

CONJOINT ANALYSIS IN CONDOMINIUM MARKETING

Abdul Hamid b. Hj. Mar Iman¹, Norhaya bt. Kamarudin¹, and Seah Lay Hoon²

¹Centre for Real Estate Studies

²Department of Property Management
Faculty of Geoinformation Science and Engineering
Universiti Teknologi Malaysia
81310 UTM Skudai
Johor, Malaysia

Correspondent Author's E-mail: norhaya@utm.my

Abstract

Condominium marketing involves a complex process of identifying buyer's behaviour, particularly their preferences. Analysis of buyer's preference, trade-off, and utility for different attributes of property products is vital to developers for a successful marketing. This paper examines the application of conjoint analysis to determine the combination of attributes that give potential buyers the highest expressed utility in choosing condominium properties. Respondents were exposed to a set of attributes that define the profiles of a particular condominium property and were asked to express their preference. They were also asked to indicate their level of total cardinal utility for each given profile. The utility-attribute relationship was then modelled using least squares technique for explanatory and predictive purposes. The results showed that price was the main priority in buying condominium units while location can be traded-off for a larger built-up area. The important implication of this study is that the analysis can identify market needs with respect to consumer's choice, preference, and expressed utility.

Keywords: Condominium, conjoint, attributes, preference, utility, marketing

1.0 INTRODUCTION

Marketing condominium units involves a complex decision-making process where marketers must identify a number of buyer's trade-offs between attributes of a particular property. These are often done based on presumed knowledge and qualitative decision drawing from individual or group observations. However, a more informed decision through an analytical enquiry is vital considering the complex nature and the high price paid for the property. Marketers face the question of attributes that buyers prefer besides the trade-offs that could be made between these attributes.

Condominium living in Malaysia is a result of pressure arising from many situations particularly the need to reside near to workplace in urban areas and getting public facilities. The complex buyer's purchase decision (Hamid, 2002), suggests the need for developers to be

well-informed of buyer's selection criteria. One of these is attribute preference. Each property attribute that buyers prefer must be carefully examined so that developers can provide product profiles that meet the market demand. Buyers evaluate these profiles before making trade-offs between them. For example, some buyers choose price over location, design over price, accessibility to workplace over building size, amenities over prestige etc. These trade-offs need to be measured and evaluated.

In general, the conjoint method is a qualitative multivariate technique used to measure buyer's trade-offs made in choosing from a pool of alternative profiles of a product (Kruskal, 1965; Green and Wind, 1975; Green and Srivinasan, 1978; Green and Srivinasan, 1990). It is particularly useful in dealing with situations in which a decision-maker has to choose among options that simultaneously vary across two or

more attributes (Luce and Tukey, 1964; Green et al., 1999). It is a scientific strategy of studying trade-offs among independent variables that maintain a dependent attribute constant (Luce, 1996).

In property marketing, the conjoint method forms the basis for analysing utility-bearing attributes that are embedded in the price of a property. Buyer's utility function can be determined using structural valuation method of priority whereby a buyer expresses the level of his/her utility for each attribute of a product and then makes a selection based on the rule of compensation (Mowen, 1990). This means, product purchase decision follows the utility-maximisation rule. The rule assumes that every user will select a product with the highest utility or part-worth between alternative products offered in the market as users are known to be wealth-maximisers (Samuelson, 1938). In the process of comparing the relative merit of different product profiles and in making selection to maximise utility, trade-offs between attributes making up a particular profile will occur. Similarly, in the process of selecting and buying properties, one will have to evaluate and select different attributes that make up property profiles in order to maximise his/her utility.

The conjoint method is an important tool to support product development, pricing and positioning (Orme, 1996b; Natter and Feurstein, 2002). It recognises the fact that buyers will not get all-the-best from a certain product, rather, a trade-off between different attributes that a product may yield. The process of making selections among different attributes of a product would reveal their real value (Orme, 1996a). Buyer's value-of-product determines the product quality that buyers are after (Green and Wind, 1975). In the real estate context, this analysis has been used in some problem-solving issues, for example, in condominium design and pricing (Fiedler, 1972), site evaluation (Knight and Menchik, 1974; Lerman and Louviere, 1978), individual preference of housing model (Louviere, 1982; Findikaki-Tsamaourtzi, 1982),

selection of old folks home, and selection of manufacturer's factory relocation (Levy, 1995).

