

THE DEVELOPMENT OF A HEDONIC PRICE MODEL OF RETAIL PROPERTY FACILITIES DESIGN

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Previous research has shown that there is a strong influence of building design on the rental price of commercial property. Studies, such as Vandell and Lane (1989), have dealt with the pricing of good architecture in a hedonic framework. This current study considers the influence of commercial retail facilities design on shopping centres in the city centre of a major Malaysian city, in order to ascertain customer satisfaction in terms of willingness to pay rent for a property facility. The level of importance of various attributes such as flexibility, quality of facilities' engineering services, appearance, image, accessibility and location are used in the process of deriving a hedonic pricing model. The results are used to determine whether the fluctuations in the level of rental prices determined from the model could justify the cost of incorporating specific levels of the attributes.

This paper reports on the first phase of the research, which uses a systematic and structured approach to analyse design attributes in a manner, which can be easily validated and updated by property owners.

Keywords: building design, rental prices, retail facilities.

INTRODUCTION

The future of commercial retail facilities is intimately tied up with the communities they serve. Retail facilities design is a dynamic and growing industry indirectly affecting all our lives, whether as designers, retailers or customers. From its first appearance with the growth of retailing in the nineteenth century, retail facilities design has always reflected the trends of the society around it. Today, retail facilities design is an established profession, playing a crucial role in the success of retailing, in bringing customer and product together.

In this area, it is essential to anticipate and understand the attributes of retail facilities design and how they could influence the level of rental prices. This will assist retail owners in providing better facilities for tenants, improving the leisure experience for customers and gaining more profits. However, uncertainty in predicting this influence may cause some retail facilities to reach the end of their economic life much earlier than expected. This is due to the decrease in tenant demand and low rental prices.

The aim of this research is to forecast the important attributes of retail facilities design and its influence on the level of rental prices. If the influence of an attribute can be forecast during the design and cost planning stage, therefore, it could prolong the retail facilities' economic life, increasing tenant demand and upgrading rental prices. There may be considered to be six attributes of retail facilities design, viz.: flexibility, quality, image, appearance, accessibility and location. The analysis will be in three phases. The first phase involves listing the attributes in a questionnaire to retail owners and tenants and analysing and ranking the most important attributes according

to their scores. This survey was conducted in the city centre of Ipoh Perak, Malaysia in the summer of 1998. Ninety retail owners and tenants from six selected commercial retail facilities participated. The second phase (currently being undertaken) is to forecast the change produced in the level of rental prices. The change, produced by those attributes, will be measured by a Hedonic Price Model. The third phase is to develop a financial appraisal, to calculate whether or not the fluctuation in the level of rental prices could possibly justify the cost of incorporating the required changes in specific attributes. In this paper, the findings of the first phase of the research are discussed.

Hedonic price models

It is worth explaining, at this point, what is meant by a 'Hedonic Price Model'. The earliest example of an empirical study for the development of a hedonic price model for differentiated products was Wough (1928), an agricultural economist, who wished to discover the important quality factors determining vegetable prices. Since then, many different products, such as automobiles, tractors, electrical goods etc. (Griliches 1988) have attracted hedonic price model researchers. Two major studies in the area of property, though, were undertaken by Hough and Kratz (1983) and Vandell and Lane (1989). Both of these studies dealt with the pricing of good architecture in a hedonic framework.

Our model will be based on a price index, which relates the market price or rent of a property to its characteristics. A basic notion is that prices can be simulated for characteristics, which do not sell on the market by themselves. Any property can be thought of as a bundle of characteristics or attributes, with each attribute increasing the rental value of the property. Statistically, the hedonic approach builds a property from scratch – adding features and summing the value of those features, until the sum of the values accounts for the rental value of the property. Basically, in this approach, data obtained on the price, property characteristics, location, accessibility and environmental quality of properties can be fitted to an equation of the form:

$$\text{Property price or rent} = f(\text{attributes})$$

The resulting model will indicate the relative importance of the factors determining the level of price or rent.

