Evaluating the Purchase Process of Household Appliances Accounting for Consumers' Attitudes towards Eco-Friendly and Sustainable Consumption Behavior

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Abstract

Globally depleting fuel resources like coal, oil and gas has triggered discussions in various forums in India emphasizing the significance of renewable energy sources like solar, hydro, wind and bio gas for future sustenance of society. Anticipating a shift of the consumer mindset towards Greener Technology products, organizations have identified this niche market and introduced a range of products for various customer segments. We have used the Howard Sheth Model of consumer behavior to understand how consumers generally look at broad range of factors including energy efficiency when purchasing major appliances, with the factors differing both in nature and order of importance across appliance types. Although there exists significant literature on consumers' purchase decision, there is not much literature available for consumers' purchase decision in emerging countries of home appliances considering environmentally friendly factors. This research work aims to study the growing energy saving consciousness and environmental friendly considerations during purchase decision of consumers in India. This is in the context of the purchase of 2 home appliances – the refrigerator and the air-conditioner in Gujarat post 2010. Indicators like star rating have been used as influencing factor on consumers' decision during purchase. It will provide an understanding of the various parameters that are considered by consumers and the degree to which they influence during the purchase of air-conditioners and refrigerators.

Keywords: Refrigerator, Air-conditioner, Green, energy. Star rating, Gujarat, consumer, buying behavior

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Introduction

Background

India's heterogeneity – ethnic groups, income levels, geographies, religions, languages, urban/rural mix – leads to a lot of variation in the tastes and likings of the consumers. Hence understanding the need of the Indian consumer and planning as well as forecasting their change in purchase behavior is always a challenging exercise for organizations during the launch of new products. The external analysis by organizations also includes competition analysis and the changing market scenario. They have to continuously keep track of global companies extending their brand in the Indian market and also the Indian companies innovating to extend their product portfolio resulting in diminishing the advantages the key success factors of existing products.

The rapidly deteriorating state of our environment has been in focus of various societal stakeholders for the past 50-60 years. People, organization and institute from across the globe have started to realize the problem and have joined forces to prevent the environment from relegating into a critical state. In 1960, a new marketing philosophy was invented known as "Green Marketing" where the consumer need of eco friendly products was the focal point of study.

Information about the range of products available is accessible to the Indian consumer through advertisements in newspaper, radio channels, television, internet, and many other e-media. The buying behavior of the electronic goods is strongly influenced by prices and offers. Moreover,

consumers who are averse to loss, find it easier to compare difference between the products, are resistant to change and base judgment on the basis of their experience. Literacy level has also increased across India through conscious efforts made by social organizations in educating all members of the Indian household to be able to read and write in either English or Hindi (National Language of India) or their native state language. This has led to the "housewife", who plays a major role in making decision during purchase of home appliances, to make an informed decision.

One dimension of choice that has had some awareness amongst the Indian consumer is the use of Green Technology and Energy efficient Home appliances. Globally depleting fuel resources like coal, oil and gas has triggered discussions in various forums in India emphasizing the significance of renewable energy sources like solar, hydro, wind and bio gas. Anticipating a shift of the consumer mindset towards Greener Technology products, organizations have identified this niche market and introduced a range of products for various customer segments.

LITERATURE REVIEW AND PURPOSE OF RESEARCH WORK

A buying decision process describes the process a customer goes through when purchasing a product. This buying decision model has gone through lots of interpretation by scholars. Although the models vary, there is a common theme across all models, that of five stages in the decision process. These stages were first introduced by John Dewey in 1910. The stages are:

1. Problem/Need recognition
2. Information search
3. Evaluation of alternatives

4. Purchase decision
5. Post-purchase behavior

These stages vary depending on the product in consideration, the urgency and the need, the cultural influence, the perceived advantages and disadvantages and the willingness to invest the amount in purchasing the product. This is also seen to vary across different customers. Don Peppers and Martha Rogers 1993 said in their book "The One to One Future" that in order to treat different customers differently, you must be able to configure different products, services, and offers to the individual preferences of different customers. Organizations find varied avenues to communicate the features of their product to the prospective buyers through different methods of communication, be it traditional or digital media or direct marketing.

