

***EXAMINING WITH DISCRIMINANT ANALYSIS THE DIFFERENCES OF
AUTOMOBILE CONSUMERS AT THE STAGE OF INFORMATION
SEARCHING IN ZONGULDAK REGION***

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Consumers' information search is the most troubled phase of the purchasing decision process. In this phase, consumers have trouble deciding which information type and information source to approach. In this study, whether consumers differ by their sex, marital status, educational level, income level, age group and ownership of goods in respect to their demand for information type and preferred information source is examined with discriminant analysis. When the assumptions (multivariate normality, equal covariance matrices, multicollinearity and linearity) of discriminant analysis are met, then discriminant analysis is the most appropriate classification technique. The discriminant analysis results point out that the discriminant functions of sex, marital status, educational level, income level, age group and ownership of goods in respect to their demand for information type and preferred information source account for a meaningful proportion of the differences among the groups.

Key Words: Information searching, automobile consumers and discriminant analysis.

ZONGULDAK BÖLGESİNDEKİ OTOMOBİL TÜKETİCİLERİNİN BİLGİ ARAŞTIRMASI AŞAMASINDAKİ FARKLILIKLARININ DİSKRİMİNANT (AYRIŞIM) ANALİZİYLE İNCELENMESİ

Satın alma sürecinde tüketicilerin bilgi edinmeleri aşaması en sorunlu aşamadır. Bu aşamada, tüketiciler hangi bilgi kaynaklarına başvuracağına karar vermede önemli güçlüklerle karşılaşmaktadır. Bu çalışmada otomobil tüketicilerinin cinsiyet, medeni durum, eğitim düzeyi, gelir düzeyi, yaş grubu ve otomobil sahipliği yönünden bilgi türleri ve bilgi kaynakları itibariyle farklılık gösterip göstermediği diskriminant analiziyle araştırılmaktadır. Diskriminant analizi, varsayımları (çoklu normal dağılım, eşit kovaryans, çoklu doğrusal bağlantı ve doğrusallık) sağlanması durumunda en uygun sınıflandırma tekniğidir. Diskriminant analizinin sonuçları otomobil tüketicileri arasında cinsiyet, medeni durum, eğitim ve gelir düzeyi, yaş grubu ve otomobil sahipliği yönünden bilgi türleri ve bilgi kaynakları itibariyle anlamlı farklılıkların olduğunu göstermektedir.

Anahtar Sözcükler: Bilgi araştırması, otomobil tüketicileri ve diskriminant analiz.

INTRODUCTION

Consumers' behaviour has come into marketers' area of interest after 1970s. Today, consumers' behaviour has become the focus for marketer's all actions. One of its most important subjects is how consumers advance through the purchasing decision processes, for goods and services to satisfy their needs. The answers of questions such as how consumers make pass their purchasing decisions processes, and how consumers are affected by which factors, and the direction and intensity of their effect will guide marketers.

Consumers decide to purchase a product through a decision making process which starts with identifying the problem, then searching for information, evaluating alternatives, purchasing goods or services and post purchase behaviour. Every phase of the purchasing decision process is very important for marketing managers. Consumers' information search behaviour is critical for planning and implementing all marketing mix. For this reason, it's not surprising that empirical research on consumers' information search behaviour has a long tradition in marketing (Moorthy et al; 1997:263).

Consumers' information search is the most troubled phase of the purchasing decision process. In this phase, consumers have trouble deciding which information type and information source to approach. A lot of candidate consumers can use a short time because of difficulties (such as geographical limitations, lack of time, incapacity of physical efforts, and lack of alternatives) on information search phase (Schiffman and Kanuk, 2004:197). Eventually, consumers may face a selection that doesn't meet their needs instead of a selection of ideal or the best alternative. As a result, consumer's needs and problems are not satisfied, and their problems will continue.

It could be thought that all problems about consumers' information searching behaviour were analyzed in the available research. However, there are some subjects remaining about information seeking behaviour. For example, it's an important question whether consumers' importance of information types and sources are different in respect to their demographics, socio-cultural properties, and whether the search is for using goods or services. If there are differences, it's not a realistic supposition what all consumers are homogenous by stated factors. On the other hand, on all phases of consumers' purchasing behaviour, consumers' attitudes and behaviours are different in respect to their cultural and personal characteristics. Past research points out that consumer' cultural and personal characteristics have an important

role on purchasing decision process (Solomon, Bamossy and Askegaard, 2002:241-245).

In this study, whether consumers differ by their sex, marital status, educational level, income level, age group and ownership of goods in respect to their demand for information type and preferred information source is examined with discriminant analysis.

1. CONSUMERS' INFORMATION SEARCH BEHAVIOUR

Information search behaviour is the process by which the consumers survey their environment for appropriate data to make reasonable decisions (Solomon, Bamossy and Askegaard, 2002:240). Consumers' information search attitude and behaviour is one of the most important phases of purchasing decision process. Consumers try to satisfy their needs and wants by passing phases respectively identifying their problem, searching for information (external and internal), evaluate alternatives, purchasing, and post purchasing behaviour. On all these phases, detailed research has been done for more than 40 years. The main objective of this research is to understand and model consumers' purchasing behaviour.

Marketers who know well and evaluate every phases of the purchasing decision process could increase their performance by implementing the marketing mix at right time and right amount (Tek, 1997:212). For an important subject for marketers are to offer right information which will form the basis to customers decision process. In order to offer right information to consumers, marketers have to select information type and source that consumers want to use (Mattila and Wirtz, 2002:214-230). A business that helps consumers' information search efforts better than others can gain a competitive advantage. Knowing which information search source at the information search phase of consumers' purchasing decision process is preferred whether consumers get information actively or passively from these information sources, and whether consumers differ in respect to experiences on goods or services, sex, age, education, and income, etc. is of importance.