OBJECTIVES OF THE FIRST PHASE RESEARCH

The objectives are twofold:

1. To analyse and determine that most of the designated design attributes, which are flexibility, quality, image, appearance, accessibility and location are in line with the opinions of retail owners and tenants.
2. To estimate and rank the level of importance of design attributes, according to the retail owners' and tenants' choices. These attributes were listed in a questionnaire for them to score in order of importance.

Sources of data

Six designated design attributes were listed in a questionnaire. The attributes were divided into sub-group and individual factors, derived from a literature review (see later references on hedonic price studies in the field of commercial property) and also from a pilot study undertaken by one of the authors. The questionnaire was sent to the commercial retail facilities owners and tenants to justify which of these attributes were the most important in designing retail facilities. SPSS and Minitab were used to rank these attributes. When the ranking had been determined, the most important attribute

Table 1: Location of the sample retailers

Retailer	Location
Jaya Jusco Kinta City	Jalan Tasek
Ipoh Parade	Jalan Sultan Idris Shah
Greentown Mall	Jalan Panglima Bukit Gantang Wahab
Makro	Jalan Gopeng
Ocean Superstore	Jalan Silibin
Ipoh Parkson Grand	Jalan Pasir Putih

Table 2: Comparison of measurement techniques according to the criteria for measuring attributes and location

Criterion	Likert Scaling	Thurstone Scaling	Weighted Evaluation
Has been proven reliable in previous studies?	Only for measuring variables	Only for measuring location	No proven
Measurement based on ratio and interval scale?	Interval scale	Ratio scale	Interval scale
Minimum bias in the ranking?	No	Yes	Yes

with its sub-group and individual factors was selected for further analysis by using a Hedonic Price Model in second phase research. The aim is to forecast the change produced in the level of rental prices influenced by this attribute.

Collection of data

In this first phase of research, the samples of data under examination include different size commercial retail facilities. Since one of the objectives of this study is to rank the attributes, by including different size commercial retail facilities in the sample, it was possible to examine the extent to which ranking may differ between retailers. These commercial retail facilities are relatively new and the oldest building in the sample was only 10 years old. The entire sample is located in the city centre of Ipoh Perak, Malaysia as shown in Table 1.

To maintain the consistency, only respondents who were retail owners and tenants from selected retail facilities participated. The respondents were asked to score the attributes and its sub-groups and individual factors in the questionnaire in order of importance and to select preference location based on their knowledge and experience.

The required samples of both retail owners and tenants were undertaken using a stratified sampling process. Practically, it was feasible to take a sample of six representative retail facilities and then choose a random sample of owners and tenants to be interviewed, provided that they all met specific criteria (see below). Fifteen respondents from each retail facility participated. In total, there were thirty retail owners and sixty tenants. However, the vast experience of respondents and their views should reflect the opinion of most retailers in Malaysia. Although the respondents were randomly selected in this research, they all met the following criteria:

- They had been involved mainly in the process of decision-making for developing and maintaining commercial retail facilities.
- They had experience in managing retail business and facilities.

- They had been involved in the retail industry for at least three years, either locally or internationally.

Measurement techniques

A comparison of alternative methods was made in order to design the most appropriate measurement techniques. This was done by listing and selecting the most appropriate technique or scaling to measure the designated attributes and retail location. The result of a comparison between the listed appropriate techniques or scaling is tabulated in Table 2. It shows that Likert Scaling was suitable for measuring the designated attributes and its factors, whereas, Thurstone Scaling was suitable for measuring the location preferences.

SPSS software was used to analyse the hypothetical attributes, their sub-groups and individual factors of commercial retail facilities design. The ranking of sub-group and individual factors was determined by selecting the overall means of individual factors for each sub-group factor. Whereas the ranking for attributes was determined by selecting the highest mean of the sub-group factors. The presentation of results shown the mean and standard deviation. MINITAB software was used to analyse the 6 preference locations. A measurement technique producing expected values for measures of association in a matrix form (Silver 1992) were used.

Preliminary research findings

The preliminary findings from the sample of ninety retail owners and tenants are shown here. The ranking of attributes and sub-groups were based on the average overall mean and standard deviation of each individual factor. (The mean and standard deviation of the two most important factors in each sub-group are shown in the Appendix). The ranking of attributes, sub-group factors and individual factors are as shown in Tables 3–5. Based on these findings, the most significant groups of attributes are accessibility, quality and image of commercial retail facilities

These attributes appear to have a significant influence on a retail facilities design preferences. Therefore, it is suggested that these attributes could have a significant influence on the level of rental prices. The validity of the hypothesis will be determined during the next phase of research.

