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Information search behaviour among new car buyers: A two-step cluster analysis

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Abstract A two-step cluster analysis of new car buyers in India was performed to identify taxonomies of search behaviour using personality and situational variables, apart from sources of information. Four distinct groups were found—broad moderate searchers, intense heavy searchers, low broad searchers, and low searchers. Dealers can identify the members of each segment by measuring the variables used for clustering, and can then design appropriate communication strategies.

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Introduction

Information search behaviour, which follows the stage of need recognition, is an important stage of a consumer's buying process. The importance of this stage is highlighted by Wilkie and Dickson (1985), who say that 'information search represents the primary stage in which marketing can provide information and influence consumers' decisions'. With consumers adopting different search strategies, identifying the patterns of their information search behaviour is a challenge for practising managers and

academicians. The allocation of resources across different sources of information depends on the understanding of the patterns of information search behaviour, which is crucial for managers.

One stream of research on search behaviour deals with the identification of the patterns of external information search behaviour, taking into consideration the amount of external search effort, decision time, sources of information search, and the involvement of others in information search (Claxton, Fry, & Portis, 1974; Furse, Punj, & Stewart, 1984; Katona & Mueller, 1955; Kiel & Layton, 1981; Klein & Ford, 2003; Newman & Staelin, 1972; Westbrook & Fornell, 1979). The results clearly indicate that there are distinct patterns of information search, i.e., there seem to be customers with distinct clusters/segments of search behaviour.

The studies on external information search behaviour have largely been conducted in the West. Moreover, most of the studies did not consider personality related variables in identifying the patterns of information search. It is essential to understand 'personality' to know more about an individual. Personality traits deal with temporally and situationally invariant personal characteristics (i.e., dispositions) that distinguish different individuals, and lead to consistencies in behaviour across situations and over time

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(Baumgartner, 2002). Individuals will adopt certain behaviour patterns that are representative of their personality, and as a consequence will follow different behavioural strategies while purchasing a product (Engel, Blackwell, & Kollat, 1978; Engel, Blackwell, & Miniard, 1990; Howard & Sheth, 1969). Hence it is important to consider personality variables in order to understand consumer behaviour.

The present study intends to extend earlier research in a few ways. First, we consider personality related variables while identifying the patterns of information search behaviour. Previous studies did not take personality related variables into consideration for identifying the distinct segments of customers based on their information search strategies; these studies mainly concentrated on search time, decision time, and sources of information. Second, the present study is conducted in India; most prior research was conducted in the West. Third, using a two-step cluster analysis, we identify the significant criterion variables which segregate the different groups. This will provide significant insights for practising managers to devise strategies to suit different segments of consumers based on their search strategy.

Literature review

Pre-purchase information search was initially considered to be a relatively limited activity (Farley, 1964; March & Simon, 1964; Stigler, 1961), and as a consequence, early work on external pre-purchase information search behaviour used a unidimensional measure of search activity—either a single aspect of search activity, or some aggregate measure (Newman & Staelin, 1971, 1972). Claxton et al. (1974) depart from this basic proposition, and show that patterns of information gathering could be identified within observed search behaviour. In order to generate clusters, they consider factors such as the number of information sources used, the total number of visits to stores, and the time taken for deliberation. Their results identify three distinct groups—thorough (store intense), thorough (balanced), and non-thorough groups.

Kiel and Layton (1981) use three dimensions of information seeking—source, time, and brand—to develop a taxonomy of consumer external search behaviour. Their results indicate three clusters—a high search group, a low search group, and selective information seekers. And the variables of the different dimensions show a complex relationship with the search behaviours of the different groups.

Westbrook and Fornell (1979) classify the respondents based on the extent of physical shopping, and the use of neutral sources versus personal sources while searching for pre-purchase information. Their findings show four segments—objective shoppers, moderate shoppers, store intense shoppers, and personal advice seekers. The buyer's age and education, her/his satisfaction with a previously purchased product and the working condition of the same, the evoked set size, and joint husband-wife decision making are shown to influence the information seeking process.

Furse et al. (1984) are the first to show the involvement of others in the information search activity. They identify six distinct external information search patterns among the

purchasers of new cars, of which four—low search group, high search group, retail shopper group, and moderate search group—are similar to those identified in previous studies. The other two groups—purchase-pal assisted search group, and high self-search group—are profiled for the first time in this study. This finding was also validated from self-report data collected from sales people. The premise under which the findings were validated from sales people was that if consumers were using different search strategies, then some dimensions of their search behaviour would be observed by the sales people as well. The results supported this assumption as the sales people data also showed a six-cluster solution which closely resembled the groups identified by the consumer data.

Urbany, Dickson, and Wilkie (1989) investigate how uncertainty of choice and uncertainty of knowledge influence search and shopping behaviour. Their results show differing search and shopping activity for the four groups of respondents, classified on two dimensions each of knowledge uncertainty (high and low) and choice uncertainty (high and low). Though the study was not primarily aimed at identifying the distinct segments of consumers based on their search strategy, it did indicate the significance of personality variables like uncertainty in differentiating the external search behaviour.