Information sources can roughly be broken down into two kinds: internal and external (Solomon, Bamossy and Askegaard, 2002:241). Internal sources are prior experience and owned information of consumers about any product. If internal information is not sufficient, consumers tend to external sources for information search (Heaney and Goldsmith, 1999:305). The driver of external search behaviour is consumers' perception of risk about goods or service. The perception of risk means probability of not being satisfied after purchasing goods or services (Solomon,

Bamossoy and Askegaard, 2002:246). If the perception of risk is high, then consumers want to gather much more information. The perception of risk depends mostly on perception of uncertainty (Mitchell, 1999:187). Uncertainty is the situation where one can not estimate the results of purchasing decision process. If uncertainty is high, the risk is high, conversely it is low. While it is possible to minimize uncertainty by comparison and experiencing of features for goods, for services uncertainty is very important source of risk (Mitra, Reiss and Capella, 1999:212).

There have been numerous empirical researches on the information search stage of consumers' purchasing decision process. Anderson et al (1979) constructed a model for external information search for automobile purchasing. Their consumers sample consisted of Consumer Reports readers, and variables considered in the model were attitude toward business, product satisfaction, and experience. They found that the amount of information search was positively related to satisfaction, negatively related to business attitude, and positively related to experience. Srinivasan and Ratchford (1991) constructed a model for information search for automobile purchasing using the determinants of perceived benefits, perceived risk, size of evoked set, and amount of experience. The model supported a significant negative relationship between the amount of experience and search effort, with positive experience leading to lower risks and negative information search. Also, subjective knowledge or amount of information possessed internally tended to increase the benefit of search. Negative information search occurs when the consumer lessens the information search. Duffy and Wrigth (1993) tested a model for automobile purchasing using a cost-benefit analysis for information search. They found that a significant positive relationship between perceived benefit and information search. The amount of search had a positive effect on cost savings and customer satisfaction. It also had a direct positive effect on perceived benefit that, in turn, had a positive effect on consumer satisfaction. Alba and Hutchinson (2000) compared what consumers know and think to know information on goods or services. They found that consumers did not know about things what they thought to know. Chao and Gupta (1995) investigated whether new car buyers of domestic cars are more likely to make less efficient choices than new car buyers of foreign cars. They found that consumers were no more or less likely to engage in information search when considering either domestic or foreign cars. Mattila and Wirtz (2002) searched the effect of information type and source on consumers' purchasing decision process. They found that different information types and sources affected differently the purchasing decision process differently. Wilson (2000) stated that consumers

realized by logical process their information searching, and information using behaviour.

In Turkey, research on information search is very limited compared to foreign countries. Çalış (1995) investigated importance levels of information sources in 1995. She found that consumers' experiences are the most important information source. Levent (1999) researched consumers' information source, and he found that friends, relatives and neighbors are the most important information sources.

In this study, we are seeking the answers for these questions;

1. Do consumers differ by sex, marital status, educational level, income level, age group and automobile ownership in their choice of information type?

2. Do consumers differ by sex, marital status, educational level, income level, age group and automobile ownership in their choice of information source?

2. METHODOLOGY

A questionnaire was sent to a sample of 500 car consumers in Zonguldak region. For research purposes 486 questionnaires was found to be useful. The questionnaire was developed in line with questionnaires used for similar research. Projective research was used for developing the questionnaire. A pilot study was performed on 20 consumers, and tried to smooth out questionnaire's insufficiency.

Questionnaires are administered by "quota sampling" method. Quota sampling may be viewed as two-stage restricted judgmental sampling. The first stage consists of developing control categories, or quotas, of population elements. To develop these quotas, the researcher list relevant control characteristics in the target population. The relevant control characteristics, which may include sex, age, educational or income level, are identified on the basis of judgment. Often, the quotas are assigned so that the proportion of the sample elements possessing the control characteristics is the same as the proportion of population elements with these characteristics. In the second stage, sample elements are selected base on convenience or judgment. One the quotas have been assigned, there is considerable freedom in selecting the elements to be included in the sample. The only requirement is that the elements selected fit the control characteristics. The distributions of grouping variables are shown in Appendix 2. Variables on demographics and ownership are scaled as nominal scale. Information types and sources variables are measured on a five point Likert scale that ranged from very important to not important.

The sampling of research is automobile users. Because, an automobile is a product which is substantially complex, expensive, and infrequently purchased. So, on the purchasing decision process of automobiles, consumers undertake an intense search for information (internal and external) because of high level of risk perception (Chao and Gupta, 1995:48).

In attempting to choose an appropriate multivariate classification technique, discriminant analysis and logistic regression analysis are the appropriate statistical techniques when the dependent variable is categorical (nominal) and the independent variables are metric. In many cases, the dependent variable consists of two groups. In other cases, more than two groups are involved. Discriminant analysis is capable of either two groups or multiple groups. Logistic regression, also known as logit analysis, is limited in its basic form to two groups, although alternative formulations can handle more than two groups (Hair et al., 1998:224).

The choice between two techniques is depend on the assumptions made by the two techniques. Discriminant analysis assumes that the data come from multivariate normal distribution, whereas logistic regression analysis makes no such distributional assumption. Violation of multivariate normality affects the significance test and classification rates (Sharma, 1996:332). Since the multivariate normality assumption will clearly violated for a mixture of categorical and continuous variables, in such cases one should use logistic regression analysis. In the cases when there are no categorical variables, logistic regression analysis should be used when the multivariate normality is violated, and discriminant analysis should be used when the multivariate normality is not violated because discriminant analysis is computationally more efficient. In addition to this logistic regression is limited, however, to prediction of only a two-group dependent measure. Thus, in cases for which three or more groups form the dependent measure, discriminant analysis is better suited (Hair et al., 1998:246).

