

Using Conjoint Analysis to Study Consumers Choice of Supermarkets

(Menggunakan Analisis Conjoint untuk Mengkaji Pilihan Pasaraya)

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ABSTRACT

This paper applied Conjoint Analysis to investigate the relative importance of supermarket attributes and part-worth utilities of attribute levels that affect consumer choice of supermarkets. A study was carried out on consumers working at the Penang Free Industrial Zone factories. The attributes identified to describe a supermarket are: distance of the supermarket from the respondent's house or office, availability of other nearby stores, product price, availability of parking space and service level provided by the supermarket. The outcomes show that, in general, most shoppers are attracted to low prices and availability of parking space. Several segmented models indicate that respondents with different socio-economic background tend to have slightly different preferences on the attributes of the supermarkets. This study hopes to provide valuable inputs to the present and future supermarket retailers on the factors that influence consumer choice of supermarket.

ABSTRAK

Kertas ini menggunakan analisis 'Conjoint' untuk mengkaji kepentingan relatif ciri-ciri pasaraya dan utiliti 'part-worth' untuk tahap ciri-ciri pasaraya yang mempengaruhi pilihan pasaraya oleh pengguna. Satu kajian kes telah dilakukan dalam kalangan pengguna yang bekerja di kilang-kilang di Zon Industri Bebas Pulau Pinang. Ciri-ciri yang dikenal pasti menerangkan suatu pasaraya adalah: jarak pasaraya dari rumah atau pejabat responden, kewujudan kedai-kedai lain berdekatan pasaraya, harga produk, kemudahan tempat letak kereta dan perkhidmatan yang disediakan oleh pasaraya. Hasil kajian menunjukkan bahawa, secara umumnya, kebanyakan pembeli tertarik dengan harga yang rendah dan kemudahan letak kereta yang baik. Beberapa pembahagian model yang lain menunjukkan bahawa wujudnya sedikit perbezaan terhadap pilihan pasaraya berasaskan latar belakang sosio-ekonomi responden. Kajian ini juga berharap dapat memberi input penting mengenai faktor yang mempengaruhi pilihan pengguna ke atas pasaraya kepada peniaga di pasaraya yang sedia ada dan juga bakal peniaga di pasaraya.

INTRODUCTION

The pressing demand of modern lifestyle has generally changed consumers' grocery shopping behaviors. Confronted with time constraint, consumers would try to optimize the time they spent on each activity including shopping. Some have changed to multi-purpose shopping trip by combining purchases of different product categories to reduce the number of trips. The others use their shopping time efficiently by increasing the amount of goods purchased in a single-purpose shopping trip. These changing behaviors of consumers have increased the market demand for supermarkets and hypermarkets.

To cater for the needs of shoppers to optimize the time spent on shopping, retailers especially supermarkets have to provide a wide range of products (food and non-food items). In order to encourage consumers to combine their purchases of multiple product categories under one roof, supermarkets also need to provide comfortable shopping environments. Supermarkets must be proactive in handling this issue because competition amongst suppliers in retailing industry has increased dramatically. There is also a rapid increase in new retailing format in that industry.

Improvements in domestic infrastructure and changes in lifestyle are reflected in rapid growth in car ownerships and the acquisition of refrigerators in homes, both of which are found to be associated with supermarket growth (Reardon, Timmer & Berdegue 2003).

In Malaysia, there are around 120,000 retail outlets of which 85% are located in Peninsular Malaysia and 15% in East Malaysia (Pegasus Business & Market Advisory 2006). Malaysian retail industry has been experiencing rather drastic changes since the early 1990s with increasing number of multinational and local chain operated supermarkets, department stores and hypermarkets. Small retailers face strong price competition and wider range of products from these larger retail chains. Major players of the multinational and local chain operated supermarkets, department stores and hypermarkets include Cold Storage, Parkson, Tesco, Makro Cash and Carry, Giant, Carrefour, Cosmart, Jaya Jusco, Sunshine Square, Metrojaya and The Store. In general, supermarkets and department stores are located at shopping complexes which also have cinemas and smaller outlets selling clothes, books, shoes, music, computers, watches, mobile phones, electrical appliances and many more including recreational centers. The

development of shopping complexes could also affect the development of a stand alone supermarket as consumers may prefer to make multi-purpose shopping in a single trip.