THE LOCATION STUDY

The aim of this part of the study is to forecast the preferred location for the development of a retail building and its influence on the level of rental prices. If preference for location can be forecast, it could prolong a retail facility's economic life, increasing tenant demand and upgrading rental prices.

Details on area coverage from the six considered locations (see Table 1) were structured in the questionnaire. The respondents were asked to measure their preference for locations on a pair-wise basis and the locations were scaled in accordance with the preferences by using Thurstone scaling.

The measurement of empirical data for location involved four stages of calculation before the locations could be ranked.

Table 3: Ranking of attributes

Attributes		Rank	Mean	SD
Accessibility	(A)	1	4.29	0.94
Quality of premises, services and amenities	(Q)	2	4.04	0.97
Image	(I)	3	4.00	0.89
Appearance	(AP)	4	3.66	1.00
Level of flexibility	(F)	5	3.22	1.03

Table 4: Ranking of sub-group factors

Sub-group factor	Attribute	Mean	SD
Better maintenance programme	I	4.44	0.86
Accessibility to the building	A	4.29	0.94
Better business facilities and other amenities	Q	4.25	0.90
Capacity of power supply	Q	4.07	0.94
Efficient energy-control system	Q	4.07	0.95
Better neighbourhood and security	I	4.04	0.99
Level of efficiency of the lift	Q	4.02	0.98
Better car-parking premises	Q	3.96	1.07
Preferred architectural style and design	I	3.95	0.86
External building signs and identification	I	3.89	0.96
Interactive main entrance	I	3.85	0.82
Quality of internal appearance	AP	3.82	0.98
Better level of comfort	Q	3.80	1.05
Quality of external appearance	AP	3.51	1.02
Flexibility to accommodate changes in space utilisation	F	3.36	1.02
Capacity to accommodate new technology	F	3.07	1.04

Table 5: Ranking of individual factors

Individual factor	Attribute	Mean	SD
Telecommunication facilities i.e. telephone, fax, telex	Q	4.52	0.86
Safety design i.e. easy to excess fire escape, stairs, lifts	I	4.51	0.77
Cleaning services i.e. toilet room, shopping area	I	4.50	0.93
Building security system	I	4.49	0.93
Easy accessible of public transportation (taxi, bus, train)	A	4.41	0.89
Air-conditioning and fan system	Q	4.39	0.92
Standby generator	Q	4.38	0.88
Effective control system	Q	4.32	0.85
Visible symbols such as flags, building and road signs	I	4.18	0.89
Decorations i.e. plants, flowers, painting, artwork	I	4.12	0.76
Building automation system	Q	4.08	0.91
Compatible with surrounding	AP	4.08	0.97
Car parking spaces i.e. greater than standard requirements	Q	4.02	1.02
Decoration tile finish	AP	3.97	0.97
Total floor area and average floor area per floor	F	3.74	0.99
Column free floor in areas that are serviceable	F	3.69	1.16

NEXT STAGE OF THE RESEARCH

It is important to include only the important attributes of all groups and subgroups in the most appropriate equation model. This is to ensure that not only the influence of the individual variables can be measured but also that the influence of different groups and sub-groups can be analysed.

The influence on the level of rental prices of the differing levels of attributes will be analysed using a discriminant analysis. Rental difference will be used as the dependent variable in the regression equation:

$$R^* - R = f(X_1, X_2 \dots X_n)$$

Where:

R^* = The highest rental in the market

R = The individual rental level at each location

$X_1 \dots X_n$ = attributes

CONCLUSION AND RECOMMENDATIONS

The first phase of the research has analysed in detail the design attributes of commercial retail facilities according to the survey results based on ninety retail owners and tenants from six selected commercial retail facilities. These findings may give a better understanding to the retail owners and tenants on the attributes of good retail facilities design and how they can be prioritized. This research used a systematic and structured approach in analysing design attributes, which can be easily validated and updated by retail owners and tenants. This would encourage retail owners and tenants to make proper investigation of the trends of commercial retail facilities design in future.