Literature has suggested (Marie Cervellon, Lindsey, 2011) that during the purchase decision, consumers do not understand the meaning of all terms and labels used to describe and guarantee green products. Hence they rely on either past experience with a similar product, the brand labels, the look and feel of the product, reading reviews from various sources, feedback from friends and family, the key benefits as marketed by the manufacturer and hence ultimately weighing it against their requirement and also their willingness to pay for the product. In recent times it has been observed that during purchase of household appliances, customers have also taken into consideration the "green" aspects of the product. Hence, the decision to purchase can get influenced by the advantages offered by the energy efficient product, in the long and short run.

The research which has been conducted on the issue of why consumers choose environment friendly products is very detailed and conclusive. It highlights three main types of green consumers, namely (Cervellon, 2010)

- the health-conscious consumer
- the environmentalist
- the quality hunter

The paper has stated that consumers might have a mix of these motivations, but nonetheless, one dominates in a specific purchase context. Marketing activities is done using several touch points as consumers generally look at broad range of factors when purchasing major appliances, with the factors differing both in nature and order of importance across appliance types. They search for this information in diverse ways ranging from conversation with family and friends, looking at newspaper and magazine ads and articles, searching ("Googling") the internet, visiting retailer showrooms, talking to trades people and other specialists, seeking out other expert advice (Department of Environment, Water, Heritage and Art, 2008).

Another article (Agariya and Singh, 2011) aims to use content analysis to provide an overview of the existing academic literature on relationship marketing by summarizing definitions and major defining constructs based on the previous research findings in this area. The authors have summarized 72 definitions along with 50 general defining constructs of relationship marketing. In addition, sector-specific defining constructs for the banking, insurance, and health care sectors have also been identified. This article bridges the gap in the existing relationship marketing literature by providing a comprehensive list of relationship marketing definitions and identifying

major general as well as some sector-specific defining constructs along different industry verticals. The review of the existing literature was done to reduce the time and efforts of present and future researchers in this area by providing a quick snapshot of the existing definitions and major defining constructs that constitute relationship marketing. In recent time energy efficiency and its advantages have created new constructs in the overall decision process of the customer.