Each supermarket operates its chain by differing its pricing format, product assortment, service level and location. The most widely used price formats are the “every day low pricing” (EDLP) and “high price low price promotional pricing” (HILO). EDLP stores mostly offer lower average price and sell a wide range of product categories. While HILO stores are more likely to offer temporary deep discounts in a smaller group of products (Bell & Lattin 1998; Dreze, Nisol, & Vilcassim 2004; Galata, Bucklin, & Hanssens 1999; Leszczyc, Sinha & Sahgal 2004; Leszczyc, Sinha & Timmermans 2000). However, the implementation of EDLP and HILO pricing formats is more in branding strategy (Galata et al. 1999).

Supermarket choice is known as a cognitive process and is an information processing behavior like other purchasing decisions (Sinha, Banerjee & Uniyal 2002). A supermarket is chosen based on the self-confidence that a customer has, mostly in regard to the nature of the store and the quality of the products and services that he or she expects to receive. Supermarket characteristics include price, ambience, parking facilities, range of products, quality of products, and also services in the store (Abubakar, Mavondo & Clulow 2001; Dreze et al. 2004; Lim, Nurwati & Ghaftar 2003; Nisol & Vilcassim 2004; Sinha, Mathew & Kansal 2005; Smith 2002).

Galata et al. (1999) investigate the nature of supermarkets that offer EDLP versus HILO. They divide their consumers into three types. First, the cherry-pickers, consisting of households that have low opportunity costs of shopping. Households in this group are more price-sensitive and they are willing to switch between EDLP and HILO to get the lowest price. Cherry-pickers are characterized as the lowest income level shoppers and their family size is normally small. They usually purchase in a small basket but shop at highest frequency. The second type is the service-seekers who patronize HILO stores which provide good services. Consumers in this group have the highest average spending per trip, the highest incomes, intermediate family size and moderate frequency shopping trips. The third type is called the time-constrained shoppers. The consumers in this segment have the largest family size, largest average basket size but lowest shopping frequency and intermediate income level. Time-constrained shoppers mostly have high opportunity cost of shopping and they patronize EDLP stores.

Sinha et al. (2002) study consumer choice behaviors for stores in India. Their results reveal that convenience and merchandise are the primary reasons for choosing a store. Gender and age of the shoppers can also influence their choices of stores.

A global Nielsen consumer report (2008) finds an overwhelming 85 percent of the world’s consumers ranked ‘good value for money’ as the most important

consideration when choosing a grocery store, with the most avid value-seekers hail from the Philippines, Singapore, Portugal, Germany, India and Austria. This finding clearly suggests that the rules of retailing game change depending on where you retail. For instance, the Nielsen survey finds that Malaysian shoppers prefer supermarkets with the most convenient/easy parking; South Koreans, Indonesians and Germans like the supermarket with the shortest distance, while the Russians and Indians seek out supermarkets that offer better selection of high quality brands and products.

This paper attempts to examine the choice behaviors of consumers who shop at different types of supermarkets. It focuses only on consumers who are working at the Free Industrial Zone in Bayan Lepas Penangs, an industrial area which contributes to the highest employment rate in 2005 (Poh & Tan 2006). The main objective of this study is to identify the key factors that influence consumers behaviors in their decisions on types of supermarkets that they prefer to patronize. Five attributes of stores have been identified based on literature review. The five attributes are: distance of the supermarket from home or work place, overall price offered in a supermarket, accessibility of parking space, availability of other nearby stores, and services provided by the supermarket. Overall, this study aims to identify the relative importance of each attribute of the supermarkets to consumers who are working at the Free Industrial Zone in Penang. Comparisons are also made on the choice behaviors of these consumers based on their socio-economic characteristics.

METHODOLOGY

Conjoint technique is employed in estimating the utility scores or the part-worth obtained in choices of supermarkets made by the consumers. The utility scores are then used to measure the relative importance of each attribute of the supermarkets. This technique is a powerful method to capture what users really value in a service or product that they choose to purchase (Muraleetharan et al. 2004). It is a measurement technique that was originally developed by Luce and Tukey (1964) in the field of mathematical psychology. It is based on a simple premise that consumers evaluate the value of a product (real or hypothetical) by combining the value of each attribute.

A simple conjoint model, in the form of the widely used adding model (Green & Srivivasan 1990; Louviere 1988), may be expressed as showing the individual consumer utility U of an alternative X_i in the form;

$$U(X_i) = \sum_{z=1}^s \sum_{j=1}^{kz} w_{zj} c_{zj}$$

where:

w_{zj} = the weight or part-worth utility contribution associated with the j th level or value ($j = 1, 2, \dots, k_z$) of the z th attribute ($z = 1, 2, \dots, s$),

- kz = the number of levels or possible values of attribute z ,
- s = the number of attributes, where $c_{zj} = 0$ if attribute z is not present in alternative X , but $c_{zj} = 1$ if attribute z is present.