2.0 BCKGROUNG THEORY

The pressure of modern living with busy lifestyle has forced developers to resort to self-contained property development. This promotes the concept of all-in-one place of living, working, leisure, and entertainment with facilities, design, price, privacy, comfort, and convenience created as the prime attributes and the selling points of a particular project. Together with other pertinent factors such as locality, amenities, prestige, positioning, accessibility, built-up area, management, and buyer's taste, they are the major price determinants (Chau and Chin, 2002; Chau and Chin 2004; Chua, 1998; Wong, 1998). Since price is a form of buyer's revealed utility, all these attributes can be ranked according to their marginal contribution to the total worth of a property. However, this can only be ascertained through some modelling of property price using actual market transaction data. This is not required in the conjoint method. Instead, the conjoint method uses buyer's expressed utility with respect to the attributes in order to ascertain the most preferred product. In this context, the conjoint method identifies product profiles and then searches for information on the related profiles. The set of information gathered will consequently enable buyers to evaluate these profiles based on certain criteria and hence to make product choice before translating the choice into actual purchase.

In marketing condominium units, it is important for developers to understand the utility-bearing attributes that prospective buyers are looking for before deciding to purchase them. Buyers' evaluation of these attributes is an important type of information for an effective marketing strategy. For example, the information facilitates developers to determine the right attribute mix of the products they are marketing.

In the above context, the conjoint method is adopted at the evaluative criteria level of a buyer's decision-making process. At this level, the product characteristics required by buyers are searched so that they will react with the problems of real estate purchase identified and these characteristics are evaluated in terms of type, number and importance (Hawkins et. al., 1989). Type comprises known characteristics (e.g. price, design, floor size) and unknown characteristics (e.g. style, prestige, image). Number relates to the total evaluative criteria considered in a particular purchase decision-making while importance concerns the influence that each criterion has in the comparison process. The accuracy of evaluation of product alternatives is situational. One situation is where product evaluative criteria do not give any impact on product choice due to identicalness of the levels of these criteria between two competing alternatives. Situational factors also affect the importance of a certain evaluative criterion. Location, for example, can be considered as an important criterion if time factor is ignored.

Having compared all the evaluative criteria for each alternative, buyer's priority against a particular alternative is formed based on the total expressed utility perceivably to be derived from attributes that form that alternative. A low-level total expressed utility reflects less degree of importance and vice versa. This forms a basis for assessing buyer's preference for the choice of attributes of real estate products. The question is that, which evaluative method should be used to arrive at an objective approach to deriving buyer's attribute preference. The process of selecting and evaluating product profiles suggest that there will be some trade-off between the profiles, making conjoint analysis relevant in determining the design of properties to be developed based on market study.

The method comprises five main steps (Table 1). The first step identifies respondent's level of utility using the part-worth model whereby a number of parameters are measured (Green and

Srinivasan, 1978; Green and Srinivasan, 1990). This model assumes that the relationship between utility and each attribute is linear; a straight-line curve connects utility points to different attribute levels.

Table 1: Steps in a Conjoint Analysis

Main steps	Methods
Consumer's selection	Part-worth model
Forming consumer's stimulus	Full-factorial design
Data collection	Full-profile approach
Measurement scale of dependant variables	Rating evaluation scale
Data analysis	Multiple regression analysis

In forming the stimulus, in the second step, the adoption of full factorial design enables the main effect and the interactive effects of the factors to be studied. Divisional factorial could not be used effectively as it will always confound the main effects of certain variables with the effect of interaction with other variables. This could result in inaccuracy when interpreting the findings (Sudman and Blair, 1988). Therefore, it is always important to determine the suitable set of attributes of condominium and the specification level of those attributes (Hair et.al., 1992).

The third step in conjoint analysis is to determine how potential buyers respond to product attributes and their levels that are exposed to them. An array of full-profile products are presented to the prospective buyers and the process of eliciting their preference is pursued. This is further discussed under Section 3.0.