Klein and Ford (2003) in their study investigate how people differ in their use of the Internet, and in the patterns of substitution they exhibit across sources and media. They introduce the third dimension of sources—offline/online—to the two traditional dimensions—impersonal/personal, and independent/seller-dominated. They show that the search pattern differs for active shoppers, late buyers, and early buyers.

There are very few studies on the general segmentation of consumers in the Indian context. Sinha (2003) identifies two segments of shoppers—fun shoppers and work shoppers—based on their shopping orientation. This study found both similarities and differences between the orientation of Indian shoppers and that of shoppers from the developed world. Goswami (2007) segmented college-goers psychographically into five clusters—life-loving go-getters, politically-conscious positivists, independent-minded, destiny-believing pessimists, and happy-go-lucky dependants. Kumar and Sarkar (2008) segmented metropolitan consumers into six behavioural groups—well-settled, strugglers, enjoyers, conservatives, self-concerned, and realists—in order to understand their consumption patterns. The segments were profiled in terms of their product ownership, activities and interests, financial investment avenues, and media habits.

While there is some research on segmenting consumers in general in the Indian context, there is hardly any on segmenting searchers. Moreover, personality variables have not been used for the purpose of clustering. In this study, we intend to cluster searchers in India on the basis of personality as well as the conventionally used variables of search activities which are detailed below.

Personality trait variables

Personality can be defined as a dynamic and organised set of characteristics possessed by a person that uniquely influences her/his cognitions, motivations, and behaviours

in various situations (Ryckman, 2004). Various theorists have attributed the differences in human personality to either heredity or social and environmental influences, and sometimes to both factors. A brief account of three major theories of personality—the Freudian theory, the Jungian theory, and the Trait theory—is given below.

According to the Freudian psychoanalytic theory of personality, a person's unconscious needs or drives are at the heart of her/his motivation and personality. Human drives are largely unconscious, which would imply that consumers are primarily unaware of the true reasons for their behaviour and choices. This theory proposes that the human personality consists of three interacting systems—the id, the superego, and the ego.

Jungian theory focuses on four pairs of personality types: sensing-intuiting, thinking-feeling, extroversion-introversion, and judging-perceiving. Each of these four pairs of dimensions reflects two distinctly different personality characteristics that influence consumer responses to the world around them.

Departing from the subjective approach of the Freudian and Neo-Freudian theories of personality measurement, Trait theory focuses on the measurement of personality in terms of specific psychological characteristics, called traits. A trait is defined as 'any distinguishing, relatively enduring way in which one individual differs from another'. Trait theory postulates that individuals possess innate psychological traits to a greater or lesser degree, which can be measured by specifically designed scales or inventories (Baumgartner, 2002; Beatty & Smith, 1987).

In line with this last theory, we consider important personality trait variables which are germane to our study, and have an effect on the gathering and processing of information. Shopping enjoyment, perceived behavioural control, subjective knowledge about the product, optimum stimulation level, need for cognition, and technology readiness are the variables taken into consideration to identify and explain the patterns of information search behaviour. Though lifestyle, attitude, and several other factors potentially influence personality development and the response of consumers towards their environment, the present study does not include them as the scope is restricted to relevant personality traits.

Shopping enjoyment

Babin, Darden, and Griffin (1994) suggest that individuals shop to gain utilitarian value and/or hedonic value; i.e. shopping can result in instrumental rewards (e.g., lower price) and/or experiential rewards (e.g., enjoyment and fun). A review of past studies suggests that shopping enjoyment is one of the antecedents of information search (Beatty & Smith, 1987; Hoffman & Novak, 1996; Hornik, 1984; Katona & Mueller, 1955). Shopping enjoyment can be defined as the degree to which performing an activity (in this case, shopping) is perceived to provide pleasure and joy in its own right, aside from performance consequences (Davis, 1989; Venkatesh, 2000). When an individual's behaviour is prompted by intrinsic motivations such as interest and enjoyment, s/he would be more willing to persist in such behaviours in the future (Deci & Ryan, 1985; Deci, Koestner, & Ryan, 1999). But not all individuals tend to enjoy the buying process (of which search behaviour

plays an important part) to the same extent. Since shopping enjoyment influences search behaviour, we include this variable in our study.

Perceived behavioural control

Perceived behavioural control (PBC) is defined as 'the perceived ease or difficulty of performing the behaviour and... is assumed to reflect past experience as well as anticipated impediments and obstacles' (Ajzen, 1988). PBC can also be interpreted as a confidence construct, and is an important determinant of consumer behaviour; it is one of the antecedents of the ability to search for information. Past studies have shown that people's behaviour is strongly influenced by their confidence in their ability to perform that particular behaviour (Bandura, Adam, & Beyer, 1977; Bandura, Adams, Hardy, & Howells, 1980). Perceived behavioural control can influence the choice of activities, the preparation for an activity, the effort expended during the performance of the activity, as well as the thought patterns and the emotional reactions (Bandura, 1982, 1991). Thus, PBC has an impact on search behaviour.