This analysis can be applied to estimate the function that relates changes in individual utility (or 'part-worth') to the changes in the levels of the attributes. In empirical applications, a researcher first constructs a set of real or hypothetical products or services by combining selected levels of each attribute. (The techniques used in data collection are the revealed or stated preference methods. The revealed preference method uses data on actual choices about real decisions. For the stated preference method, individuals are asked to make choices on hypothetical scenarios.) These combinations are then presented to respondents, who provide only their overall evaluations. A typical conjoint analysis would ask the respondents to rate, rank or make pair-wise comparisons based on the hypothetical scenarios presented to them. These hypothetical scenarios are formed based on the combinations of different attributes as well as levels of attributes identified as important in the provision of a good or service (Hair et al. 1998).

In this study, the conjoint analysis provides a useful tool for generating the profiles of the hypothetical supermarkets presented in the questionnaire. A full-concept profile has been used in this study. A full-concept

includes all the five attributes identified in this study in describing a supermarket. The choice of supermarkets is assumed to be influenced by their attributes such as distance of the supermarket from a factory worker's home or working place, availability of other nearby stores, price, parking availability and the service level of the supermarket and were labeled as distance, stores, price, parking and service, respectively. The number of levels for each attribute was restricted to two to minimize the respondent evaluation task and yet, be able to estimate the parameters with reasonable accuracy. The details of the attributes and their levels are given in Table 1.

From the five attributes and their levels, the total number of combinations generated will be 32. Producing 32 profiles of the supermarkets in the questionnaire will be too taxing for the respondents to rank in an effective way. For this reason, only a subset of all possible profiles has been used in this study. The orthogonal fractional factorial design allows us to assess the relative importance of different attributes of the supermarkets through a reduced sample size of the profiles. The orthogonal arrays enable all the main effects to be measured on an uncorrelated basis. Eight orthogonal designs for the hypothetical supermarkets selected are given in Table 2. The respondents were asked to indicate their preferences by ranking from 1 to 8 amongst the hypothetical supermarkets. The most preferred choice will be ranked as 1 and the least preferred choice will be ranked as 8. From these rankings, conjoint analysis derives utility score for each factor level. These

TABLE 1. Attributes and levels

Attributes	Levels	Explanations of attributes
Distance	≤ 15 Minutes > 15 Minutes	Travel time from respondent's house / factory to the supermarket
Stores	Yes No	Whether there are other stores such as food court, sports center, bookstore nearby the supermarket or within the same building.
Price	Low Average	Average price offered by a supermarket compared to other supermarkets.
Parking	Plenty Limited	Sufficient parking space for customer of the supermarket
Service	Helpful Staff Self Service	Service offered by the supermarket

TABLE 2. Orthogonal Design of the Supermarkets

Supermarket	Distance	Others	Price	Parking	Service
A	>15 Minutes	No	Average	Limited	Helpful Staff
B	>15 Minutes	Yes	Average	Plenty	Helpful Staff
C	≤ 15 Minutes	Yes	Average	Limited	Self Service
D	≤ 15 Minutes	No	Average	Plenty	Self Service
E**	≤ 15 Minutes	Yes	Low	Plenty	Helpful Staff
F	>15 Minutes	Yes	Low	Limited	Self Service
G	>15 Minutes	No	Low	Plenty	Self Service
H	≤ 15 Minutes	No	Low	Limited	Helpful Staff

Note: Supermarket which fulfills profile E is considered the pre-defined best supermarket as it has all the preferred attributes.

utility scores are called part-worth and were used to find the relative importance of each factor.

The questionnaires were disseminated to the workers respective factory via their company email. In some cases some hardcopies were also distributed. Slightly over a thousand sets of questionnaires were distributed at the Free Industrial Zone in Penang. Respondents were also asked to forward the questionnaire to other friends and colleagues who are working in that area in order to reach out to more potential respondents. The total number of returned questionnaires was 289.

A simple check was carried out to ensure data reliability. Profile E (marked with double asterisks in Table 2) is the pre-defined best supermarket with all attributes at the favorable levels. Of all the respondents, only those who ranked Profile E as the first choice will be considered in the analysis. Twenty three respondents who ranked other profiles as the first choice were discarded. These are the respondents whom were suspected to have not understood the instructions given in the questionnaire or have not answered the questionnaire seriously. Finally, only 266 respondents were taken into consideration in the analysis in this study.

