

CHAPTER III

LOCATIONAL ANALYSIS

3.1 INTRODUCTION

A retail location is any fixed place for shopping purposes. It is specific and therefore unique. There are two main types of location as defined by R.L. Nelson (1958) in "The Selection of Retail Locations" as follows :

- Generative

A generative location is one to which the consumer is directly attracted from his home, as the principal purpose of the trip. Such a location is expressly selected to be easily accessible to the greatest proportion of persons who leave home for shopping.

- Suscipient

A suscipient location is one to which the consumer is impulsively or coincidentally attracted while out on another primary purpose, and which receives rather than generates business.

Most shopping centres are generative, though occasionally susceptible trade may be obtained in large shopping centres offering other attractions, such as entertainment or medical facilities.

In preparing an economic appraisal of a potential location, it is necessary for a conceptual image of the completed shopping complex to be formulated, either on an actual or on an unknown site, in order to assess the various factors comprising the analysis.

This image should include a consideration of the likely tenants, and especially of those major tenants (many of whom may enter agreements to manage stores in the completed shopping complex before the economic analysis is commenced).

Once a shopping centre site has been selected, it is possible to estimate the total trade that may be expected (i.e. turnover forecast) as well as the gross floor space necessary to generate such trade (i.e. productivity forecast).

In a detailed analysis, the floor space can be subdivided between the various trades, both convenience and durables and the unit rentals calculated from the overall development costs and the return required.

In Malaysia, it can be said that feasible sites are often purchased before any major economic analysis is undertaken. Lack of expertise, stemming from inexperience, often results in the purchase of poor sites and the selection of a

site from alternatives is rarely possible. In such case, the economic analysis would indicate whether the site is viable, and if the amount of building and land area required to produce a satisfactory return could be accommodated on that site.

3.2 **TRADE AREA STUDIES**

The long-term structuring of a shopping centre facility, involving various kinds of assets, represents a formidable commitment and confidence in the socioeconomic fabric of the supporting trade area. For it is axiomatic that the kind, quality and stability of the community as a whole, and the trade area contained therein, are fundamental and primary to the decision to invest, for equity and mortgage interests, in an exciting or contemplated retail facility. (Michael S. Noble, Ronald F. Bush and Joseph F. Hair).

The trade area or catchment area is defined as the area of influence from which a shopping centre could expect to derive 80-90% of its total sales volume. This area often being subdivided into primary, secondary and occasionally tertiary zones.

Within the trade area, the strongest influence would be exerted closest to the site, and account should be taken of this diminution of influence by further subdivision into 'radial' zones, previously referred to as primary, secondary and tertiary, at varying distances from the subject location.

In larger trade area, zones are delineated according to the extent and nature of facilities planned for the new centre, and various percentage ratings assessed for different types of goods in each zone.

H. Hoyt (1963) in “Shopping Centres - Design and Operation” recommended that three zones should be established :

Zone 1 (Primary)

This is the area immediately surrounding the centre, the latter containing the convenience goods shops nearest to the population in that area. Hoyt suggested that over 50% of all food expenditure in this zone would go to the new centre.

Zone 2 (Secondary)

The area would already possess convenience goods stores, such as food, chemist and service shops, nearer to the residents than those at the new centre, but lacks department and clothing stores of equal merit to those in the centre. For this reason, total food expenditure of the population at the new centre is not likely to exceed 10-15%.

Zone 3 (Tertiary)

This area is the ‘fringe’ zone, the degree of attraction being dependent on the existing facilities in that zone and on the quality of services to be provided at

the new centre. Any food sales to this zone would be to shoppers attracted to the centre by shoppers' goods items; sales of the latter may be equal to those in zones 1 and 2.

The establishment of these zones, together with the discounts attracted to them, could only be assessed on the basis of local circumstances, the actual delineation being based on an analysis of incomes, accessibility and competitive facilities, as well as the boundaries of areas suitable for data collection.

3.3 **THE GRAVITY MODEL ANALYSIS**

The basic techniques used to delineate trade areas are :

1. Analysis of shopping habits, by reference to public transport demand, in centres of comparable status and conditions.
2. Analysis of retail expenditure in comparable locations.
3. From theoretical formula.

The gravity model of retail gravitation formulated by William J. Reilly (1931), is a manifestation of the least-effort attribute of human behavior.