Subjective knowledge

Previous studies have shown conflicting effects of the dimensions of knowledge on information search, with the results showing positive, negative, or inverted U shaped relations. Consumer knowledge has two dimensions—subjective knowledge (SK) and objective knowledge (Brucks, 1985; Spreng & Olshavsky, 1989). Objective knowledge is comprised of what the consumer actually knows, while subjective knowledge is the consumer's perception of the amount s/he knows about the product domain—what s/he thinks s/he knows. Subjective knowledge influences information search through the ability to search and the motivation to search. Park and Lessig (1981) find that SK may be closely related to confidence. A consumer with high SK has confidence in her/his ability to perform product-related tasks including information search (Duncan & Olshavsky, 1982).

A major benefit of information search is the reduction of risk (Bennett & Harrell, 1975; Howard & Sheth, 1969), and confidence is related to a reduction in risk (Cox, 1967). High SK is associated with lower benefits to search, since the consumers believe that they already have enough information, and therefore they feel they require less information (Johnson & Russo, 1984). Thus different levels of SK result in different levels of information search behaviour.

Optimum stimulation level

An individual's behaviour is influenced by the intrinsically motivated desire to accomplish a specific level of stimulation, which is known as optimum stimulation level (OSL) (Berlyne, 1960). Consumer research has established that the level of optimum stimulation varies across individuals (Raju, 1980). When the stimulation derived from the environment is too low, individuals will attempt to increase the stimulation, and vice versa. Psychological pleasantness is highest at the OSL, the level of stimulation at which a person feels most comfortable (Steenkamp & Baumgartner, 1992). According to Raju (1980), OSL is a crucial factor when individuals are engaged in activities like information

search and exploratory behaviour. Hence we consider OSL to be significant in explaining the differences in external information search behaviour.

Need for cognition

The level of cognitive resources available is related to a consumer's need for cognition (NFC), which indicates a person's motivation to engage in elaborate cognitive activities. According to Cacioppo, Petty, and Kao (1984), the key factor that affects a consumer's cognitive resources is her/his NFC. Consumers with a high NFC have strong internal motivations to process or cognise information, and so they have more cognitive resources available. Cacioppo and Petty (1982) propose that NFC is a stable individual difference in people's tendencies to engage in and enjoy effortful cognitive activity. Cacioppo, Petty, Feinstein, and Jarvis (1996) find that individuals with a high NFC tend to process information more thoroughly, and tend to engage in more extensive information search than those with a low NFC. Inman, McAlister, and Hoyer (1990) find that high-NFC consumers attend to and process more information in the purchase environment than low-NFC consumers. In our study we include NFC as a variable since we believe it helps in explaining the differences in external information search behaviour.

Technology readiness

Technology readiness refers to 'people's propensity to embrace and use new technologies for accomplishing goals', and is a state of mind resulting from a gestalt of mental enablers and inhibitors that collectively determine a person's predisposition to use new technologies (Parasuraman, 2000). Mick and Fournier (1998) conclude that technology will trigger both positive and negative feelings. The positive feelings would propel people towards new technologies, while the negative feelings may hold them back. The relative dominance of these two types of feelings is likely to vary across individuals. Technology readiness has four dimensions, reflecting two positive and two negative feelings: optimism—a positive view of technology, and a belief that it offers people increased control, flexibility, and efficiency in their life; innovativeness—a tendency to be a technology pioneer and thought leader; discomfort—a perceived lack of control over technology, and a feeling of being overwhelmed by it; and insecurity—a distrust of technology, and scepticism about its ability to work properly.

In the present study, the technology readiness index is used to capture the propensity of consumers to adopt new technologies like the Internet in accessing information. Internet usage is increasing dramatically; as on March 31, 2009, there were 81 million Internet users in India (www.internetworldsstat.com). As companies have increasingly begun to use the Internet to disseminate information about their products, it becomes important to understand the predisposition of new car buyers towards new technology.

Research methodology

The research methodology employed in this study on external information search behaviour among new car buyers is detailed in the following section.

Data collection

The data for the study was collected from new car buyers from two Indian metros, Bangalore and Chennai, and the product chosen, the car, is a high involvement product which is infrequently purchased. This follows the trend set by a majority of the earlier studies which considered either car buyers or buyers of durable goods (Beatty & Smith, 1987; Claxton et al., 1974; Duncan & Olshavsky, 1982; Furse et al., 1984; Kiel & Layton, 1981; Klein & Ford, 2003; Moorthy, Ratchford, & Talukdar, 1997; Punj & Staelin, 1983; Ratchford, Lee, & Talukdar, 2003). Another reason for our choice was the explosive growth of the Indian car market in recent years. India is the ninth largest automobile industry in the world with an annual production of over 2.3 million units in 2008, and in 2009, India emerged as Asia's fourth largest exporter of automobiles (Timmons, 2007). According to Vikas Sehgal (partner, Booz & Company), the Indian car market is about 1.7 million units, and is expected to grow to 3 million by the year 2015 (Athavale, 2009). According to the global rating firm Fitch, the Indian auto industry is likely to see a growth of 10–12% in sales in 2010.