RESULTS

The scores of importance of each attributes are generated by taking the utility range (i.e. the difference between the highest and the lowest values of the part-worth utility) for the particular attribute and dividing it by the sum of all the utility ranges. Each of the attributes has a weight that reflects the relative importance in influencing the choice of supermarkets. The scores of relative importance of each attribute are shown in Figure 1. The outcome indicates that 'Price' which represents the relative low price offered by a supermarket compared to other supermarkets is the most important attribute which influences the respondents' decision in patronizing that outlet. Out of the overall scores of 100%, price is the most important attribute which contributes 28%.

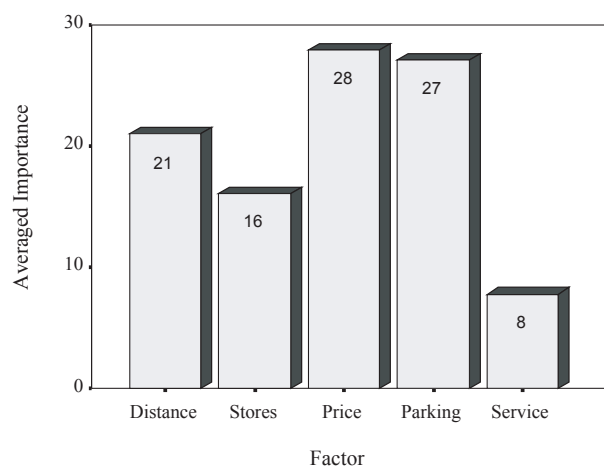


FIGURE 1. Importance score of each attribute

Easy accessibility of parking space is the second important attribute which is almost as important as the price factor. This is similar to the outcome in the Nielsen consumer global survey (Nielsen Survey, 2008) which indicates the unique choice behavior of Malaysian shoppers whereby they give high priority to supermarkets with the most convenient/easy parking. Distance between supermarket and the house or office of the respondents is the third important factor which contributes to 21% of the overall scores followed by the availability of other stores near the supermarket. This may indicate that most respondents prefer to make multi-purpose shopping, where they can combine their shopping at the supermarket and other stores like clothing, electrical accessories, foods and games. The attribute 'Service' does not have much influence over the choice of supermarkets compared to the other attributes. It does not matter much whether a supermarket provides friendly staff or self service operations. This attribute will not have much effects on consumers choices on which supermarkets they wish to patronize.

The utility profiles of all the eight hypothetical supermarkets can be generated and they are given in Table 3. Profile E with all the favorable levels of the five attributes produces the highest utility, i.e. 7.9933 *util*. On the other hand, Profile A is the least desirable supermarket with a total utility of only 1.3957 *util*. It can be seen that all the hypothetical supermarkets with low price generate higher utility.

Conjoint technique also allows the analysis to be carried out based on the respondents' socio-economic characteristics such as gender, age, mode of transportation to the supermarket, marital status and number of children, race, income, how frequent a person shops in a month and average total expenditure for each shopping trip. Choice behaviors may vary amongst respondents based on their socio-economic characteristics. Table 4 shows the simple descriptive statistics of respondents' socio-economic characteristics taken into consideration in this study.

As shown in Figures 2 and 3, respondents who are above 30 years old and also those who are married seem to have very similar choice behaviors. This is not a surprise as most of the married respondents are also the older respondents. This group of respondents usually needs to do family grocery shopping which takes up a big portion of their income. Thus, price factor which indicates good value for money is the most important attribute to them. Younger and unmarried respondents seem to give high priority to convenience, which are, easy parking and distance of supermarket from office or home and price factor comes third in their choices. Availability of other nearby stores and services provide by the supermarket are less important to the respondents regardless of their age or marital status.

One hundred and twenty five or 47% of total respondents are married and out of those who are married, 88 or 70% of them have at least one child. As shown in Figure 4, those who have at least a child obviously prefer

TABLE 3. Utility of supermarket profiles

Profile	Distance	Stores	Price	Parking	Service	Total Utility
A	>15 Minutes	No	Average	Limited	Helpful Staff	1.3957
B	>15 Minutes	Yes	Average	Plenty	Helpful Staff	4.0537
C	≤15 Minutes	Yes	Average	Limited	Self Service	3.5743
D	≤15 Minutes	No	Average	Plenty	Self Service	4.4709
E	≤15 Minutes	Yes	Low	Plenty	Helpful Staff	7.9933
F	>15 Minutes	Yes	Low	Limited	Self Service	4.1401
G	>15 Minutes	No	Low	Plenty	Self Service	5.0367
H	≤15 Minutes	No	Low	Limited	Helpful Staff	4.9463