The fourth and fifth steps, together, will need to be preceded by model specification. Let $p = 1, 2, \dots, t$ denotes the set of t attributes that are used in the study design. Let y_j denotes the level of the p_{th} attribute for the j_{th} stimulus; we first assume that y_{jp} is inherently continuous. The vector model assumes that the preference s_j for the j_{th} stimulus is given by

$$s_j = \sum_{p=1}^t w_p y_{jp} \tag{1}$$

where w_p denotes respondent's weight for each of the t attributes. The ideal point model posits that preference s_j is negatively related to the weighted squared distance d_j^2 of the location y_{jp} of the j^{th} stimulus from the individuals' ideal point x_p , where d_j^2 is defined as

$$d_j^2 = \sum_{p=1}^t w_p (y_{jp} - x_p)^2 \tag{2}$$

The part-worth model assumes that

$$s_j = \sum_{p=1}^t f_p(y_{jp}) \tag{3}$$

where f_p is a function denoting the part-worth of different levels of y_{jp} for the p^{th} attribute. In practice, $f_p(y_{jp})$ is estimated for a selected set of discrete levels of y_{jp} . The buyer's utility function from choosing a set of conjoint attributes, x is given as:

$$r_i(x,z,s,p) = \phi[U_i(x,z,s,p)] \tag{4}$$

where r_i is the rating for product i , z is a composite product, and p is product price. Ratings are regressed on the attributes describing the alternative choices of product attributes. Then, the general model for estimating buyer's expressed utility with respect to a certain combination of product attributes can be specified as follows:

$$R = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k + e \tag{5}$$

where R = level of buyer's expressed cardinal utility; x = product attributes; β = conjoint marginal utility; and e = error term. The estimation of the model follows the ordinary least squares (OLS) technique. The estimated model is then statistically evaluated in the conventional way based on R^2 , F-value, t-values and some diagnostic tests.

3.0 DATA AND ANALYSIS PROCEDURE

A purposive sample of seventy-six middle-income potential buyers was selected for this purpose. Following a pilot survey, it was decided that in order to reduce respondent's confusion in evaluating too many sets of prospectus, only three most important attributes

were included to form product profiles, namely price, location, and floor area (Appendix II).

Table 3: Product Attributes and their Levels

Attribute	Description	Attribute level
Location	Physical distance	Near to workplace (W) Near to transportation (T)
Price	Low (L) Medium (M) High (H)	RM125, 000- RM150, 000 RM150, 000- RM175, 000 RM175, 000- RM200, 000
Floor area	Small (S) Medium (D) Big (B)	800-1000 sq. ft 1001-1200 sq. ft 1202-1400 sq. ft

The location attributes were assessed at two levels, price attributes at three levels, and built-up area attributes at three levels (Table 3). The respondents were given a set of structured questionnaire and were asked to rank the levels of condominium attributes that affect their choice according to their preference (Appendix I). The attributes (and their levels) in Table 3 were re-arranged to form eighteen combinations

Table 4: Matrix of Marketing Stimulus						
	Near to workplace (W)			Near to public transport (T)		
	Low (L)	Medium (M)	High (H)	Low (L)	Medium (M)	High (H)
Small (S)	WLS	WMS	WHS	TLS	TMS	THS
Medium (D)	WLD	WMD	WHD	TLD	TMD	THD
Big (B)	WLB	WMB	WHB	TLB	TMB	THB

Notes:
 Location: Near to workplace (W); Near to public transport (T);
 Price: RM125,000 – RM150,000 (L); RM150,000 – RM175,000 (M); RM175,000 – RM200,000 (H). Floor area: 800 – 1,000 sq.ft. (S); 1001 – 1200sq.ft. (D); 1201 – 1400 sq.ft. (B)

(A through R) of factors based on the matrix of marketing stimulus as shown in Table 4.

The matrix represents the complete profiles of condominium units in Johor Bahru where the respondents were able to evaluate a set of

Table 2: Respondent’s Profile

Demography	Frequency	(%)
Sex		
Female	43	56.6
Male	33	43.4
Age group		
<25	16	21
25-34	52	68
35-44	5	7
45-54	3	4
Race		
Chinese	61	80
Malay	6	8
Indian	7	9
Others	2	3
Marital status		
Single	68	89
Married	8	11
Occupation		
Semi-professionals, clerical	1	1
Skill worker, chief clerk, secretary, low-rank officers	9	12
Semi-professional, low rank manager, senior executives	15	20
University graduates, manager, executives	46	61
Qualified professionals	5	7
Work experience		
<2 years	16	21
2-5 years	36	47
5-10 years	19	25
> 10 years	5	7
Monthly income		
RM2, 000-4,000	70	92.1
RM4001-6000	3	4
RM6001-8000	2	2.6
RM8000 and above	1	1.3
Home ownership status		
Family home	24	32
Own home	7	9
Rented home	45	59