To facilitate recollection of data, we contacted only those respondents who had bought a car recently, i.e., in the last four months prior to their answering the questionnaire. The new car owners were contacted at car showrooms, shopping centres, and similar places of leisure. Personal interviews were conducted using a structured questionnaire. Respondents answered questions that elicited information on the search activities, the personality variables, the situational variables, and the decisions undertaken while selecting their new car. They indicated the various models of cars that they had considered during the purchase process, the model of the car eventually purchased, the level of importance given to the attributes of the car(s), their satisfaction with the car purchased, the total time devoted to information search, the information search activities that were used (e.g., talking to friends/relatives, reading magazines/advertisements, visiting dealers, talking to sales persons), and so on. Information on the various personality variables—SK, shopping enjoyment, PBC, technology readiness index, innovativeness, and NFC—was also collected. Information on the demographic characteristics of the consumers—gender, family income, education, and occupation—was obtained by multi-level categorical questions. Data was obtained from 284 consumers who had recently purchased a new car, and 260 responses were considered for the study. Twenty-four respondents were eliminated due to inconsistent responses and/or excessive missing data.

Measurement

The questionnaire was designed using standard scales adapted from earlier studies. The extent of pre-purchase information search activity was measured in terms of the amount of time invested (in hours) and the breadth of the search process (the number of sources accessed). The total search time was calculated by adding up the search time from individual sources of search. Similarly, the total

Exhibit 1 Reliability measure of constructs used to identify patterns of search behaviour.

Composite	Source	Cronbach's alpha	Number of items
Total search time	Furse et al. (1984), Klein and Ford (2003), Ratchford et al. (2003)	0.960	10
Total search in numbers	Furse et al. (1984), Klein and Ford (2003), Ratchford et al. (2003)	0.784	6
Subjective knowledge	Cowley and Mitchell (2003)	0.658	4
Shopping enjoyment	Marmorstein et al. (1992)	0.721	4
Perceived behavioural control	Taylor and Todd (1995)	0.832	4
Technology readiness index	Parasuraman (2000)		
• Optimism		0.952	3
• Innovativeness		0.899	3
• Discomfort		0.741	3
• Insecurity		0.807	3
Optimum stimulation level: Change Seeker Index (CSI)	Steenkamp and Baumgartner (1994)	0.697	6
Need for cognition	Cacioppo and Petty (1982)	0.917	18

number of sources accessed was calculated by aggregating the number of sources accessed.

Some of the items used in this study were selected from earlier studies. The items for measuring the relative importance of the various attributes of cars were adopted from Klein and Ford (2003) and Ratchford, Talukdar, and Lee (2001). The items for personality constructs were also taken from previous studies—shopping enjoyment from Marmorstein, Grewal, and Fishe (1992); perceived behavioural control from Taylor and Todd (1995); subjective knowledge from Cowley and Mitchell (2003); optimum stimulation level from Steenkamp and Baumgartner (1994); and need for cognition from Cacioppo and Petty (1982). To reduce the length of the questionnaire, not all 36 items of the technology readiness index proposed by Parasuraman (2000) were included. Instead, a reduced set of 12 items as used by Liljander, Gillberg, Gummerus, and van Riel (2006) was chosen, three each for the four dimensions of optimism, innovativeness, discomfort, and insecurity. These constructs were measured using a 7-point Likert scale.

The reliability of the constructs was assessed using Cronbach's alpha (Nunnally, 1978). Cronbach's alpha for each construct, and the number of items per construct are given in Exhibit 1. The internal consistency of the measures was good given that for all the constructs, Cronbach's alpha was greater than 0.6.

Analysis

As a preliminary step before initiating the cluster analysis to identify the patterns of information search behaviour, 14 items related to the attributes of new cars (Klein & Ford, 2003) which consumers consider important while searching for information were factor analysed. The factor analysis was designed to minimise the problem of multiple measures of similar constructs by identifying the latent variables. A principal component analysis was carried out. The initial solution indicated low extraction communality for the variable Model Reputation (0.266), i.e., the variance accounted for by the factors in the factor solution was low, which indicates that this variable will not fit well with the

factor solution. Hence the variable Model Reputation was eliminated in the subsequent factor analysis. A four-factor solution was indicated by two criteria—Eigen values > 1, and the scree plot. These four factors were subjected to VARIMAX rotation, which reduced the moderate factor loadings, and increased those loadings which were already high, providing clear factor loadings. Therefore, the VARIMAX rotation was retained in the final solution. Exhibit 2 provides details of the items loading on each factor.

Factor 1 consists of driving comfort, exterior and interior styling, and whether the vehicle is a diesel or a petrol version. This factor is identified as the styling and comfort dimension of the vehicle. The first three items of this factor are fairly obvious, and the diesel/petrol distinction is possibly due to the fact that petrol vehicles are more comfortable to drive. Factor 2 is associated with the mileage, the price, the warranty, and the colour of the vehicle. Again, the first three items are fairly obvious; some

Exhibit 2 Factor loadings of individual items related to attributes of new cars.