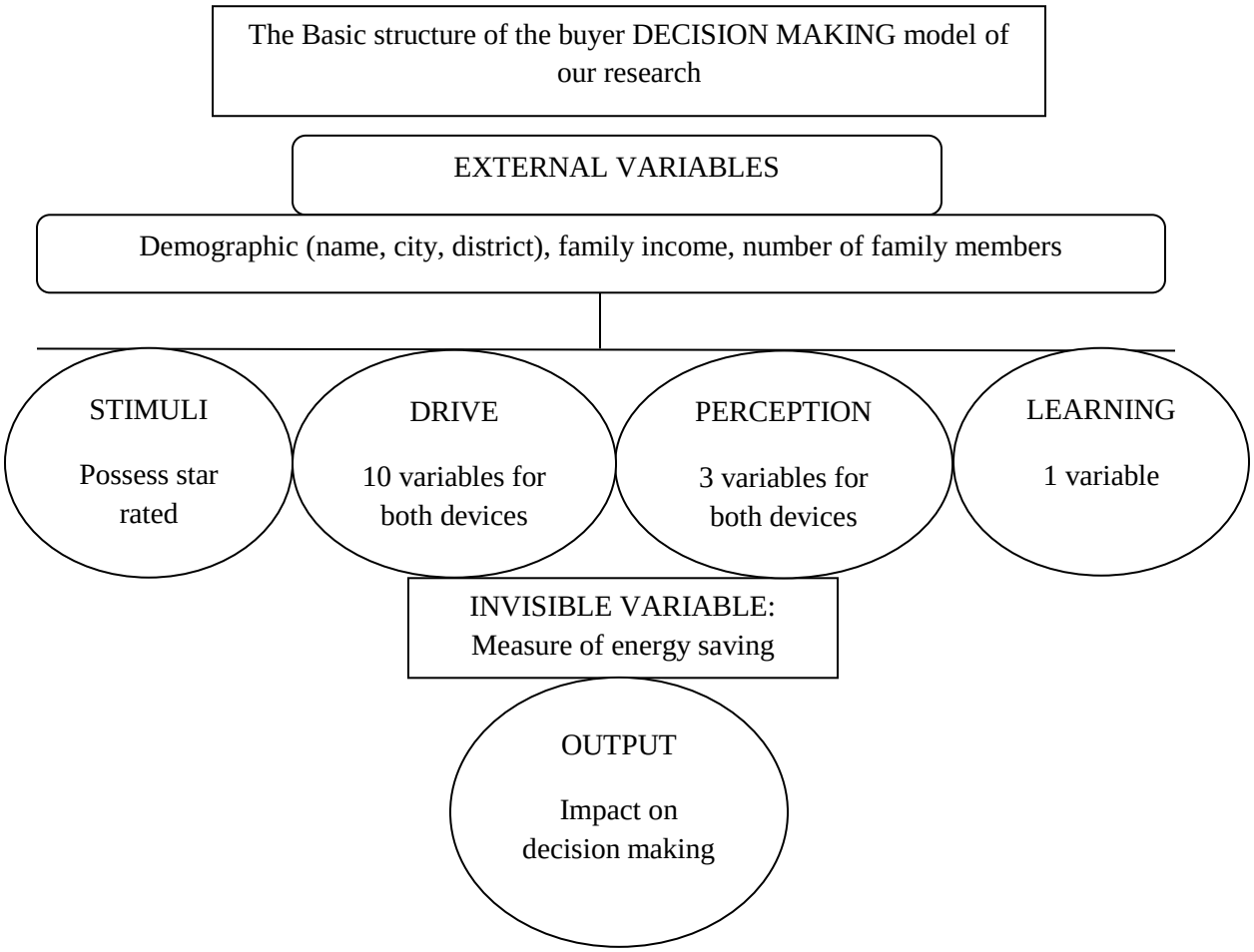
Our literature review includes understanding studies done on purchase of energy efficient devices for residential sector. Energy efficiency is defined as the "energy service per unit of energy consumption". The 2 products that are of our interest in this research study are the Refrigerators and Air-conditioners. For air-conditioners, model's efficiency is the amount of cooling capacity (output) per unit of energy it consumes (input). The measure of energy service for a refrigerator is the volume that has to be cooled. Additionally there is adjustment of volume for extra cooling in the freezer. Star rating, the measure for energy efficient devices, was created in 1992 by Department of Energy and Environmental Protection Agency (EPA) by John S Hoffman in the United States. For Refrigerators and Air-conditioners, standards were revised in 2000, which were again revised in 2010. Defrost is not yet a part of the star rating equations (Energy rating 2014). Results of a study (Garg, Amit; Maheshwari, Jyoti; Upadhyay Jigeesha. 2010) indicate that a large scope exists for penetration of energy efficient devices in residential sector until 2010 in India.

This research work aims to study the purchase decision behavior of consumers during the purchase of 2 home appliances – the refrigerator and the air-conditioner in Gujarat post 2010. Both of these appliances are seen in households across different income groups. Refrigerators function 24/7 throughout the year. The air-conditioner has limited use during certain months of

the year. They are available in varied sizes, varied features and energy saving options. Based on existing literature and simple Howard and Sheth model 1977 of consumer behaviour that aims not only to explain consumer behaviour in terms of cognitive functioning but to provide an empirically testable depiction of such behaviour and its outcomes, we have considered 17 parameters for this study.

Figure 1

Research Model



Why has the study been conducted for purchases made post 2010?

Literature review has identified associated work done until 2010 for Gujarat, India. Additionally, the literature is available on star ratings, a significant factor considered for this research work, and it went through a revision in 2010 (Energy rating 2015). The original star rating equations for refrigerators were developed in 1986. These were revised (re-graded) in 2000 and again in 2010 to take account of the substantial improvement in the energy efficiency of products over this period (for example, new refrigerators today use 70% less energy than equivalent products from the 1980's).