TABLE 4. Descriptive statistics

Demographic	Characteristics	Number of respondents	Percent
Age	≤30	139	52%
	>30	127	48%
Gender	male	114	43%
	female	152	57%
Marital Status	Single	141	53%
	Married	125	47%
Children	No child	37	30%
	With child	88	70%
Race	Chinese	152	57%
	Malay	77	29%
	Indian	36	14%
	Others	1	0%
Travel Mode	Car	214	81%
	Motor	41	15%
	Others	11	4%
Income	<RM1500	58	22%
	RM1500 - RM5000	164	62%
	>RM5000	44	16%
Frequency	≤ 4 Times	125	47%
	> 4 Times	141	53%
Expenditure	< RM100	141	53%
	≥ RM100	125	47%



FIGURE 2. Choice of supermarket by age

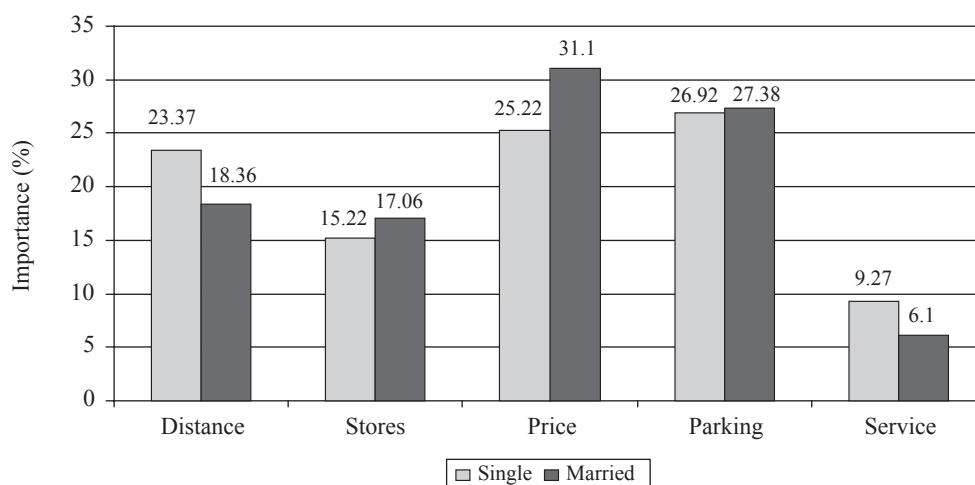


FIGURE 3. Choice of supermarket by marital status

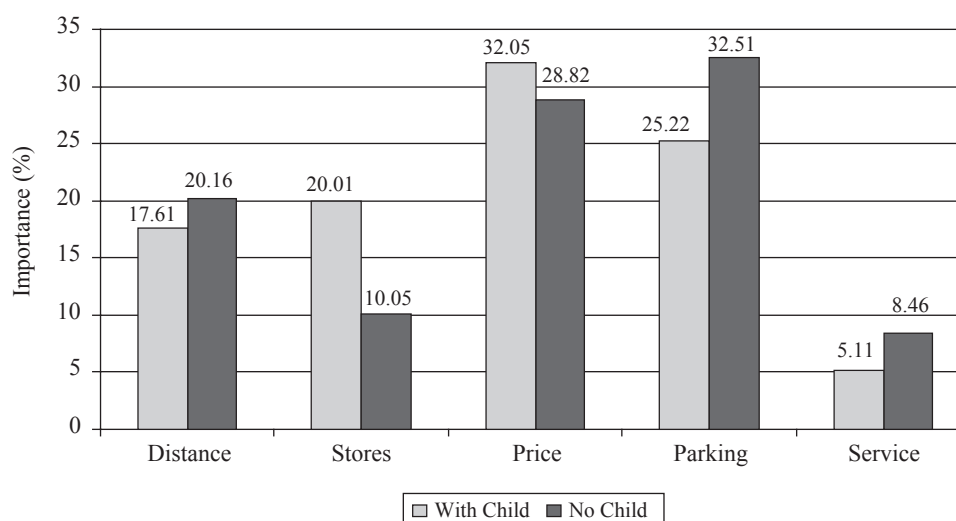


FIGURE 4. Choice of supermarket by those with or without children

to shop at supermarkets which provide good value for their money. The second important factor to them is the availability of parking space. Having other nearby stores are also relatively more important to them compared to their counterparts. Level of services provided by the supermarkets is the least important to them. Respondents without children, on the other hand, rank parking convenience as the most important attribute followed by price and distance.

Figure 5 indicates that gender is not an important factor in determining the choice of supermarket. The relative importance of all the five attributes is more or less the same among the male and female respondents.