Factors	Components	Factor loadings
Factor 1 Styling and comfort	Driving comfort	0.784
	Exterior styling	0.858
	Interior styling	0.891
	Diesel or petrol	0.516
Factor 2 Value for money	Mileage	0.824
	Vehicle price	0.688
	Warranty	0.804
	Colour of vehicle	0.650
Factor 3 Safety and reliability	Safety rating	0.820
	Size of vehicle	0.750
	Reliability of vehicle	0.557
Factor 4 Miscellaneous	Manufacturer's reputation	0.654
	Engine power	−0.806

colours are cheaper than others, and so colour loads on this factor. This factor is identified as the value for money dimension. Factor 3 is associated with the safety rating, the size and the reliability of the vehicle. It is designated as the safety and reliability dimension of the vehicle. Factor 4 is characterised by the manufacturer's reputation, and the engine power of the vehicle. It is identified as the miscellaneous dimension of the vehicle. Engine power loads negatively; this could be because higher power might inversely influence the reputation of the manufacturers in India due to safety considerations. The factor scores for each of the 260 respondents were calculated, and were used as the basis for cluster analysis along with the other variables.

Cluster analysis

The objective of the cluster analysis was to identify using search activity variables and personality variables, the various groups of customers according to their pre-purchase external information search behaviour. Various multivariable techniques are available to choose from, and the final choice depends on two considerations: the extent to which the method can isolate the respondents into groups exhibiting maximum within-group similarity and between-group differences on predefined criterion measures; and how the criterion measures significantly influence various groups which may be more managerially actionable. Broadly there are two groups of multivariate techniques—structural and functional. Structural multivariate techniques such as factor analysis, multidimensional scaling, and conjoint analysis are suited for segment delineation. Functional multivariate techniques such as regression and discriminant analysis are used to establish a relationship between the observed segments, and the descriptive or explanatory variables. We have selected the two-step cluster analysis technique as it simultaneously offers the benefits of both the structural as well as the functional techniques.

The two-step method is a one-pass-through-the-data approach which addresses the scaling problem by identifying pre-clusters in the first step, then treating these as single cases in the second step which uses hierarchical clustering. The two-step method is also the one chosen when categorical variables with three or more levels are involved. It simultaneously succeeds in delineating groups or segments which differ on criterion variables, and establishes significant relationships between the segments and the categorical and continuous variables.

The first step of the two-step clustering procedure is the formation of pre-clusters. The goal of the pre-clustering stage is to reduce the size of the matrix that contains distances between all possible pairs of cases. The pre-clustering stage employs a cluster feature tree with nodes leading to leaf nodes, following the sequential clustering method described by [Theodoridis and Koutroumbas \(1999\)](#). In the second step, the sub-clusters resulting from the pre-cluster step are taken as input, and are grouped into the desired number of clusters using the standard agglomerative hierarchical clustering algorithm. The primary reason for using this algorithm is that it works well with the auto-cluster method. To determine the number of clusters automatically,

a two-step procedure with a hierarchical clustering method is used. In the first step, the Schwarz Bayesian Criterion or the Akaike Information Criterion for each number of clusters within a specified range is calculated, and this is used to arrive at an initial estimate for the number of clusters. In the second step, this initial estimate is refined by finding the largest increase in distance between the two closest clusters in each hierarchical clustering stage.

In the two-step clustering procedure used in this study, two distance measures were used. For categorical variables, log-likelihood was the distance measure used, following a method developed by [Melia and Heckerman \(1998\)](#). For continuous variables, Euclidean distance was used. The two-step clustering procedure is an improvement on the earlier BIRCH method ([Zhang et al., 1996](#)), which supported only continuous variables, and did not use log-likelihood distances. The clustering algorithm was based on a distance measure that gives the best results if all the variables are independent, the continuous variables have a normal distribution, and the categorical variables have a multinomial distribution. This is seldom the case in practice, but the algorithm is thought to behave reasonably well even when the assumptions are not fully met ([Garson, 2009](#)). All the variables were standardised to take care of the differences in measurement and distribution assumptions. Since the final solution could possibly depend on the order of the cases, the cases were randomly ordered. In addition to this precautionary step, the cluster solution was tested with cases sorted in ten different random orders to verify the stability of the solution. For all the ten runs of cluster analysis, the final solution remained the same, thus ensuring the stability of the cluster solution.

To sum up, we used the two-step cluster analysis technique because we had both continuous and categorical variables, and in a single run, this procedure helps to identify the variables that significantly differentiate the segments from one another.

Findings

The two-step cluster analysis showed a four cluster solution based on the 260 respondents. Based on the variables from which they were derived, the four clusters were named as follows.

1. The broad moderate searchers cluster comprised 25.1% of the total respondents, and was characterised by moderate search across all the sources of information.
2. The intense heavy searchers cluster consisted of 4.3% of the respondents, who searched intensely across all the sources of information.
3. The low broad search cluster was the largest group, with 44.7% of the total respondents belonging here; this cluster was characterised by low search across all the sources of information.
4. The low search cluster consisted of 25.9% of the respondents, characterised by below average search across all the sources of information.

A brief profile of each of the clusters with the characteristics differentiating each segment from the other groups is outlined below. (The mean and the standard

deviation values of all the continuous criterion variables and the frequencies of the categorical variables for all the clusters are available on request.)

Cluster 1: Broad moderate searchers

The average total search time of the members of this cluster was 25.66 hours. They were broad searchers, who searched from various sources of information, and accessed each source in greater detail; i.e., they went through more brochures, consulted more dealers and more sales people, and they test drove a larger number of cars before they made their final choice when compared to the other groups.