During the purchase of these appliances, the Indian consumer considers various parameters to make the ultimate purchase. Are parameters like environmentally friendly features and the long term cost saving due to lower consumption of energy significant in the mind of the consumer? Do they make a conscious choice considering these and associated parameters in high priority or do they consider these parameters for certain incentives provided by the manufacturer/retailer? Do consumers believe in spending more upfront during the purchase for saving energy cost in the long run? This research work will try to answer these and similar associated questions. This study would hence provide an understanding of the consumers' buying behavior for refrigerators and air-conditioners in Gujarat.

According to Joel Makower (Shafaat & Sultan et al., 2012), challenges faced by green marketer also include the lack of standards and common consensus among the public about what actually constitutes "green". Despite these challenges, green marketing continues to gain popularity, particularly in light of growing global concern about climate change. Companies are coming

forward to showcase their commitments to reduce adverse climate impacts of their products and services. Green marketing can play an important role in sustainable development so firms must adapt innovative methods to sustain itself in the competitive environment.

Objective of the study

Study the behavior patterns of Indian household on green appliance purchase using a survey instrument developed. Specifically, we would like to focus on attitudes and preferences of consumers towards energy saving appliances.

METHOD

This research work has been carried out by collecting data through primary and secondary sources using questionnaire and interview method and hence is a mix of qualitative and quantitative assessment of the data.

a. Conduct primary research on adoption trend of 2 home appliances the refrigerator and the air-conditioners in India and particularly in the state of Gujarat (post 2010)
b. Summarize the findings for consumer decision making behavior during the purchase of refrigerators and air-conditioners in Gujarat.

Variable selection

In addition to the literature study, methods used have been

a. In-store Observation at the retail outlets
b. Talking to consumers post purchase in the retail stores and
c. Discussion with experts from the field in academia

From literature review we find that no significant study has been done post 2010 to identify changing consumer behavior towards energy efficient products in India. In order to address this gap, tests have been conducted to evaluate what drives the ultimate purchase decision. The 17 parameters (variables) as per the model (Figure 1) stated for this research work are as follows:

Stimuli (1 variable): Are the consumers able to measure the energy saving?

Drive (10 variables): Variables that are considered during purchase decision making

1. Label and brand name
2. Look and feel
3. Recommendation from relatives and friends
4. Persuasion from salesman
5. Personal research from website and newspaper before purchase
6. Cost incentive attached like easy EMI, festival offer, free gifts
7. Energy saving
8. Convenient to use
9. Medical reasons
10. Latest and smart technology

Perception (3 variables): what does star rated product mean to you?

1. More energy saving
2. Statement for identity
3. Good for the environment

Learning variable (1): Impact on next purchase decision

Invisible variable (1): Have the consumers purchased electric appliance after 2010?

Output (dependent) variable (1): Priority given to star rating during purchase of Refrigerator and Air-Conditioner

A structured questionnaire has been used to evaluate the 17 variables in the research model by understanding the buying decision of consumers for Refrigerator and Air Conditioner. Sample data has been collected from 8 cities across Gujarat state in India. The 8 cities have been chosen such that it represents the entire state of Gujarat. The cities from which the data has been collected are Ahmedabad, Gandhinagar, Bhuj, Rajkot, Surat, Mehsana, Porbandar and Bhavnangar. This has been done by doing a door to door survey. Judgemental sampling method has been used. A total of 1260 responses have been collected across the cities.

It is usually a belief that with additional features of a product, the cost of the product increases. However, often due to several influencing factors like discounts and promotions, the product is available at different price points. We wanted to check if the star rating feature increases the cost of the product. Our first hypothesis is as follows:

H1: Customers who have purchased an electrical appliance after 2010 have paid more money for the star rating compared to non-star rated appliances.

The anticipated response led us to contemplate that if the customer decides on spending more on the product because of the star rating feature, what "star rating" actually means for the customer. From secondary research we narrowed down 3 parameters and have tried to measure the response from the tabulation result. Our second hypothesis is as follows:

H2: Customers believe that star rating means more energy saving for them.