3. FINDINGS

3.1. *Evaluating the Significance of Discriminator Variables*

In discriminant analysis the first step is to evaluate the significance of the discriminator variables. Do the selected discriminating variables significantly differentiate between the groups? It appears that the means of each variable are different at least for one group.

Appendix 5 and Appendix 6 contain the tests of equality of group means of variables for the related grouping variable (sex, marital status, educational and

income level, age group and ownership of automobile), along with the corresponding F statistics and significances levels (p values). These statistics shows significance test for the equality of group means for each variables individually. The F values and their significance are the same as calculated from a one-way analysis of variance with the corresponding dependent (grouping) variable. According to 10% observed significance level, significance differences are identified for the variables KT01, KT06, KT10, KT13, KT14, KT15, KT18, KT19, KT20 and KT21 for the grouping variable of sex. Similarly, the significant variables for the other grouping variables are shown in Appendix 5 and Appendix 6.

3.2. *Estimating the Coefficients*

Descriptive statistics and univariate tests of significance provide basic information about distributions of the variables in the groups and help to identify some differences among the groups (SPSS Inc., 1999:253-255; Malhotra, 1996:625-632). However, in discriminant analysis and other multivariate statistical procedures, the emphasis is on analyzing the variables together, not at a time.

By considering the variables simultaneously, we are able to incorporate important information about their relationships. In discriminant analysis, a linear combination of independent variables is formed and serves as the basis for assigning cases to groups. Thus information contained in multiple independent variables is summarized in a single index.

The maximum number of discriminant functions that can be computed is the minimum $G-1$ or p , where G is the number of groups and p is the number of variables (Sharma, 1996:251; Malhotra, 1996:625-632). When the number of groups is equal to 2, only one discriminant function is possible. In discriminant analysis the next obvious question is: How many discriminant functions should one retain or use to adequately represent the differences among the groups? The question can be answered by evaluating the statistical significance and the practical significance of each discriminant function. That is, does the discriminant score of the respective discriminant function significantly differentiate among the groups? In Appendix 3 and Appendix 4, a significant chi-square value would imply that the second and maybe the following discriminant functions significantly explain the differences in the groups that were not explained by the first function. In Appendix 3 and Appendix 4, because the chi-square value for the second discriminant functions is not statistically significant at %5 significance level, first discriminant functions are needed to be interpreted.

As usual, statistically significant tests are sensitive to sample size. That is, for large sample size a discriminant function accounting for only a small difference among the groups might be statistically significant (Sharma, 1996:253, 302; Malhotra, 1996:625-632). Therefore, one must take also take into account the practical significance of a given discriminant function. Practical significance of discriminant function relates to assessing how large or how meaningful the differences between the two groups are. The practical significance of a discriminant function is assessed by the squared canonical correlation (CR^2) and the eigenvalues. The resulting canonical correlations for the first significant discriminant functions of sex, marital status, educational level, age group and ownership of automobile are respectively %31.2, %36.1, %37.6, %34.5, %25.2. In general, a correlation coefficient greater than %30 is accepted significant, if the correlation coefficient greater than %50 is considered rather significant. Significant values (not very high) of CR^2 's suggest that the discriminant functions account for a meaningful proportion of the differences among the groups.

One can also use the eigenvalues to assess the practical significance of the discriminant functions. Recall that eigenvalue is equal to SS_b/SS_w .¹ The greater the value of eigenvalue for a given discriminant function, the greater the ability of that discriminant function to discriminate among the groups. Therefore, the eigenvalue of a given discriminant function can also be used as a measure of its practical significance. In discriminant analysis, where dependent variables are educational level and age group for knowledge type data, the first discriminant functions account for %73.7 and %77.5 of the possible differences among the groups and the second functions account the remaining %26.3, %22.5 of the differences among the groups respectively. Together, the discriminant functions account for all (%100) of the possible differences among the groups. In present case only the first discriminant functions are needed to account for a significant portion of total differences among the groups. This assertion is also supported by the low values of CR^2 .

3.3. Assessing the Importance of Discriminant Variables and the Meaning of Discriminant Function

The standard discrimination coefficients for the knowledge type data (23 variables) and knowledge sources data are shown in Appendix 7 and Appendix 8 respectively. If the discriminant analysis is done on standardized data then the resulting discriminant

function is referred to as standardized canonical discriminant function. Standardized coefficients are normally used for assessing the relative importance of discriminator variables forming discriminant function. The greater the standardized coefficient, the greater the relative importance of a given variable and vice versa. From Appendix 7, the discriminant analysis where the dependent variable is marital status, it appears that the variables of KT03 (%34.7), KT11 (-%46.9), KT18 (-%56.3), KT19 (%53.2) and KT20 (%30.7) are relatively more important than the remaining variables in forming the discriminant function.

Similarly, the most important discriminator variables for the first discriminant functions of sex, educational level, income level, age group and ownership of automobile are KT12 (-%58.5), KT05 (%46.2), KT08 (%64.2), KT18 (-%71.2) and KT19 (-%51) respectively. On the other hand, from Appendix 8 (Knowledge Source Data), the most important discriminator variables for the first discriminant functions of sex, marital status, educational level, income level, age group and ownership of automobile are KS12 (-%66.9), KT05 (%58.9), KS15 (%50.8), KS11 (%69.8), KS05 (-%52.1) and KS15 (-%74.3) respectively.