When we look at the personality variables, the members of this group moderately enjoyed shopping for cars, and had moderate PBC, but their SK of cars was the lowest among all the groups. On the technology readiness index, they showed moderate levels of optimism and innovativeness, and also moderate levels of discomfort and insecurity. Surprisingly, the members of this group showed the lowest value for OSL when compared to the members of the other groups. Also their NFC was relatively low. Among the various characteristics of a new car that they looked for, they placed negative emphasis on the power of the vehicle. The average age of the members in this group was 38.3 years, and all the members were males. A majority of the members had a relatively high family income (above Rs 5 lakhs/Rs 500,000 per annum), and a majority of them were professionals with graduate/postgraduate education.

Cluster 2: Intense heavy searchers

This cluster was the smallest of all the groups in size (4.3% of the total number of respondents). The average total search time of the members in the group was the highest (71.64 hours). Although these intense searchers sought information from different sources, they accessed fewer numbers in each source of information. Compared to the members of the other groups, they collected information from fewer brochures, visited the lowest number of dealers, consulted a relatively moderate number of sales persons, and carried out the least number of test drives.

With regard to the various personality variables, when compared to the members of the other groups, the members of this cluster derived the highest enjoyment while shopping for cars, had the highest PBC, and had the highest SK about cars. On the technology readiness index, these members showed more favourable technology readiness in terms of higher positive value for optimism and innovativeness. But at the same time, they also showed higher unfavourable attitudes by having the highest discomfort and insecurity related to technology. One possible explanation could be that they were apprehensive about newer technologies even though they would like to adopt them. This is especially true of people in the higher age group, who adopt new technology slowly. The members of this cluster showed the highest value for OSL compared to the members of the other groups. Also, as was expected, their NFC was the highest among all the groups, and the members of this group had the highest average age. The members of this cluster placed more emphasis on certain characteristics of the car like value for money, and the

comfort and styling of the car compared to the other group members. Though the cluster size was the smallest when compared to the other clusters, all the female respondents (five) except one belonged to this cluster. The members of the group had a family income between Rs 5 and 10 lakhs (Rs 500,000–1 million) on average; a majority of them were in salaried managerial jobs, with graduation/post-graduation.

Cluster 3: Low broad searchers

This was the largest cluster, comprising 44.7% of the total respondents. The members of this group had a low average total search time (22.88 hours). The low broad searchers accessed information from different sources, and the numbers accessed within each source were the second highest (next only to cluster 1). They visited more dealers, consulted more sales people, and took more test drives when compared to the other groups (except for cluster 1). But they browsed through relatively fewer brochures.

Although the members of this group had moderately high SK about cars (next only to cluster 2), they enjoyed shopping for cars the least, and had the lowest perceived control over resources compared to the members of the other groups. They had lower positive and negative attitudes on the technology readiness index. But for OSL, they had moderately high values (next only to cluster 2). As was expected, the NFC was low for the members of this group. The average age of the members of this cluster was the lowest among all the groups (33.92 years). They placed relatively more emphasis on the safety characteristics of the car, possibly because they were in the stage of early family life. All the members of this group were males except for one female. They had moderate income levels ranging between Rs 1.5 and 5 lakhs (Rs 150,000–500,000). Nearly all of them were graduates with salaried managerial jobs.

Cluster 4: Low searchers

This cluster was composed of 25.9% of the total respondents, and the members of this group had the lowest average total search time (22.15 hours). They gathered information from different sources, but the numbers accessed within each source was the lowest for the number of brochures browsed, and the number of sales people consulted when compared to the other groups. Compared to the members of cluster 2, the low searchers visited more dealers, and took more test drives of the cars.

As was expected, the members of this cluster had the least SK about cars among all the groups compared, with low levels of shopping enjoyment, and low perceived control over resources. They showed the least positive as well as the least negative dimensions towards technology preparedness when compared to the members of the other groups. As was expected, they had the lowest value for OSL, and their NFC was also the lowest among the groups compared. They placed more emphasis on the characteristics of comfort and styling, and value for money of the car. The average age of the members in this group was 37.05 years. All the members were male, with a moderate to high income ranging between Rs 2.5 and 10 lakhs (Rs

250,000–1 million). All of the members were either self-employed or working as professionals, and a majority of them were graduates or professionally qualified.

Relative ranking of variables

The relative importance of the variables in the two-step cluster analysis is shown in a chi-square plot in which the y-axis is the set of variables, and the x-axis is the chi-square value. Those variables with higher chi-square values than the other variables are more important in differentiating that particular cluster from the others. If a variable is a significant differentiator for a given cluster, it would imply that this variable differentiates that particular cluster from at least one of the other clusters. Exhibit 3 lists the relative importance of significant variables (continuous and categorical) in differentiating the clusters that were identified.

For cluster 1, who were moderate searchers, dealer centric factors (like the number of dealers visited, the number of test drives undertaken, and the number of sales people consulted, etc.) are relatively more important in differentiating the cluster. The power dimension of the car attribute differentiates this segment significantly. Among the personality trait variables, OSL and PBC are significant differentiators as is the innovativeness dimension of the technology readiness index. Among the categorical variables, income, occupation and education significantly differentiate the group (in that order).