Purchasing a product is a combination of perceived advantage and hence judgment over several dimensions. We wanted to identify which parameter plays a significant role when a customer decides to purchase a star rated appliance against a non star rated one. This led us to our third hypothesis. We provided 7 parameters to our customers and asked them to rate their significance during the final decision to purchase a star rated product.

H3: Customers who purchase an appliance with star rating base their decision on prior research done on the product.

In this research work, we have tested the outcome of H3 on 2 appliances: the Refrigerator and the Air-conditioner. For both the appliances, we were interested in finding out which parameter leads the purchase decision for customers. Our fourth and fifth hypothesis tests it as follows:

H4: Customers consider "star rating" as a significant criterion during purchase of refrigerators.

H5: Customers consider "star rating" as a significant criterion during purchase of air-conditioners

We have discussed the outcomes in the next section from the results of logistical regression.

After the purchase made by consciously considering all parameters and then going for a star rated product versus a non star rated product would naturally lead the buyer to think about the advantages of the star rating, the actual energy saving that he/she is able to measure over the years. We asked the customers if they were able to measure the saving in energy. For those who answered in affirmative, we were interested in finding our if they would be convinced to purchase their next appliance again with the star rating. We have used Chi Square test result across these 2 responses for the following hypothesis:

H6: Customers who were able to measure the difference of energy saved after purchasing the star rated appliance would be willing to purchase more star rated appliances in the future.

The empirical findings provide the details of the test results on the 1260 responses.

EMPIRICAL FINDINGS

For testing H1, we have used 2 questions from the questionnaire. One identifies whether the customer had indeed purchased an appliance after 2010, and the other identifies if he/she had paid an additional amount for the star rating label on the appliance. The star rating is primarily signifying energy saving in the long run. Chi square test results (Table 1) indicates that out of the 1260 responders, 78.9% of them purchased an appliance after 2010 of which 97.5% paid more for the star rating. The Chi-Square value is .189 (Table 2) which is less than expected value 3.841 at alpha=.05. This means our hypothesis does not hold true. Customers who have purchase an appliance after 2010 have not necessarily paid more money for the star rating compared to non-star rated appliances. This is an interesting finding which indicates that companies provide the added feature of star rating to the customer but necessarily does not imply that it will always come with an extra cost.

For H2 we have tested 3 parameters, namely, a) more energy saving, b) a statement of their identity and, c) environmental benefits. From the tabulation results that measured the significance of star rating amongst the customers, all the 3 parameters are significant indicators.

However, 82.7% have associated it to energy saving and 77.8% have indicated environment benefits. (Table 3).

We went on to identify the basket of parameters that drive the decision to purchase a star rated product. Customers make the ultimate decision of going for the star rated product based on a combination of variables. We have tested H3 where we have considered the purchase of an appliance post 2010 as a categorical variable dependent variable. Then further evaluated what do the customers consider as the parameters of significance during purchase of the star rated product – the decision variables being brand name, label, looks; suggestions from their friends and family; influence by the salesperson; their own research done prior to the purchase; cost incentives like festival offers, easy EMI schemes and free gifts. The decision variables are the independent variables. From the logistic regression result (Tables 4 and 5), we find that the model predicts 97.1% times correct results. Amongst the decision variables, their prior research on the product and free gift scheme are significant in influencing their decision to go for a star rated product.

While considering the Refrigerator and Air-conditioner products in specific, the same test were done with somewhat more customized decision variable. For the Refrigerator (H4), we measured happiness index to the value provided by the star rated appliance. From the logistic regression results (Tables 6 and 7), we find that the model predicts 94.8% times correct results. It further indicates that customers are happy with their purchase and branded labels and more capacity in the refrigerator are significant indicators of happiness. For the Air-Conditioner (H5), we tested whether they possess a star rated refrigerator and if so the reasons for their selection of a star rated product. The logistic regression results indicate (Tables 8 and 9), that the model predicts

76.6% times correct results. Modern looks of the Air-conditioners and health reasons (a belief that star rating has health benefits) are significant indicators. We find that in both Refrigerators and Air-conditioners, "energy saving" does not show up as a significant parameter. Hence, both H4 and H5 are not supported. Since the new models of both these products are available on the shelves with star rating on them, the customers purchase them for certain associated benefits as seen from the analysis.