There is only one respondent who is an Iban under the category of 'others,' thus, the analysis only takes into consideration the three major races in Penang; the Chinese which consist of 152 respondents (57%); the Malays, 77 respondents (29%); and the Indians, 36 respondents (14%). As shown in Figure 6, Indian shoppers are found to be most price-sensitive. They also behave quite differently from the other groups as they do not give a high priority to the

accessibility of parking space. The availability of other stores near the supermarket is the second most important attribute and convenience of parking only comes in third. The Malay shoppers seemed to find most of the attributes in this study to be important except for services provided by the supermarkets. The Chinese shoppers give a very high priority to convenience of parking followed by price and distance. Whether or not there are other nearby stores and services provided by the supermarket do not seem to be important to them.

Obviously shoppers who do not have their own transport (group under 'others' in Figure 7) would give high priority to distance of the supermarket from home or office. These respondents are generally from the lower income group. As indicated in Figure 7, supermarkets that provide low price and located near to their homes or work place are given the highest priority by these respondents. Distance is also the main concern for those who only own motorbikes. Those who own cars ranked easy accessibility of parking space as the most important attribute followed by price.

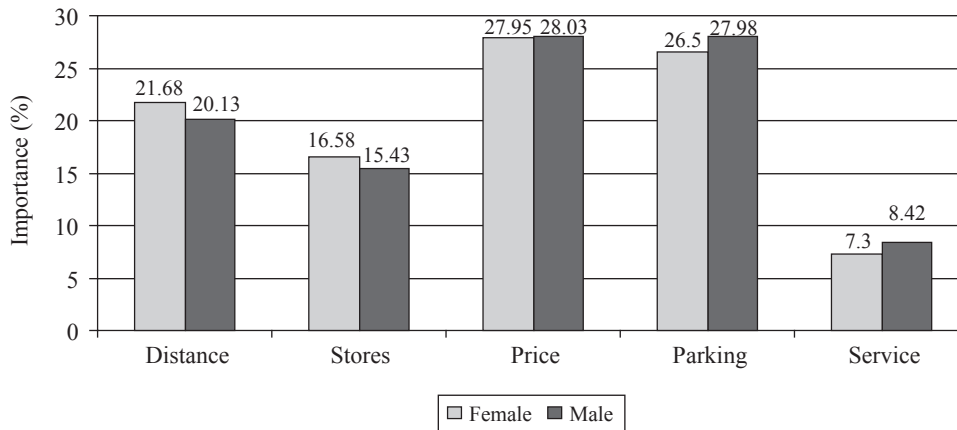


FIGURE 5. Choice of supermarket by gender

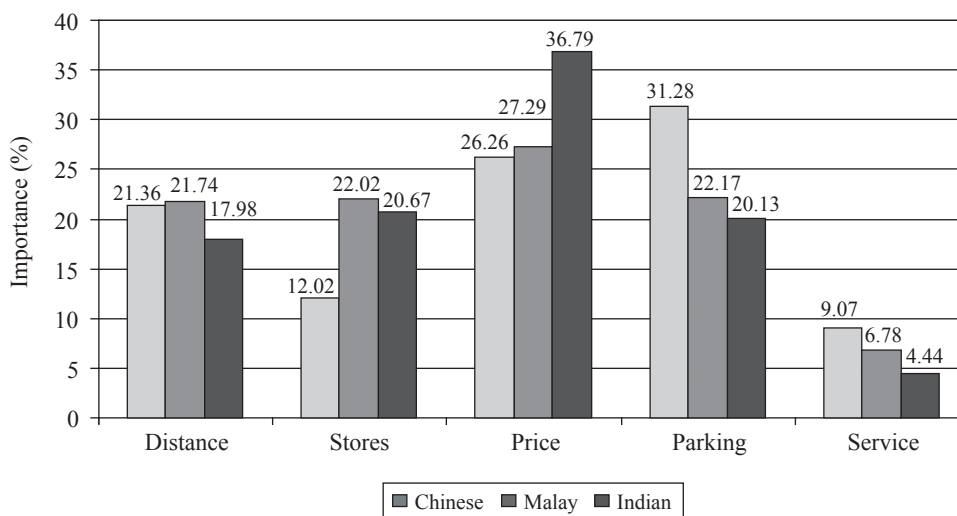


FIGURE 6. Choice of supermarket by ethnicity

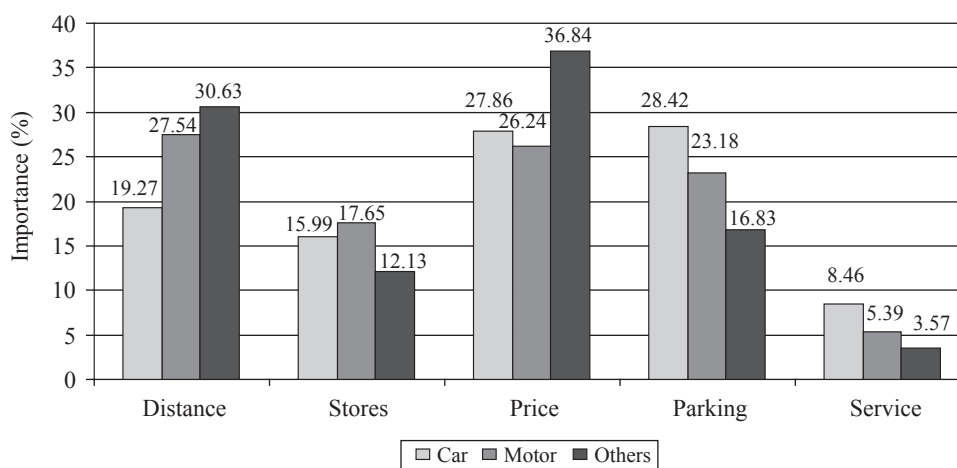


FIGURE 7. Choice of supermarket by travel mode

As shown in Figure 8, respondents from the lower income group seem to find most of the attributes are important to them. Except for services provided by the supermarkets, all other four attributes are found to be important to them. Among the attributes, distance (24.29%) is the most important attribute to the lower income group