factors simultaneously. In order to elicit respondent’s level of utility, these profiles were included in the questionnaires. The profiles were arranged at random. The technique used to measure respondent’s expressed utility was an 11-point rating scale (Appendix II). Respondents were asked to indicate their preferences for the condominium profiles based on the exposed combination of attributes. A 10-point score represents highest expressed utility while a 0-point score shows non-preference. This technique was chosen since it was easy to administer and minimised the effect of bias during interviews.

The data collected from the interviews were analysed using the Statistical Package for Social Science (SPSS). Analysis was carried out to measure consumers’ marginal utility, total utility, and the trade-offs for product attributes. The independent variables used in this study were price, location, and floor size. The dependent variable was respondents’ expressed utility for the stated combination and levels of attributes. This procedure used “1” to represent available factors and 0 for non-available factors. The analysis yielded a regression equation to calculate the expected value of the dependent variable with the pre-determined levels of property attributes.

4.0 RESULTS AND DISCUSSION

4.1 Sample Profile

Table 2 shows the respondents’ profiles. More than half of them were female Chinese mostly between 25 to 34 years old, semi-professionals, low-rank manager, senior executives, university graduates, manager, and executives. With less than six years of working experience, about two-thirds of the respondents were still new in the work force. The income of the majority of respondents was between RM 2, 000 to RM5, 000 per month. Most of them were singles, living either in a rented property or living together with their parents.

4.2 Marginal Utility of Attributes

The regression results are shown in Table 5. Based on the R², the model explained about 94% variation in buyer’s expressed utility for condominium units in the study area. All variables were statistically significant and have the correct signs.

Table 5: Basic Regression Results (Dependent: 11-point Buyer’s Expressed Utility)

R ²	0.939	
Adj. R ²	0.914	
F-value	37.133	
SSE	0.408	
SEE	2.000	
Variable	Coefficient	t-value
Constant	2.500	10.607
Nearness to workplace	0.556	2.887
Unit Price RM 125,000 to 150,000	2.500	10.607
Unit Price RM 150,00 to 175,000	1.167	4.950
Floor area 1,001 to 1,200 sq. ft.	1.333	5.657
Floor area 1,201 to 1,400 sq. ft.	1.833	7.778

The regression coefficient measures the marginal utility of a particular attribute level of condominium unit offered to the prospective buyers. Table 5 indicates that price tag of RM 125,000 to RM 150,000 per unit was the most important factor influencing prospective buyer’s expressed utility. Although the three price levels were affordable to the respondents, they have preferred units with the lowest price.

Interestingly, location near to workplace was found to be the least important factor influencing prospective buyer’s expressed utility. At the outset, this result did not seem to auger well with the traditional location theory which suggests that the most important factor affecting property is the nearness to workplace. A further analysis discovered that the respondents were mainly young people who have own transport and do not mind travelling a longer distance to work. The respondents were also particular about built-up area whereby a

larger floor size was the second most preferred attribute.

Although marginal utility indicates the relative importance of a particular level of attribute against that of another, it could not describe buyer’s main preference as in the real world they could not get all the best in a certain product. This requires a formulation of priority equation. Information integration suggests that priority formation is effected when users combine all the information on a set of attributes. Thus, the equation derived was used to calculate respondent’s priority by combining his/her marginal utility on each evaluated attribute level to determine the total utility. Discussion follows.

4.3 Total Utility and Order of Preference

Based on the part-worth utility concept, all the eighteen attribute profiles of condominium units in the study area were ranked to determine respondent’s order of preference. The analysis then measured respondent’s total utility and the order of preference to determine how ideal attributes of condominium units make up a maximum utility of a prospective buyer. The total utility of eighteen condominium attributes profiles was calculated by using dummy variables in the respondent’s preference equation whereby “1” represented factor level that was present while “0” represented factor level that was not present in the profile. The total utility was then arranged based on the rules of maximum utility. It assumed that respondents would have selected the product that will yield the highest utility (part-worth).