Finally in H6 we have tried to find out if the customers are able to measure the energy saved from the star rated appliance, be it from their electricity bills or the electricity meter in their house. Further we have tried to find out their inclination to go for star rated appliances in the future. Across 2 questions in the questionnaire, we have run the Chi-square test. Results (Tables 10 and 11) indicate that out of the 1260 respondents, 830 respondents were able to measure the energy saved and would go for the next purchase for a star rated appliance. However, the Chi-square value is high 28.98, which indicates we go by our hypothesis as correct; customers who were able to measure the difference of energy saved after purchasing the star rated appliance would be willing to purchase more star rated appliances in the future.

DISCUSSION

We began our research work with the following 3 objectives:

a. Conduct primary research on adoption trend of 2 home appliances the refrigerator and the air-conditioners in India and particularly in the state of Gujarat (post 2010)
b. Identify testable hypotheses on behavior segmentation of Indian household on green appliance purchase using the survey instrument developed.

c. Summarize the findings for consumer decision making behavior during the purchase of refrigerators and air-conditioners in Gujarat.

To address the objectives of the study, we have developed and tested 6 hypotheses. It is seen that the Stimuli variable in Model 1 that identifies the responder's ability to measure the energy saving from a star rated appliance has a role on the next purchase decision. Based on experience from having used a star rated appliance in the past, consumers are making an informed choice about purchasing another star rated product. Amongst the Driver variables (10), the influencing factors in decision making on purchase of next star rated appliance are primarily the brand name, look and feel, gifts and schemes, feedback provided by relatives and friends and their personal research work before the purchase. Consumers are realizing the value of energy saving and clean environment as an outcome of using home appliances that are eco friendly. From table 3 which measure the Perception variables (3), we see that consumers who believe in energy saving also consider environmental friendliness as an important factor. From the empirical findings and test results, it is concluded that consumers give priority to star rated appliances during purchase of Refrigerators and Air Conditioners in India.

Implications of this research work

Based on available literature, no extensive work on purchase decision of Household appliances considering its environmentally friendly features has been done post 2010. With the recent awareness drive towards using greener products, this work will identify the changing buying behavior in consumers during the purchase of Refrigerators and Air Conditioners in Gujarat. It will provide an understanding of the various parameters that are considered and to what degree during the purchase of air-conditioners and refrigerators. Which particular parameters provide

inclination towards the consumer choosing an energy efficient (star rated) product during the purchase. Manufacturers and retailers can hence include these into their product attributes. Environmentalists can get a sense of the changing attitude of consumers towards cleaner energy products. It will also provide information to power companies about household energy awareness and usage in Gujarat. There is scope for further research by investigating similar consumer behavior in other cities in India and hence validate the current set of attributes for a population representation from India.

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LIST OF TABLES

Table 1

Customers who purchased an appliance after 2010 and whether they paid more for the star rating

Purchase * More payment Crosstabulation

			More payment		
			Yes	No	Total
Purchase	Yes	Count	968	259	1227
		% within Purchase	78.9%	21.1%	100.0%
		% within More payment	97.5%	97.0%	97.4%
		% of Total	76.8%	20.6%	97.4%
	No	Count	25	8	33
		% within Purchase	75.8%	24.2%	100.0%
		% within More payment	2.5%	3.0%	2.6%
		% of Total	2.0%	.6%	2.6%
Total		Count	993	267	1260
		% within Purchase	78.8%	21.2%	100.0%
		% within More payment	100.0%	100.0%	100.0%
		% of Total	78.8%	21.2%	100.0%

Table 2

Chi-square test result

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.189[a]	1	.664		
Continuity Correction[b]	.048	1	.827		
Likelihood Ratio	.183	1	.669		
Fisher's Exact Test				.667	.399
Linear-by-Linear Association	.189	1	.664		
N of Valid Cases	1260				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.99.