3.4. Labeling the Discriminant Functions

3.4.1. Labeling the Discriminant Functions for the Knowledge Type Data

The structure matrix gives the simple correlation between the attributes and the discriminant scores (Appendix 9 and Appendix 10). The higher the loading of a given variable (or attribute) on a function, the more representative function is of that attribute (SPSS Inc, 1999, p: 277-278). KT15 (%39.4), KT13 (%36.8), KT14 (%35.5), KT20 (%34.2) and KT18 (%31) have a significant (high) loading on the first discriminant function where the dependent variable is sex and therefore this function is labeled "*design and security*" to represent the design and security of the car (App. 9).

KT19 (%49.5), KT11 (-%39.7), KT18 (-%36.1), KT02 (%31) and KT03 (%30) have a significant (high) loading on the second discriminant function where the dependent variable is marital status and therefore this function is labeled "*capacity and services*" to represent the design and security of the car (Appendix 9). KT05 (%54.3), KT04 (%54.2), KT03 (%41.9), KT12 (%37.9), KT02 (%37.5), BT06 (%34.9) and KT10 (%31) have a significant (high) loading on the first discriminant function where the dependent variable is educational level and therefore this function is labeled "*guarantee and services opportunity*" to represent guaranty and services opportunities of the car. KT07 (%63.3), KT09

¹ Where SS_b is Sum of the Squares Between and SS_w is Sum of the Squares Within.

(%51.4), KT16 (%41.6), KT11 (%35.9), KT17 (%34.6), BT18 (%29.9) have a significant (high) loading on the second discriminant function where the dependent variable is educational level and therefore this function is labeled “*design, services and selling facility*” to represent the design, services and selling facilities of the car (Appendix 9).

KT03 (%45.6), KT04 (%44.1), KT08 (-%40.3) and KT02 (%33.5) have a significant (high) loading on the second discriminant function where the dependent variable is income level and therefore this function is labeled “*spare parts, technological attributes and fuel consumption*”. KT12 (%51) have a significant (high) loading on the second discriminant function where the dependent variable is income level and therefore this function is labeled “*durability*” to represent the durability of the car.

KT02 (%37.4), KT18 (-%37.1) and KT05 (%36.8) have a significant (high) loading on the first discriminant function where the dependent variable is age group and therefore this function is labeled “*fuel consumption, external design and guarantee*” to represent fuel consumption, external design and guarantee of the car. KT04 (%53.4), KT12 (%29.9) and KT10 (%29.5) have a significant (high) loading on the second discriminant function where the dependent variable is age group and therefore this function is labeled “*spare part and durability*” to represent spare part facility and durability level of the car (Appendix 9).

KT06 (%44.9), KT12 (%34.8), KT19 (-%33.2), KT18 (%33.1) and KT07 (%31.6) have a significant (high) loading on the first discriminant function where the dependent variable is ownership of automobile and therefore this function is labeled “*selling facilities and durability*” to represent selling facilities and durability level of the car (Appendix 9).

3.4.2. Labeling the Discriminant Functions for the Knowledge Source Data

The structure matrix for the knowledge source data are given in Appendix 10. Based on these results the discriminant functions are labeled as follow: KS10 (%58.3), KS11 (%57.3), KS09 (%52.5), KS08 (%41.4), KS04 (%40.9) and KS07 (%36.6) have a significant loading on the first discriminant function where the dependent variable is sex and therefore this function is labeled “*sales representative, television, newspaper and magazines*”.

KS05 (%54.1), KS03 (%48.3) and KS01 (%44) have a significant (high) loading on the first discriminant function where the dependent variable is marital status and therefore this function is labeled “*service persons, accumulation and experiences*” .

KS13 (-%37.1), KS12 (-%36), KS15 (%32.6) and KS01 (%32.3) have a significant (high) loading on the first discriminant function where the dependent variable is educational level and therefore this function is labeled “*internet, web pages, test driving and experiences*” (Appendix 10). KS05 (%54.5) and KS04 (%32.2) have a significant (high) loading on the second discriminant function where the dependent variable is educational level and therefore this function is labeled “*showroom and experiences*” (Appendix 10).

KS12 (%35.5), KS13 (%31.1) and KS05 (-%30.3) have a significant (high) loading on the first discriminant function where the dependent variable is income level and therefore this function is labeled “*web pages, television and service persons*” (Appendix 10). KS04 (-%36.1) and KS01 (%34.2) have a significant (high) loading on the second discriminant function where the dependent variable is income level and therefore this function is labeled “*relatives and experiences*” (Appendix 10).

KS01 (-%48.3), KS11 (%44.9), KS03 (-%43.8), KS14 (%43.5) and KS15 (%33.6) have a significant (high) loading on the first discriminant function where the dependent variable is age group and therefore this function is labeled “*experiences, televisions, showrooms and test driving*” (Appendix 10). KS02 (%51.1), KS04 (%38.8) and KS06 (%32.9) have a significant (high) loading on the second discriminant function where the dependent variable is age group and therefore this function is labeled “*friends, relatives and neighborhoods*” .

KS01 (%48.3), KS03 (%36.4) and KS15 (-%36.3) have a significant (high) loading on the first discriminant function where the dependent variable is ownership of automobile and therefore this function is labeled “*experiences, accumulation and test driving*” (Appendix 10).

CONCLUSION

Consumers’ information seeking behaviour is very important for marketers. Consumers deeply seek in formations to minimize risks of their decisions at information searching phase of the purchasing decision process. However, marketers posit that consumers are homogeneous and do not differ by demographic, psychological, and social factors in their promotion mix. But, consumers may have different attitudes and behaviours by their seeking information type and information source. As things stand, prepared promotion program will not incur same effects on all target consumers. If consumers are different by their sex, marital status, educational and income level, age group and ownership of automobile for seeking information type and source, then these differences must be

considered in preparing promotion mix to get competitive advantage. Thus, consumers may get information type which they just want through information source which they prefer and may easily pass the information seeking phase with an eye to minimize their risks.