For cluster 2, who were intense heavy searchers, two dimensions of the technology readiness index (discomfort and innovativeness), and OSL differentiate the group significantly. As the group constitutes an equal proportion of males and females, gender is a significant distributor.

For cluster 3, who were low broad searchers, age is the most important differentiating factor among the continuous variables, followed by total search time and the number of test drives. Low PBC and one dimension of technology readiness index (innovativeness) differentiate the group. Among the categorical variables, occupation, income, and education significantly differentiate the group (in that order).

And for cluster 4, various dealer characteristics differentiate the group—the number of sales people consulted, the number of dealers visited, the number of brochures consulted, and the number of test drives taken. Compared to cluster 1, the respondents of this group search less and consult lower numbers of sources related to the dealer dimension. Among the personality variables, the dimensions of the technology readiness index—optimism, innovativeness, and discomfort—significantly differentiate the group.

Discussion

Our research has a number of contributions to make. We show that there are four distinct segments of consumers in India having different patterns of external information search behaviour, based on our analysis of the information search behaviour of car buyers—broad moderate searchers, intense heavy searchers, low broad searchers, and low searchers. Our research identifies distinct patterns of information search

Exhibit 3 Relative ranking of variables that significantly differentiate each cluster

Cluster 1: broad moderate search group (25.1%)		
Ranking	Categorical variables	Median value
1	Family income	Rs 5–10 Lakhs*
2	Occupation	Professional*
3	Education	Graduate*
Continuous variables		Mean value
1	No of dealers	5.08**
2	Power	0.63**
3	No of test drives	4.19**
4	No of sales people	5.88**
5	Optimum stimulation level	1.70**
6	Age	38.30**
7	Perceived behavioural control	1.96**
8	No of brochures	3.34**
9	TRI: innovativeness	2.16**
Cluster 2: intense heavy search group (4.3%)		
Ranking	Categorical variables	Median value
1	Gender	Both*
Continuous variables		Mean value
1	TRI: discomfort	3.79**
2	TRI: innovativeness	3.58**
3	Optimum stimulation level	3.35**
Cluster 3: low broad search group (44.7%)		
Ranking	Categorical variables	Median value
1	Occupation	Salaried managerial*
2	Family income	Rs 1.5–5 Lakhs*
3	Education	Graduate*
Continuous variables		Mean value
1	Age	33.92**
2	Total search time	22.88**
3	No of test drives	2.35**
4	Perceived behavioural control	1.50**
5	Value for money	–0.21**
6	TRI: innovativeness	1.48**
7	No of brochures	2.16**
Cluster 4: low search group (25.9%)		
Ranking	Categorical variables	Median value
1	Occupation	Self-employed*
2	Education	Graduate*
3	Family income	Rs 2.5–5 Lakhs*
Continuous variables		Mean value
1	No of sales people	2.35**
2	No of dealers	2.42**
3	TRI: optimism	1.06**
4	Total search time	22.15**
5	No of brochures	2.12**
6	TRI: innovativeness	1.37**
7	No of test drives	2.24**
8	TRI: discomfort	1.60**

* indicates significant chi-square value. ** indicates significant at 0.05.

behaviour among the purchasers of high value and high involvement products, which corroborates the findings of previous studies. Previous studies had incorporated variables reflecting the different dimensions of search activities in order to identify distinct patterns of information search. But [Punj and Stewart \(1983\)](#) suggested that an interaction of situational and individual difference characteristics may produce distinctive patterns of search and decision making. Our results support this proposal, as personality variables along with different dimensions of search activities differentiate the respondents into distinct groups.

Prior studies had indicated that personality variables such as NFC, SK, and PBC help in differentiating the distinct patterns of information search behaviour ([Brucks, 1985](#); [Cacioppo & Petty, 1982](#); [Park, Gardner, & Thukral, 1988](#)). This supports our decision to incorporate personality variables as most of them are significantly different across clusters, and they add explanatory power to the solution, i.e., more clarity emerges when they are included. In addition, the search groups are differentiated in the breadth of their search, highlighting the importance of the two aggregate measures of search activity as proposed by [Johnson, Moe, Fader, Bellman and Lohse \(2004\)](#) and [Klein and Ford \(2003\)](#). This study provides additional insights about the segmentation of new car buyers; the personality variables effectively differentiate new car buyers based on their information search strategies.

Based on the findings of this study, organisations can design their communications strategies in specific ways in order to influence the behaviour of particular clusters of consumers. The broad moderate search group constituted 25.1% of the total respondents. Their total search time was moderate, but they accessed more types and numbers of information sources. They collected information mainly from dealer centric sources—sales persons, test drives, and showrooms. Given their low SK, they tended to perceive new information as more important, and hence they were more receptive to new information ([Park et al., 1988](#)). Managers have to orient their dealer networks to be receptive to this segment of consumers. The sales people in showrooms have to be trained to provide all relevant information as quickly as possible.