'The Law of Retail Gravitation' states that two towns would attract trade from any immediate point in direct proportion to the population size of the

respective towns, and in inverse proportion to the square of the distance that the immediate point from either town, as expressed in the Reilly formula :

$$\begin{array}{l} \text{The number of miles from} \\ \text{larger centre A to the outer} \\ \text{limits of trade area} \\ \text{(computed on major roads)} \end{array} = \frac{\text{Mileage on road to adjacent} \\ \text{smaller centre B}}{1 + \frac{\sqrt{\text{Population centre B}}}{\sqrt{\text{Population centre A}}}}$$

In more recent years, the population factors have been replaced by the floor space of two major stores in each centre while the mileage factor being expressed in terms of the driving-time distance. (R. L. Nelson (1958)).

3.4 BASIC FACTORS AFFECTING LOCATIONAL ANALYSIS

The basic factors that affect the locational analysis of shopping complexes are as follows :

- a. population
- b. income levels
- c. retail expenditure
- d. retail floor space
- e. accessibility
- f. shopping habits
- g. competitive facilities

- h. other factors

3.4.1 **Population**

The composition of population and its density in a time-distance framework represent important parameters for potential accessibility and consumer attraction and patronage.

In the analysis of population, the following gross figures for each trade area should be considered :

1. Number of private households.
2. Race/Age/Sex ratios, either in total numbers or per thousand population, with the classification of all persons below school leaving age or over 60 or 65 years of age.
3. The number of persons per household.
4. Changes in population, occur through natural increase or decrease (the ratio of live births to deaths), or through migration.

The analysis of shopping at a targeted date requires the provision of population estimates, in order that a reasonably actual picture of shopping hinterlands can be established. There are two main methods of estimating population :

1. By projection.

This system involves the examination of the existing race/age/sex structure and the expected natural change, with past trends projected to the targeted date. This method does not take into account increase or decrease due to migration movements, which are considered as static in this case.

2. By forecast

Apart from natural change and the race/age/sex structure, migration trends both past and future are analyzed. The extent to which migration is 'planned' or voluntary would depend on national and local and circumstances, notably such factors as slum clearance and redevelopment, industrial redundancy or under-occupation.

Certain basic assumptions may apply to both methods of forecasting future population, such as :

1. Economic and social factors would remain the same : for example, that the birth rate trends would not be altered radically by birth control; that opportunities for full time education and earlier retirement owing to automation would be continued.
2. National policy on employment and housing. Forecasting must in the light of other evidence, assume a continuation of present trends and levels of

government intervention in the location of employment or in action taken under any new development acts and regulations.

Detailed information on local factors is obtained from different departments of local authorities, and forecasts derived from Census material should be amended in the light of the following factors :

1. Housing sites

The number of sites scheduled for redevelopment and slum clearance; the number of conversions and infilling sites, and new sites for residential use in the local government development plan. The latter should be tabulated in terms of area, average density, accessibility to and distance from the subject location.

2. Education

Census figures and projections can be checked against local education authority estimates of the required number of school places, and proposed further education facilities. The size and grading of educational establishments would affect the numbers of pupils staying on after normal school leaving age, and also those able to proceed to further education within the area.

3. Other Land Uses

Analysis should be made of other land uses in the trade area, and local authority provision for future suburban retail facilities in particular.

3.4.2 Income Levels

Income levels, including their rate of change and relative structures, indicate the depth and quality of market segments and real or potential discretionary income. Therefore, subtle visible changes in neighborhood maintenance and corresponding resultant attitudes in the area could represent and be forerunners of emerging upside or downside trends.

The range of family incomes is wider than that of the corresponding per capita incomes, suggesting that the number of income earners in a family is a more significant determinant of family income than is the actual level of earnings of the individual earner. Average figures taken from a small range of figures would be more reliable than from a wide range. Sample surveys should be undertaken in each subdivision of the trade area, to establish income, occupation of the head of the household and the number of wage earners. These incomes should be tabulated according to the income groups and by occupation, i.e. professional, clerical, manual or retired, so that the total expenditure by the number of persons in each group and in each subdivision may be calculated.