In this research, consumers' importance about information types and sources was investigated through information seeking phase of the purchasing decision process. Information types and sources variables are measured on a five point Likert scale that ranged from very important to not important. The discriminant analysis was performed by SPSS 11.5 statistical package. Results show that consumers are inside of different groups by their seeking of information types and sources.

The discriminant analysis results point out that the discriminant functions of sex, marital status, educational and income level, age group and ownership of goods in respect to their demand for information type and preferred information source account for a meaningful proportion of the differences among the groups.

The discriminant analysis results for the knowledge type data show that the most important attributes for grouping variables of sex, marital status, educational and income level, age group and ownership of automobile are related with "*design and security,*" "*capacity and services,*" "*guarantee and services opportunity,*" "*spare parts, technological attributes and fuel consumption,*" "*fuel consumption, external design and guarantee*" respectively.

On the other hand the discriminant analysis results for the knowledge source data show that the most important attributes for grouping variables of sex, marital status, educational and income level, age group and ownership of automobile are related with "*sales representative, television, newspaper and magazines,*" "*service persons, accumulation and experiences,*" "*internet, web pages, test driving and experiences,*" "*showroom and experiences,*" "*web pages, television and service persons,*" "*relatives and experiences,*" "*experiences, televisions, showrooms and test driving,*" "*experiences, accumulation and test driving*" respectively.

Appendix 1: Description of Grouping (Dependent) and Discriminator Variables

CODE	DESCRIPTION OF VARIABLES
<u>Grouping (Dependent) Variables</u>	
N01	Sex (1 = Male; 2 = Female)
N02	Marital Status (1 = Married; 2 = Unmarried)
N03	Educational Level (1 = Low; 2 = Middle; 3 = High)
N04	Age Group (1 = Below 30 Age; 2 = 30-40 Age; 3 = Upper 40 Age)
N05	Ownership of Automobile (1 = Yes; 2 = No)
N06	Income Level (1(Low)= <750; 2 (Middle) = 751-1500; 3 (High)= Upper 1501)
<u>Discriminator (Independent) Variables: Knowledge Type Attributes (KT)</u>	
KT01	The importance level of information about price
KT02	The importance level of information about fuel consumption
KT03	The importance level of information about spare part price
KT04	The importance level of information about spare part availability
KT05	The importance level of information about guarantee opportunities
KT06	The importance level of information about payments facilities
KT07	The importance level of information about the ability of selling in used markets
KT08	The importance level of information about technological attributes
KT09	The importance level of information about services opportunities
KT10	The importance level of information about horsepower
KT11	The importance level of information about services attributes
KT12	The importance level of information about durability
KT13	The importance level of information about usage facility
KT14	The importance level of information about model
KT15	The importance level of information about color
KT16	The importance level of information about services type
KT17	The importance level of information about internal design
KT18	The importance level of information about external design
KT19	The importance level of information about baggage capacity
KT20	The importance level of information about security attributes
KT21	The importance level of information about comfort
KT22	The importance level of information about passenger capacity
KT23	The importance level of information about accessory
<u>Discriminator (Independent) Variables: Knowledge Source Attributes (KS)</u>	
KS01	The importance level of information obtained from experiences
KS02	The importance level of information obtained from friends
KS03	The importance level of information accumulation
KS04	The importance level of information obtained from relatives
KS05	The importance level of information obtained from repairman and Services Persons
KS06	The importance level of information obtained from neighborhoods
KS07	The importance level of information obtained from advertisement brochures
KS08	The importance level of information obtained from magazines
KS09	The importance level of information obtained from newspaper
KS10	The importance level of information obtained from sales representatives
KS11	The importance level of information obtained from televisions
KS12	The importance level of information obtained from web pages
KS13	The importance level of information obtained from internet
KS14	The importance level of information obtained from showrooms
KS15	The importance level of information obtained from test driving

Appendix 2: Frequencies Distributions of Grouping Variables

Income Level (Mil.)		Educational Level		Age Group		Sex		Married		Ownership	
Category	Frequency	Category	Frequency	Category	Frequency	Category	Frequency	Category	Frequency	Category	Frequency
<750	140	Primary	46	< 30	192	Male	364	Yes	474	Yes	329
751<1500	189	Middle	183	30-40	174	Female	122	No	12	No	157
>1500	157	High	257	> 40	120						
Total	486	Total	486	Total	486	Total	486	Total	486	Total	486

Appendix 3: Eigenvalues and Wilks' Lambda of Discriminant Function for Knowledge Type Data

Eigenvalues										
	Sex	Marital Status	Educational Level	Income Level	Age Group	Ownership				
Eigenvalue	,108	,150	,164	,059	,148	,060	,135	,039	,068	
% of Variance	100	100	73,7	26,3	70,9	29,1	77,5	22,5	100	
Cumulative %	100	100	73,7	100	70,9	100	77,5	100	100	
Canonical Correlation	<u>,312</u>	<u>,361</u>	<u>,376</u>	<u>,236</u>	<u>,359</u>	<u>,239</u>	<u>,345</u>	<u>,195</u>	<u>,252</u>	
Wilks' Lambda										
	Sex	Marital Status	Educational Level	Income Level	Age Group	Ownership				
Wilks' Lambda	,90	,87	,81	,94	,822	,94	,847	,962	,936	
Chi-square	48,36	64,19	98,78	26,96	96,62	27,70	78,120	18,214	31,027	
df	23	23	46	22	48	23	46	22	23	
Sig.	<u>,002</u>	<u>,000</u>	<u>,000</u>	<u>,213</u>	<u>,000</u>	<u>,228</u>	<u>,002</u>	<u>,693</u>	<u>,122</u>	