The presentation of the preliminary findings is important for the next phase of the research. It was found that accessibility, quality and image are important attributes. For individual factors, it was found that the telecommunication facilities (telephone, fax, telex) safety design (easy to access fire escape, stairs, lifts) and cleaning services (toilet room, shopping area) are important. Whereas, for sub-group factors, it was found that a better maintenance programme, accessibility to the building and better business facilities and other amenities are important.

However, it must be stressed that the findings are applicable only to commercial retail facilities in one area of Malaysia. Future research in this area could consider replicating this research for other facilities and locations or extending it to include other types of developments. Alexander (1995) and Khalid (1992) show the potential for this work. In order to make this analysis more reliable, a large and varying size of commercial retail facilities sample is required. This is important to determine better justification either from the small or big retail facilities sample. However, most of the data needed sometimes is quite difficult to collect due to the lack of commitment of retail owners and tenants. Therefore it needs the government departments or large organization research to be directly involved or at least to participate in future research.

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APPENDIX

Attribute: Level of flexibility

1.1 Capacity to accommodate new technology

Factor	Mean	SD
Co-ordinated grids for lighting, ceiling panel, air-condition and floor	3.54	0.86
Column free floor in areas that are potentially high serviceable	3.69	1.16

1.2 Flexibility to accommodate changes in the utilization of space

Factor	Mean	SD
Flexible walling system i.e. mountable partition walling system	3.51	1.08
Total floor area and average floor area per floor	3.74	0.99

Attribute: Quality of services, premises and amenities

2.1 Level of efficiency of the lift

Factor	Mean	SD
Number of floors served by each lift	4.09	0.99
Effective control system	4.32	0.85

2.2 Capacity of power supply

Factor	Mean	SD
Capacity of power supply i.e. 3 phase power	3.99	0.92
Standby generator	4.38	0.88

2.3 Better level of comfort

Factor	Mean	SD
Air-conditioning and fan system	4.39	0.92
Noise absorption system	3.92	1.02

2.4 Efficient energy-control system

Factor	Mean	SD
Building automation system	4.08	0.91
Energy-saving lighting sources or using more natural lighting	4.06	0.99

2.5 Better car-parking premises

Factor	Mean	SD
Car parking spaces i.e. greater than standard requirements	4.02	1.02
Type of car parking i.e. basement, ground, roof	3.91	1.12

2.6 Better business facilities and other amenities

Factor	Mean	SD
Telecommunication facilities i.e. telephone, fax, telex	4.52	0.86
Leisure facilities i.e. internal cinema theatre, children playground	4.40	0.86

Attribute: Appearance

3.1 Quality of internal appearance

Factor	Mean	SD
Quality of furniture and décor	3.82	1.04
Compatible with surrounding	4.08	0.97

3.2 Quality of external appearance

Factor	Mean	SD
Plastered bricks and painting	3.80	0.91
Decoration tile finish	3.97	0.97

Attribute: Image

4.1 External building signs and identification

Factor	Mean	SD
Visible commercial retail facilities signs	3.92	0.97
Visible symbols such as flags, building and road signs	4.18	0.89

4.2 Better neighbourhood and security

Factor	Mean	SD
Building security system	4.49	0.93
Security staffs or guards	4.37	0.89

4.3 Interactive main entrance

Factor	Mean	SD
Decorations i.e. plants, flowers, painting, artwork	4.12	0.76
Matching, warmer and softer colour scheme	4.03	0.81

4.4 Preferred architectural style and design

Factor	Mean	SD
Building layout i.e. easy excess to other floors	4.24	0.81
Safety design i.e. easy to excess fire escape, stairs, lifts	4.51	0.77

4.5 Better maintenance programme

Factor	Mean	SD
Cleaning services i.e. toilet room, shopping area	4.50	0.93
Quick replacement of any damage components	4.49	0.82

Attribute: Accessibility

5.1 Accessibility to the building

Factor	Mean	SD
Easy accessible of public transportation i.e. taxi, bus, train etc.	4.41	0.89
Visible car-parking and road signs	4.34	0.89