b. Computed only for a 2x2 table

Table 3

Significance of star rating

			Frequency	Percent	Cumulative Percent
Valid	**Energy Saving**	Strongly agree	633	50.2	50.2
		Somewhat Agree	409	32.5	82.7
	Personal status	Strongly agree	398	31.6	31.6
		Somewhat Agree	386	30.6	62.2
	Environment	Strongly agree	594	47.1	47.1
		Somewhat Agree	386	30.6	77.8

Table 4

Model predictor for customers who purchased appliance after 2010

Observed			Predicted		
			Purchase		Percentage Correct
			No	Yes	
Step 1	Purchase	No	0	37	.0
		Yes	0	1223	100.0
	Overall Percentage				97.1

Table 5

Decision variables for star rating

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Brand and looks	-.062	.191	.104	1	.747	.940	.647	1.367
	Relatives and friends	-.085	.072	1.411	1	.235	.918	.797	1.057
	Salesman	-.276	.140	3.860	1	.049	.759	.576	.999
	Research	.486	.202	5.759	1	.016	1.625	1.093	2.416
	Easy EMI	-.179	.141	1.619	1	.203	.836	.634	1.102
	Free gifts	.281	.189	2.209	1	.137	1.324	.914	1.917
	Festival offers	.039	.185	.044	1	.833	1.040	.724	1.494
	Constant	3.355	.637	27.712	1	.000	28.646		

a. Variable(s) entered on step 1: Q.7.a, Q.7.b, Q.7.c, Q.7.d, Q.7.e.1, Q.7.e.2, Q.7.e.3.

Table 6

Model predictor for customers happy with purchase of star rated refrigerator

Classification Table[a]

Observed			Predicted		
			Happy with refrigerator		Percentage Correct
			No	Yes	
Step 1	Happy with refrigerator	No	0	65	.0
		Yes	0	1195	100.0
	Overall Percentage				94.8

a. The cut value is .500

Table 7

Decision variables for Refrigerator

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Energy saving	-.512	.197	6.783	1	.009	.599	.407	.881
	Modern looks	.060	.217	.078	1	.781	1.062	.694	1.625
	Branded labels	.409	.219	3.495	1	.062	1.505	.980	2.310
	More capacity	.687	.258	7.095	1	.008	1.987	1.199	3.294
	Constant	1.954	.367	28.350	1	.000	7.057		

a. Variable(s) entered on step 1: Q.11.1, Q.11.2, Q.11.3, Q.11.4.

Table 8

Model predictor for customers having star rated Air-Conditioners

Classification Table[a]

Observed			Predicted		
			Possess star rated AC		Percentage Correct
			No	Yes	
Step 1	Possess star rated AC	No	279	134	67.6
		Yes	161	686	81.0
	Overall Percentage				76.6

a. The cut value is .500

Table 9

Decision variables for Air-conditioners

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Energy saving	.014	.153	.008	1	.927	1.014	.751	1.369
	Convenient to use	.274	.141	3.754	1	.053	1.315	.997	1.735
	Smart technology	-.033	.139	.058	1	.810	.967	.737	1.269
	Modern Looks	1.000	.148	45.743	1	.000	2.720	2.035	3.634
	Health reasons	.712	.094	57.509	1	.000	2.038	1.696	2.450
	Constant	-2.467	.218	127.801	1	.000	.085		

a. Variable(s) entered on step 1: Q.14.1, Q.14.2, Q.14.3, Q.14.4, Q.14.5.

Table 10

Comparing customers who were able to measure energy saving and their decision on next purchase

Purchase impact * Measure energy saving Crosstabulation

Count

		Measure energy saving		
		1	2	Total
Purchase impact	1	830	382	1212
	2	15	33	48
Total		845	415	1260

Table 11

Chi square result

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	28.976[a]	1	.000		
Continuity Correction[b]	27.315	1	.000		
Likelihood Ratio	26.773	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	28.953	1	.000		
N of Valid Cases	1260				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.81.

b. Computed only for a 2x2 table