Appendix 4: Eigenvalues and Wilks' Lambda of Discriminant Function(s) for the Knowledge Source Data

Eigenvalues										
	Sex	Marital Status	Educational Level	Income Level	Age Group	Ownership				
Eigenvalue	,132	,090	,152	,047	,129	,084	,086	,014	,089	
% of Variance	100	100	76,2	23,8	60,7	39,3	85,7	14,3	100	
Cumulative %	100	100	76,2	100	60,7	100	85,7	100	100	
Canonical Correlation	<u>,342</u>	<u>,287</u>	<u>,363</u>	<u>,213</u>	<u>,338</u>	<u>,278</u>	<u>,281</u>	<u>,119</u>	<u>,286</u>	
Wilks' Lambda										
	Sex	Marital Status	Educational Level	Income Level	Age Group	Ownership				
Wilks' Lambda	,883	,918	,829	,955	,817	,923	,908	,986	,918	
Chi-square	39,626	39,935	89,243	22,048	96,14	38,22	45,852	6,772	40,636	
df	15	15	30	14	30	14	30	14	15	
Sig.	<u>,001</u>	<u>,000</u>	<u>,000</u>	<u>,078</u>	<u>,000</u>	<u>,000</u>	<u>,032</u>	<u>,943</u>	<u>,000</u>	

Appendix 5: Tests of Equality of Group Means for Knowledge Type Data

Code	Sex		Marital Status		Educational Level		Income Level		Age Group		Ownership	
	F	Sig.	F	Sig.	F	Sig.	F	Sig.	F	Sig.	F	Sig.
KT01	2,930	<u>.088</u>	,747	,388	,645	,525	,772	,463	1,500	,224	1,105	,294
KT02	1,026	,312	6,772	<u>.010</u>	5,616	<u>.004</u>	3,400	<u>.034</u>	4,626	<u>.010</u>	,041	,840
KT03	,416	,519	6,351	<u>.012</u>	6,965	<u>.001</u>	6,884	<u>.001</u>	2,909	<u>.055</u>	,067	,795
KT04	,002	,962	1,475	,225	11,794	<u>.000</u>	5,902	<u>.003</u>	4,842	<u>.008</u>	,149	,700
KT05	,279	,598	2,854	<u>.092</u>	11,912	<u>.000</u>	1,625	,198	4,461	<u>.012</u>	2,605	,107
KT06	2,969	<u>.086</u>	,402	,526	5,424	<u>.005</u>	,942	,391	,139	,871	6,623	<u>.010</u>
KT07	,611	,435	,636	,426	6,105	<u>.002</u>	2,713	<u>.067</u>	,272	,762	3,272	<u>.071</u>
KT08	,207	,649	,553	,457	,194	,824	5,692	<u>.004</u>	1,255	,286	,001	,979
KT09	1,127	,289	1,446	,230	4,529	<u>.011</u>	,070	,932	1,219	,296	,797	,373
KT10	3,061	<u>.081</u>	,634	,426	4,412	<u>.013</u>	,472	,624	,868	,421	,908	,341
KT11	1,317	,252	11,127	<u>.001</u>	4,283	<u>.014</u>	,235	,791	2,169	,115	1,410	,236
KT12	1,908	,168	1,924	,166	6,943	<u>.001</u>	1,817	,164	1,747	,175	3,972	<u>.047</u>
KT13	7,067	<u>.008</u>	,688	,407	,927	,397	1,452	,235	1,585	,206	1,166	,281
KT14	6,563	<u>.011</u>	,557	,456	,646	,525	4,596	<u>.011</u>	1,067	,345	1,293	,256
KT15	8,080	<u>.005</u>	4,482	<u>.035</u>	,663	,516	,060	,942	,662	,516	2,689	,102
KT16	2,174	,141	,458	,499	3,074	<u>.047</u>	,162	,850	,657	,519	,046	,831
KT17	,981	,323	2,559	,110	4,154	<u>.016</u>	,778	,460	,947	,389	1,733	,189
KT18	5,010	<u>.026</u>	9,183	<u>.003</u>	1,915	,148	1,279	,279	4,537	<u>.011</u>	3,591	<u>.059</u>
KT19	4,446	<u>.035</u>	17,298	<u>.000</u>	2,215	,110	2,011	,135	3,849	<u>.022</u>	3,631	<u>.057</u>
KT20	6,093	<u>.014</u>	4,435	<u>.036</u>	,528	,590	,391	,677	1,577	,208	,477	,490
KT21	2,773	<u>.097</u>	1,945	,164	2,096	,124	1,016	,363	1,406	,246	,004	,951
KT22	,453	,501	4,695	<u>.031</u>	,181	,834	,580	,561	1,074	,342	1,168	,280
KT23	,912	,340	4,958	<u>.026</u>	1,559	,211	1,829	,162	1,748	,175	,072	,789