Table 6 suggests that respondents have shown most preference for profile G condominium since it combined the most ideal attribute levels. However, an ideal situation seldom exists forcing buyers to go for the next scale of preference should the most ideal situation is not attainable. There will be the ‘trade-off’ for less

preferred attribute combinations. For example, the trade-offs between different combinations of attribute levels has resulted in the selection of condominium with profile D, P, H, and so on.

This selection process will continue until all eighteen attributes profiles were evaluated. In our case here, the least preferred profile of condominium attribute level profile was L.

This analysis reveals that buyers are utility-maximisers whereby the objective of purchase is to maximise utility of the different attributes at the lowest cost. The finding also shows that

certain utility functions have the same ranking such as that shown in profiles A, E, J, M, and O. This means that buyers can become indifferent to certain combinations of levels of product attributes, making them difficult to choose.

4.4 The Real Value of User’s Preference

Theoretically, when users have to trade-off among different product attributes in a purchase decision, the true value of product attributes will be known (Orme, 1996b). In order to assess the trade-off pattern in condominium selection, two

aspects of choice was analysed. The first was the attribute that a buyer finds it difficult to choose and the second was the attribute that a buyer finds it easy to make concession. The levels of concession for each of the attribute considered are known through the ranking of respondent’s level of preference (Table 7).

Table 7 shows that Profile G condominium was treated as a control profile in this study since it was assumed to be “too perfect” and seldom exists in the real world. The ‘what-if’ issue was raised to observe the trade-off pattern of respondent’s selection. The issue is addressed by first eliciting respondent’s choice if profile G is not offered.

Table 6: Total utility and order of preference

Profile	Location	Price (RM) ('000)	Floor size (sq. ft)	Total utility	Rank
A	Near to workplace	125-150	800-1,000	5.556	5
B	Near to workplace	150-175	800-1,000	4.223	13
C	Near to workplace	175-200	800-1,000	3.056	17
D	Near to workplace	125-150	1,001-1,200	6.889	2
E	Near to workplace	150-175	1,001-1,200	5.556	5
F	Near to workplace	175-200	1,001-1,200	4.389	11
G	Near to workplace	125-150	1,201-1,400	7.389	1
H	Near to workplace	150-175	1,201-1,400	6.056	4
I	Near to workplace	175-200	1,201-1,400	4.889	10
J	Near to public transport	125-150	800-1,000	5.000	8
K	Near to public transport	150-175	800-1,000	3.667	16
L	Near to public transport	175-200	800-1,000	2.500	18
M	Near to public transport	125-150	1,001-1,200	3.833	14
N	Near to public transport	150-175	1,001-1,200	5.000	8
O	Near to public transport	175-200	1,001-1,200	3.833	14
P	Near to public transport	125-150	1,201-1,400	6.833	3
Q	Near to public transport	150-175	1,201-1,400	5.500	7
R	Near to public transport	175-200	1,201-1,400	4.333	12

The true scale of respondent's selection was that units with price range of RM 175,000- RM 200,000 and floor area of 800-1,000 sq. ft. were

Table 7: Attribute Preference of the Respondents

Profile	Location	Price (RM'000)	Floor size (sq. ft)	Utility	Rank
G	Near to workplace	125-150	1,201-1,400	7.389	1
D	Near to workplace	125-150	1,001-1,200	6.889	2
P	Near to public transport	125-150	1,201-1,400	6.833	3
H	Near to workplace	150-175	1,201-1,400	6.056	4

not considered when other attribute levels were offered. The attribute level where concession was easy to make was for units with building size of 1,201-1,400 sq. ft. This could be attributed to the fact that most of the respondents were singles or have a small family size. Although the location attribute was the main reason for selecting condominium units, respondents can trade-off this attribute for a larger built-up area of 1,001-1,200 sq. ft. However as far as the price is concerned there was no concession given and most of the respondents have agreed to RM 125,000-RM 150,000 price level suggesting that there is no trade-off for price.

4.5 Implications and Further Discussion: Conjoint Analysis and Marketing Strategy

The use of conjoint analysis in this study has an impact on the marketing strategy that developers can adopt. Marketing task is a process whereby developers need to identify consumer's needs and preference. The analysis on product's attribute preference should directly inform developers on the specifications that the market requires. This direct information helps

developers to embark on the development with confidence particularly in product positioning. Product positioning strategy encompasses five elements, namely marketing mapping, product strategy, price strategy, promotional strategy and distributional strategy (Hamid, 2002). The findings of this study have at least two important implications in condominium marketing. Firstly, product's characteristic mapping. Secondly, buyer's demographic mapping.