followed by low price, which contributes 24.14%. The other two attributes which are relatively important to this group of shoppers are parking and availability of other nearby stores. Parking space contributes 21.23% while other stores near the supermarket contribute 20.93%. The middle income group (RM1500 – RM5000) consumers

ranked the availability of plenty of parking space as the most important attributes. However, for the higher income group (> RM5000) factory workers, low price still plays the most important role in the choice of supermarket. The accessibility of parking space comes second.

How often a consumer patronizes the supermarkets does not seem to be influenced by the characteristics of the supermarkets. As given in Figure 9, it is obvious that those who patronize the supermarkets more frequently give priority to the availability of parking space. Meanwhile, due to distance factor some respondents patronize the supermarket less frequently.

The amount spent on each trip to the supermarket does not seem to have any significant in influencing the choice of supermarket based on the five attributes (as shown in Figure 10) which are stated in this study.

DISCUSSION

In general, this study shows that ‘good value for money’ is the most important attribute in choosing the supermarket to patronize. Similar findings are also found in Dreze et al. (2004), Galata et al. (1999), Sinha et al. (2005) and Solgaard and Hansen (2003) as well as the Nielsen consumer global report (2008), where price is an important factor that influences the choice of supermarket or store format in most countries. However, the segmented models based on age, marital status, number of children, race, travel mode, income level and shopping frequency show that easy accessibility of parking space is more important than price for certain groups of people. This is similar to the Nielsen consumer report (2008) which finds this uniqueness amongst the Malaysian shoppers where they