Appendix 6: Tests of Equality of Group Means for Knowledge Source Data

Code	Sex		Marital Status		Educational Level		Income Level		Age Group		Ownership	
	F	Sig.	F	F	F	Sig.	F	Sig.	F	Sig.	F	Sig.
KS01	1,364	,244	8,214	<u>.004</u>	3,835	<u>.022</u>	2,371	<u>.094</u>	4,975	<u>.007</u>	10,033	<u>.002</u>
KS02	1,090	,297	,837	,361	,628	,534	1,859	,157	1,076	,342	,147	,701
KS03	2,923	<u>.088</u>	9,878	<u>.002</u>	,392	,676	,187	,829	4,368	<u>.013</u>	5,710	<u>.017</u>
KS04	7,228	<u>.008</u>	,526	,469	1,847	,159	2,645	<u>.072</u>	1,023	,360	,169	,681
KS05	,436	,509	12,411	<u>.000</u>	7,469	<u>.001</u>	3,492	<u>.031</u>	1,643	,194	,031	,860
KS06	2,137	,145	1,211	,272	,297	,743	,426	,654	2,077	,126	2,927	<u>.088</u>
KS07	5,773	<u>.017</u>	,322	,571	,673	,511	,913	,402	,299	,742	1,074	,301
KS08	7,410	<u>.007</u>	1,802	,180	1,942	,144	,691	,502	,881	,415	,232	,630
KS09	11,912	<u>.001</u>	2,103	,148	,410	,664	1,045	,353	,696	,499	,019	,889
KS10	14,687	<u>.000</u>	,032	,857	1,562	,211	2,305	,101	1,154	,316	3,177	<u>.075</u>
KS11	14,188	<u>.000</u>	2,942	<u>.087</u>	1,226	,294	3,000	<u>.051</u>	4,157	<u>.016</u>	2,781	<u>.096</u>
KS12	1,038	,309	,836	,361	4,829	<u>.008</u>	4,023	<u>.018</u>	1,311	,270	,005	,942
KS13	3,503	<u>.062</u>	,073	,787	5,704	<u>.004</u>	3,042	<u>.049</u>	1,084	,339	,017	,897
KS14	1,422	,234	3,031	<u>.082</u>	,605	,547	2,778	<u>.063</u>	4,468	<u>.012</u>	,915	,339
KS15	,021	,884	,421	,517	4,417	<u>.013</u>	1,795	,167	2,344	<u>.097</u>	5,690	<u>.017</u>

Appendix 7: Standardized Canonical Discriminant Function Coefficients for the Knowledge Type Data

Code	Sex	Marital Status	Educational Level		Income Level		Age Group		Ownership
	F-1	F-1	F-1	F-2	F-1	F-2	F-1	F-2	F-1
KT01	,118	-,083	-,367	,102	,336	,121	,085	,035	-,318
KT02	,036	,222	,260	,022	-,278	-,120	,210	-,282	-,076
KT03	-,061	,347	,201	-,311	-,305	,276	,220	-,077	,000
KT04	-,028	-,130	,220	-,030	-,167	-,162	,018	,717	-,168
KT05	-,371	,113	,462	-,031	-,157	-,292	,377	-,279	,176
KT06	,228	-,112	,178	-,012	-,079	-,055	-,190	-,183	,483
KT07	-,030	-,037	-,055	,611	-,271	,080	-,331	,063	,252
KT08	-,044	-,063	-,216	-,423	,642	-,198	,225	-,216	-,223
KT09	,038	-,087	-,095	,590	-,011	-,149	-,123	-,020	,168
KT10	,100	,176	,261	-,240	-,173	,043	,224	,518	,053
KT11	,240	-,469	,031	,378	-,057	,136	-,361	-,144	,092
KT12	-,585	,221	,268	,159	-,196	-,156	,124	,304	,284
KT13	,391	-,087	-,142	-,075	-,007	,265	,108	,098	,018
KT14	,180	-,027	-,036	-,006	,086	,465	,090	,265	-,193
KT15	,310	-,077	,030	-,166	-,002	-,138	-,018	,225	,313
KT16	-,102	,212	-,345	,401	,045	-,166	,260	-,532	-,196
KT17	-,462	,092	,351	,116	-,054	,541	,137	-,010	,100
KT18	,491	-,563	-,162	,041	-,211	-,584	-,712	,200	,336
KT19	,327	,532	,218	-,084	,268	,290	,274	,056	-,510
KT20	,459	,307	-,388	-,167	,159	,108	,204	-,167	,046
KT21	,092	-,178	,097	,034	-,070	,349	-,294	-,313	-,271
KT22	-,170	,140	-,277	-,154	,134	-,088	,116	-,180	-,096
KT23	-,465	-,233	,092	,187	,120	-,391	,085	,035	-,032

Appendix 8: Standardized Canonical Discriminant Function Coefficients for Knowledge Source Data

Code	Sex	Marital Status	Educational Level		Income Level		Age Group		Ownership
	F-1	F-1	F-1	F-2	F-1	F-2	F-1	F-2	F-1
KS01	,038	,244	,409	,038	,006	,602	-,353	,151	,447
KS02	-,007	,016	-,031	-,457	,357	,067	,072	,439	,132
KS03	-,413	,372	-,155	,137	,061	-,384	-,364	,251	,280
KS04	,562	-,050	-,250	,413	-,003	-,551	,065	,292	,057
KS05	-,448	,589	,206	,583	-,178	-,329	-,521	-,279	,221
KS06	-,231	,168	,289	-,134	-,309	,465	,318	,057	-,480
KS07	,195	,471	,334	-,067	-,212	,428	-,322	,264	-,047
KS08	-,190	-,308	-,431	,640	,221	-,118	,101	,496	,028
KS09	,418	-,302	-,126	-,338	,385	-,213	-,030	-,581	,226
KS10	,618	,049	,273	,257	-,288	,671	,064	-,433	-,378
KS11	,200	-,331	,478	-,334	-,698	-,579	,442	-,146	-,328
KS12	-,669	-,303	-,371	,180	,493	-,252	-,004	,289	,122
KS13	,402	,393	-,434	-,450	,145	,100	-,131	-,211	,039
KS14	-,114	-,222	-,295	,155	,600	,159	,177	,577	,708
KS15	-,003	-,261	,508	-,435	-,490	,054	,496	-,302	-,743

