aided Awareness

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.913 ^a	3	.005
Likelihood Ratio	14.661	3	.002
Linear-by-Linear Association	.034	1	.854
N of Valid Cases	100		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 4.29.

Interpretation: The Chi-square test has been applied and the calculated value (.005) is less than tabulated value of p value (.05), hence the null hypothesis has been rejected and its establish that the there is significant relationship in qualification of the respondents and aided awareness level of the brands.

1.1 Figure on Aided Awareness and Qualification Relationship



1.2 Age of the Respondents * Aided Awareness

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.772 ^a	3	.856
Likelihood Ratio	.864	3	.834
Linear-by-Linear Association	.182	1	.670
N of Valid Cases	100		

A. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .99.

Interpretation: The Chi-square test has been applied and the calculated value (.856) is less than tabulated value of p value (.05), hence the null hypothesis has been rejected and its establish that the there is significant relationship in qualification of the respondents and aided awareness level of the brands.

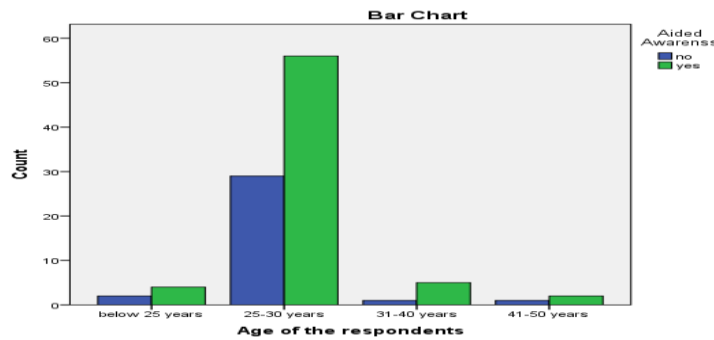


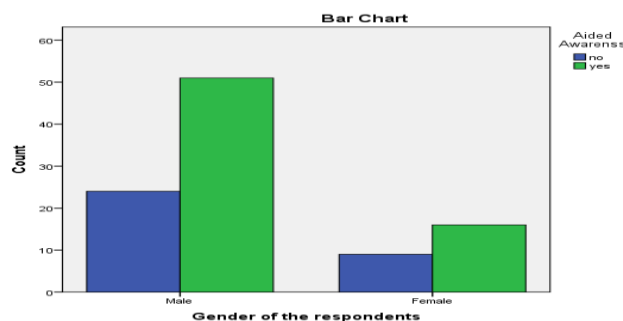
Figure 1.2 on Aided Awareness and Age of the Respondents Relationship

1.3 Gender of the respondents * Aided Awareness

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.136 ^a	1	.713		.000
Continuity Correction ^b	.015	1	.902		
Likelihood Ratio	.134	1	.714		
Fisher's Exact Test				.807	.446
Linear-by-Linear Association	.134	1	.714		
N of Valid Cases	100				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.25.
 b. Computed only for a 2x2 table

Figure 1.4 Gender of the Respondents and Aided Awareness



Hypothesis 2
Logistic Regression
Block 0: Beginning Block

Classification Table ^{a,b}					
	Observed		Predicted		
			Aided Awareness		Percentage Correct
	no	yes			
Step 0	Aided Awareness	no	0	33	.0
		yes	0	67	100.0
	Overall Percentage				67.0

a. Constant is included in the model.
 b. The cut value is .500

Variables in the Equation							
	B	S.E.	Wald	df	Sig.	Exp(B)	
Step 0	Constant	.708	.213	11.089	1	.001	2.030

Variables not in the Equation						
				Score	df	Sig.
Step 0	Variables	Qualification		12.913	3	.005
		Qualification(1)		2.937	1	.087
		Qualification(2)		8.162	1	.004
		Qualification(3)		4.292	1	.038
Overall Statistics				12.913	3	.005

Block 1: Method = Enter

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	14.661	3	.002
	Block	14.661	3	.002
	Model	14.661	3	.002

Interpretation: This is the probability of obtaining this chi-square statistic (14.661) if there is in fact no effect of the independent variables, taken together, on the dependent variable. This is, of course, the p-value, which is compared to a critical value, at .05 to determine if the overall model is statistically significant. In this case, the model is statistically significant because the p-value is less than .00

Equation: $\log(p/1-p) = b_0 + b_1*x_1 + b_2*x_2 + b_3*x_3 + b_3*x_3 + b_4*x_4$

Step Number: 1

Observed Groups and Predicted Probabilities

80 +			+
I			I
I			I
F I			I
R 60 +			+
E I	y		I
Q I	y		I
U I	y		I
E 40 +	y		+

N	I			y				I			
C	I			y				I			
Y	I			y				I			
	20 +			y			y	+			
	I		y y	n			y	I			
	I		n y	n			y	I			
	I		n n	n			y	I			
Predicted -----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----											
Prob:	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1

Group:
 nnyyy
 yyyyy

Predicted Probability is of Membership for yes
The Cut Value is .50
 Symbols: n - no
 y - Yes
 Each Symbol Represents 5 Cases

Hypothesis 3
3.1 Case Processing Summary

		N	Marginal Percentage
Recommended Products	Bosch	18	18.0%
	Samsung	25	25.0%
	Siemens	18	18.0%
	TATA	39	39.0%
Aided Awareness	No	33	33.0%
	Yes	67	67.0%
Valid		100	100.0%
Missing		0	
Total		100	
Subpopulation		25 ^a	

a. The dependent variable has only one value observed in 13 (52.0%) subpopulations.

3.2 Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	118.879			
Final	101.831	17.048	12	.148

Interpretation: This indicates the parameters of the model for which the model fit is calculated. Here “Intercept only” 118.8 describes a model that does not control for any predictor variables and simply fits an intercept to predict the outcome variable. "Final" 101.8 describes a model that includes the specified predictor variables and has been arrived at through an iterative process that maximizes the log likelihood of the outcomes seen in the outcome variable. By including the predictor variables and maximizing the log likelihood of the outcomes seen in the data, the "Final" model should improve upon the "Intercept Only" model. This can be seen in the differences in the -2(Log Likelihood) values associated with the models. Here .148 values shows strong model fit for the model and that established a relationship that the brand considerations and Brand Recommendation.

4. Conclusion

This research is an attempt to study the consumer perception about brand visibility and brand perception. And also to understand how much trust and interest the consumer has in each of the brands and their products and services. The findings made it very clear that all the four companies are powerful in terms of their business, but still some strong variables are found in some of the companies which are not that strong in the others. All three organizations has a good brand visibility and

positive perception. However the minor variation found the visibility is as mentioned. Tata is the best among the consumers as compared to the other brands. But still there is Samsung, which has got a huge brand image and presence in the market throughout the world. Bosch also holds a good reputation in the perception of the consumers, but Bosch and Siemens both need to put in some marketing efforts to increase their awareness, familiarity and association among the consumers of today's generation which shall be the future progress makers of the world and hence shall lead to a sustainable and energy efficient system in all the fields.

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