The intense heavy search group constituted only 4.3% of the total population studied, but they cannot be ignored as they could be potential opinion leaders. The results also show that they possessed high OSL, high NFC, high SK, enjoyed more while shopping for a car, and had high PBC when compared to the other groups. This would translate into high self-confidence, as a result of which their ability to perform product related tasks including information search would be high ([Duncan & Olshavsky, 1982](#)). [Brucks \(1985\)](#) suggests that higher subjective knowledge is related to a decrease in following a salesperson's recommendation, which indicates that the members of this group would depend on information from neutral sources. So managers, and especially dealers, could have separate relationship officers instead of sales people to cater to the needs of the members of this cluster. Managers could also consider providing more detailed technical and product related information on their Website.

Since personality variables are important in segmenting consumers, managers may also want to begin measuring consumers' personality traits such as their OSL, NFC, etc.

This could be done online by giving some incentives to participate in surveys, or at the dealer location where would-be buyers are usually asked to fill out standard questionnaires; these could be modified to include items that elicit information about their personality traits. Manufacturers could have registration forms on their Websites that measure personality variables like OSL along with demographic information; and they could provide the consumers incentives to register (e.g., a lucky draw or a discount). This information can be relayed to the dealers to whom these consumers are most likely to go to (e.g., a Bangalore consumer's information can be given to all the Bangalore dealers). Alternatively, the dealers may measure these variables on their own when a consumer comes to the showroom. Dealers would be able to categorise consumers based on this information. For example, dealers can identify the segments to which potential car buyers belong by measuring their personality variables. A car buyer with moderate levels of OSL, PBC, and shopping enjoyment would belong to cluster 1. Similarly a car buyer with high levels of shopping enjoyment, SK, OSL, and NFC, who belongs to a higher age group, would belong to cluster 2. Cluster 3 car buyers would be characterised by moderate NFC and SK, and would be the youngest of them all. Finally car buyers belonging to cluster 4 would have low levels of PBC, low shopping enjoyment, low NFC, and low OSL.

There is a growing body of literature which indicates that having the same marketing strategies for all customers could be sub-optimal. [Cowley and Mitchell \(2003\)](#) show that customers differ in knowledge and suggest that communication must be tailored accordingly. Our findings show that there are four distinct segments of searchers in the car market, and managers would need to devise different communication strategies for each of these segments.

Previous studies in the West identified between three and six distinct clusters based on the information search strategies of the respondents ([Claxton et al., 1974](#); [Furse et al., 1984](#); [Kiel & Layton, 1981](#); [Klein & Ford, 2003](#); [Urbany et al., 1989](#); [Westbrook & Fornell, 1979](#)). In our study in the Indian context, the results show that there are four distinct clusters of consumers based on their pre-purchase information search behaviour. The two segments from the Western studies for which evidence could not be found in the Indian context were the purchase-pal dependent cluster and the retail shopper cluster. One of the possible reasons could be that the purchase decision of a car is still a family oriented behaviour in the Indian context. The influence of friends and purchase-pals is limited in the actual decision making stage.

Prior research findings on external information search behaviour in the West suggested that people often search less than what is ideally required ([Furse et al., 1984](#); [Kiel & Layton, 1981](#); [Klein & Ford, 2003](#)). Our results support these earlier findings; 70.6% of the respondents searched less than what was ideally required, and had low NFC. As an individual's NFC is one of the determinants of search behaviour ([Cacioppo & Petty, 1982](#)), people with low NFC would tend to avoid situations that require more deliberation, which have low cognitive resources available to them. As a result, consumers with low NFC are susceptible to peripheral cues (persuasion cues like celebrity endorser)

(Inman et al., 1990). To influence this particular segment of consumers, managers would need to spend more on promotional gimmicks like celebrity endorsements.

Our study makes two contributions to the consumer external information search behaviour literature. First, by incorporating the suggestions of Punj and Stewart (1983), our study highlights the importance of personality variables in identifying distinct patterns of information search behaviour. Second, our study is the first to attempt the segmentation of car buyers in India. Moreover, we demonstrate the effectiveness of the two-step clustering procedure in identifying simultaneously the distinct segments of consumers and the relative importance of the variables in differentiating the segments.

Limitations

Our study has certain limitations. Our study was limited to urban new car buyers who are distinct from rural new car buyers; the latter constitute a significant market size. The information search behaviour of rural consumers would be distinct from that of the urban consumers because of the different communication mix adopted by the companies. Future studies could possibly focus on investigating the external information search behaviour of rural consumers. Second, the size and the number of clusters are likely to differ across product categories and situations. Also, the measurement of the different dimensions of search activity relied on recall of the respondents, and as Newman and Lockeman (1975) found, there can be significant differences between self-reported behaviour and observed behaviour. Since the objective of the study was to determine distinct groups, we were concerned more with the relative differences in search activity rather than the absolute search activity of the respondents. However, we were careful in minimising the errors of recall by selecting only those respondents who had purchased a car in the last four months prior to their answering the questionnaire. This could be overcome in future studies by capturing longitudinal measures through observation, or through click-stream data now that the Internet technology is more readily available. The cluster solution is dependent on the technique used, and it does not provide unique solutions. Future research could examine the information search patterns for other product categories where the communication mix is different. Another area for future research could be the impact of the Internet on the patterns of information search behaviour.

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