Appendix 9: Structure Matrix for Knowledge Type (KT) Data

Code	Sex		Marital Status		Educational Level		Income Level			Age Group			Ownership	
	F-1	Code	F-1	Code	F-1	F-2	Code	F-1	F-2	Code	F-1	F-2	Code	F-1
KT15	,394	KT19	,495	KT05	,543	,119	KT03	,456	,198	KT02	,374	-,079	KT06	,449
KT13	,368	KT11	-,397	KT04	,542	,091	KT04	,441	-,033	KT18	-,371	,071	KT12	,348
KT14	,355	KT18	-,361	KT03	,419	,013	KT08	-,403	-,231	KT05	,368	-,050	KT19	-,332
KT20	,342	KT02	,310	KT12	,379	,295	KT02	,335	,020	KT19	,343	-,004	KT18	,331
KT18	,310	KT03	,300	KT02	,375	,055	KT07	,281	,147	KT03	,289	,140	KT07	,316
KT19	,292	KT23	-,265	KT06	,349	,204	KT12	,241	-,062	KT11	-,255	,063	KT15	,286
KT10	,242	KT22	,258	KT10	,310	,204	KT06	,173	-,049	KT23	-,227	-,086	KT05	,282
KT06	,239	KT15	-,252	KT19	,235	,033	KT10	,124	-,017	KT01	,212	,056	KT17	,230
KT01	,237	KT20	,251	KT13	,133	,127	KT22	-,123	,092	KT20	,211	-,117	KT11	,207
KT21	,231	KT05	,201	KT15	,117	,090	KT11	,084	-,039	KT13	,199	,176	KT14	-,198
KT16	,204	KT17	-,190	KT08	,064	,046	KT09	,042	,034	KT21	-,194	-,135	KT22	-,189
KT12	-,191	KT21	-,166	KT07	,103	,633	KT14	-,163	,510	KT09	,192	,044	KT13	,188
KT11	,159	KT12	,165	KT09	,141	,514	KT19	-,179	,267	KT22	,173	-,099	KT01	-,183
KT09	,147	KT04	,145	KT16	-,125	,416	KT23	-,161	-,267	KT14	,169	,120	KT10	,166
KT02	,140	KT09	,143	KT11	,249	,359	KT13	,123	,261	KT17	-,167	,058	KT09	,156
KT17	,137	KT01	,103	KT17	,249	,346	KT21	,036	,259	KT15	-,132	,097	KT20	,120
KT23	-,132	KT13	,099	KT18	,127	,299	KT05	,181	-,208	KT07	-,091	,000	KT04	,067
KT07	,108	KT07	,095	KT21	,174	,251	KT18	,158	-,190	KT04	,255	,534	KT23	,047
KT22	,093	KT10	-,095	KT23	,143	,230	KT01	-,107	,170	KT12	,166	,299	KT03	,045
KT03	,089	KT14	,089	KT14	-,017	,211	KT17	,117	,158	KT10	,035	,295	KT16	,037
KT05	-,073	KT08	-,089	KT20	-,047	,176	KT20	-,065	,134	KT16	-,034	-,255	KT02	-,035
KT08	,063	KT16	-,081	KT01	-,109	,110	KT16	-,042	-,086	KT08	,163	-,201	KT21	-,011
KT04	-,007	KT06	,075	KT22	,024	,106	KT15	,030	-,047	KT06	,047	-,084	KT08	,005

Appendix 10: Structure Matrix for Knowledge Source (KS) Data

Code	Sex		Marital Status		Educational Level		Income Level			Age Group			Ownership	
	F-1	Code	F-1	Code	F-1	F-2	Code	F-1	F-2	Code	F-1	F-2	Code	F-1
KS10	,583	KS05	,541	KS13	-,371	-,239	KS12	,355	-,066	KS01	-,483	,215	KS01	,483
KS11	,573	KS03	,483	KS12	-,360	-,079	KS13	,311	-,033	KS11	,449	-,002	KS03	,364
KS09	,525	KS01	,440	KS15	,326	-,216	KS05	-,303	-,177	KS03	-,438	,344	KS15	-,363
KS08	,414	KS14	-,267	KS01	,323	,030	KS14	,272	,152	KS14	,435	,402	KS10	-,272
KS04	,409	KS11	-,263	KS11	,170	-,120	KS11	-,261	-,207	KS15	,336	-,037	KS06	-,261
KS07	,366	KS09	-,223	KS14	-,125	-,056	KS02	,240	,052	KS05	-,277	-,132	KS11	-,254
KS13	,285	KS08	-,206	KS07	,123	,103	KS15	-,229	,090	KS10	,235	-,065	KS07	-,158
KS03	-,260	KS06	,169	KS09	-,104	,034	KS09	,163	-,102	KS09	,183	,012	KS14	,146
KS06	,222	KS02	,141	KS06	,082	,068	KS08	,141	-,060	KS02	,091	,511	KS08	-,073
KS14	,181	KS12	-,140	KS05	,333	,545	KS04	,014	-,361	KS04	,156	,388	KS04	-,063
KS01	-,178	KS04	,111	KS04	-,135	,322	KS01	,018	,342	KS06	,287	,329	KS02	,058
KS02	,159	KS15	-,100	KS08	-,170	,277	KS10	-,155	,277	KS12	,221	,296	KS05	-,027
KS12	,155	KS07	,087	KS02	-,010	-,233	KS07	-,062	,198	KS08	,181	,241	KS09	-,021
KS05	-,100	KS13	-,042	KS10	,170	,211	KS06	-,090	,092	KS07	,072	,236	KS13	,020
KS15	-,022	KS10	-,028	KS03	,069	,137	KS03	,048	-,076	KS13	,212	,212	KS12	-,011

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