In this study, respondents' profile showed that the majority of condominium buyers or tenants could have been middle-income young executives, professionals, and singles that may have not owned a house yet. Based on their demographic characteristics and priority (e.g. the lifestyle of this group is mainly related to career, shopping, and recreation), strategy can be planned to meet their needs. For example, these groups will normally prefer condominium units not only with the lowest price but also one that is reasonably spacious.

This case study has shown that price cannot be traded-off and, hence, developers must stick to the price that buyers can tolerate. This appears to be true to a certain extent, as the market for high-priced condominium units does not have good demand in the study area. Market analysis has shown that there was no or only slight increase in the sale price of condominium market in Johor Bahru (*Property Market Report*, 2004). In addition, the Johor Bahru's condominium market had experienced a slow growth compared to other residential property markets. Between 2003 and 2004, three out of seven projects completed have achieved a sale of less than fifty percent (*Property Market Report*, 2004). Besides, four projects could not reach an ideal sale target during their first launching and requires a re-launching. This has not recovered until today. Therefore, making an informed decision could be problematic unless information on buyers needs is made available. The conjoint method has, in some way, addressed the inefficient nature of the property

market by approaching market consumers directly.

Another aspect that is beneficial in this study is to combine information obtained and to act accordingly. For example, as shown in the analysis, buyers do not mind if the location is rather inferior. This allows developer to capitalise the situation by acting accordingly and by trading-off price for location. This study has revealed that the most considered price range of condominium units was between RM 125, 000 to RM 150,000. In order to increase buyer's utility, the price range have to be maintained even if expectations for other quality attributes such as building area, location and product concept will have to be traded-off. Although condominium units with a built-up area of more than 1,000 sq. ft. have been most favoured by middle-income buyers over location, the basic infrastructure must be well laid out with good access to main public facilities, business area, learning institution and recreational area.

From marketing organisation point of view, conjoint analysis provides an opening gate for balancing between product quality and buyer's satisfaction with respect to certain attributes that make up a particular product profile. Namwo Kang et al. (2007) have proposed a theory in integrating the design process suggesting the solutions for the trade-offs between marketing domain that pursues the utility of product and research and development's domain that emphasizes robustness of product quality. This integrated design process will give enterprises competitive advantages in new product development (NPD).

5.0 CONCLUSION

Understanding consumer needs and wants is vital in condominium marketing. This can only be achieved by studying buyers' behaviour. This study has demonstrated the use of conjoint analysis to evaluate buyer's expressed utility and preference in selecting condominium units.

It strengthens the marketing theory that says that buyers are utility-maximisers. The results also showed that pricing was the most important aspect of condominium marketing followed by building size and location. However, in facing the reality of life, some trade-off between different profile attributes of condominium will have to be exercised.

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Appendix I: Factors Used to Elicit Respondents' Preferences for Condominium Attributes

Location	Near city centre Near working place Near public transport Near shopping area Near recreational centre Near amenities centre Others (specify): _____	Price	RM 125 000 – RM 150 000 RM 150 000 – RM 175 000 RM 175 000 – RM 200 000 RM 200 000 – RM 225 000 RM 225 000 – RM 250 000
Density	High Density Medium Density Low Density	Floor Level/ Height	Below 4 th Floor 5 th – 10 th Floor 11 th & above
View	Facing Swimming Pool Facing Town Area Facing Green Scenery Facing Sea/River/Lake Facing Hill	Built-up Area	800-1000 sq. ft. 1001 - 1200 sq. ft. 1201 - 1400 sq. ft. 1404-1600 sq. ft. 1601 & above sq. ft.
Design	Balcony Large Window Good Sound Proofing Marble/Ceramic/Mosaic Flooring Others (specify): _____	Unit Types	2 bedrooms 3 Bedrooms 4 Bedrooms
Amenities	24Hours Guard/ Surveillance Nursery Lauderette Cafeteria Car Mini Market BBQ Area Others (Specify): _____	Facilities	High Speed Modern Lift Parking Space Swimming Pool Wading Pool Function Hall Tennis/Squash/Badminton Court Gymnasium Sauna Children Playground Jogging Track Gazebo Others (specify): _____