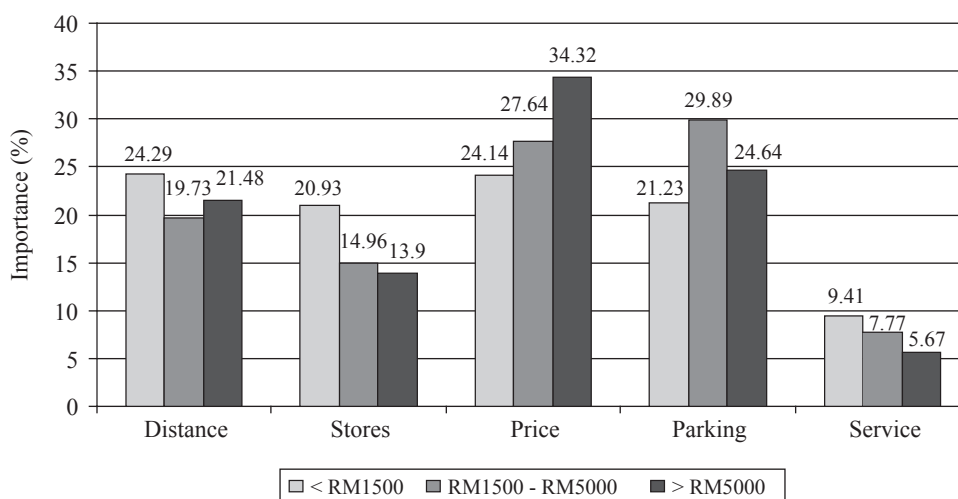


FIGURE 8. Choice of supermarket by income

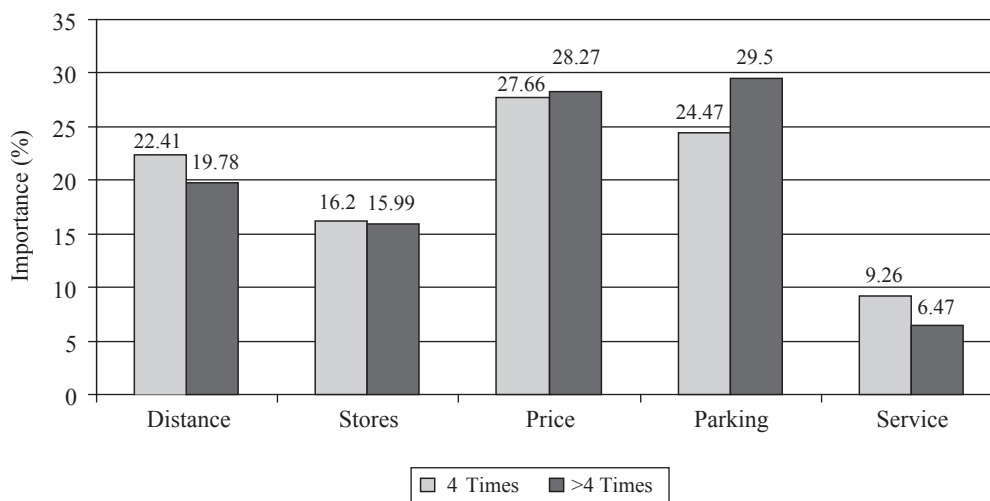


FIGURE 9. Choice of supermarket by shopping frequency

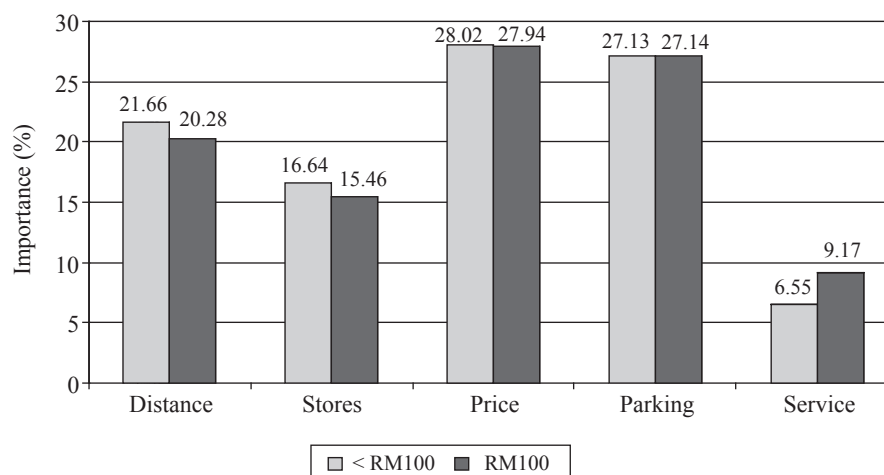


FIGURE 10. Choice of supermarket by expenses per trip

give top priority to convenient/easy parking when they choose which supermarket to shop. Studies carried out by Abubakar et al. (2001) and Lim et al. (2003) also conclude that convenient and easy parking is an important factor in influencing which supermarket to patronize. Distance of supermarket from home or office and the availability of other stores around the supermarket are generally ranked third and fourth, respectively. Whether or not the supermarket provides friendly staff or self-service does not matter much to the overall sample as well as the segmented groups.

The conjoint analytical technique has shown to be an effective method to gauge the relative importance of the attributes of supermarket in this study. As resources are always limited, the outcomes of this study could provide some important information for the existing or future supermarket retailers. The segmented models provide important insights based on the characteristics of the population of the area where the supermarket is located. For example, if a new supermarket were to be built in an area where the population is mostly Chinese, it has to place a greater importance to the accessibility of parking space. However, if the residents of the area to be considered are mostly Indian, then price has to be the most important factor that the retailers need to look into.

As stated in the Global consumers report by Nielsen (2008), the rules of the retailing game is not fixed; it varies based on where you retail. Thus it is very important to gauge the choice of consumers based on the attributes of the supermarkets before the decision of building a supermarket is made, as each location has different consumer choices.

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