3.4.3 Retail Expenditure

1. Present Retail Expenditure

Expenditure patterns, where they could be ascertained, reflect the lifestyles and values of the residents. Again, the evidence may be subtle, but the differences might signify important opportunities or caution signals for certain kinds of retail ventures. Perception and subjective evaluation, in addition to identified and quantified retail expenditures, may be most important.

The total retail expenditure should be analyzed as follows :

- i. Total retail expenditure per annum on all goods for the trade area, and for each subdivision. This is calculated by multiplying the number of persons of similar status and income groups by the average retail expenditure of persons in that group.
- ii. Total retail expenditure per annum on each good, and for each good in each subdivision in the trade area. These can be calculated by multiplying the number of persons of similar status and income groups by the average retail expenditure of persons in that group on each separate good.

- iii. Sales per head of population, in terms of total expenditure per year, and for each good in each subdivision. These can be calculated by dividing the results of (i) and (ii) by the estimated trade area population.

2. Future Retail Expenditure

The assessment of sales at any target date, assuming no new centre has been built, is relatively straightforward. For each subdivision of the trade area, the population at the targeted date is multiplied by the per capita expenditure, both in total and for each good. Allowance should be made for differential changes in the area of per capita expenditure, both in total goods and for each good. Allowance should be made for differential changes in the rate of per capita expenditure on durable goods, which may be expected to rise more rapidly than that on convenience goods.

3.4.4 Retail Area

1. Present Retail Area

The existing net retail area should be considered in terms of square footage. Such area could be used to ascertain the turnover, i.e. the sales per square foot applicable in the trade area, or conversely, the square footage required to support such a turnover.

2. Future Retail Space Requirement

Once the total target population, target sales per head and target sales per square foot have been calculated, the floor area required at the target date could be assessed for each good, from the formula.

Assuming a target date of 2000, then the required retail floor area

$$= \frac{\text{RM(1996 value)} \\ \text{Sales per head(2000)} \times \text{Total Population(2000)}}{\text{Sales per square foot(2000)} \\ \text{RM(1996 value)}}$$

In this, the 'sales per square foot' factor is an important element, since it is affected greatly by the increasing efficiency in the use of shopping floor space. This greater efficiency, in terms of turnover per square foot, may lead to a shrinkage in the required floor space in areas of modest population growth. For this reason, the prevailing higher sales per square foot factor should be used. More research is required into such factors, which may vary considerably in different regions in order to indicate a more accurate figure on the approximate retail floor space required.

3.4.5 Accessibility

The success of a particular shopping centre is dependent on the minimum distribution costs for the trader and on its central location in relation to the most productive area within its trading hinterland. Consequently, the relative accessibility of a hierarchy of shopping centres is reflected in their spatial disposition, and in the road usage by private cars and public transport vehicles.

Accessibility is dependent on the following :

- journey times and distances
- road usage and capacities
- car ownership
- public transport services

3.4.6 Shopping Habits

Nelson gives the following reasons for an assessment of shopping habits as part of an economic analysis :

- They may assist in delineating the trade area.
- They measure the effectiveness of existing competition.
- They determine the residential areas from which competition draws most.

- They may indicate any special or unusual circumstances affecting shopping patterns within the trade area.

Certain general characteristics of consumer response should be recognized when all other things being equal :

- Shoppers would move towards the dominant trading centre.
- Shoppers would not go through one trade area to reach another having equal facilities.
- Shoppers would patronize the closest centre with equal facilities.
- Shoppers would tend to follow traditional circulation patterns.

Two major factors influence shopping habits : wide selection and convenience of shopping facilities, particularly the point of travel time. Indeed travel time and the range of facilities appear to be more decisive than parking.

3.4.7 **Competitive Facilities**

Major competitive facilities to a projected shopping centre would have been analyzed in the preliminary assessment of the trade area. If, as a result of the analysis of population and potential spending power, the subject location is considered feasible, account must be taken of existing smaller competitors within the trade area :

1. For projected convenience goods centres, all shops within 1 mile radius should be analyzed in terms of square footage, sales area, quality and volume of business.
2. For projected larger centres, two concentric trade zones should be ascertained.

The first zone is for convenience goods without any extra facilities within the centre, but all competition for convenience goods sales is measured as in (1). This is necessary because, in a large centre, a supermarket, for example, would draw from approximately the same area even if other facilities are provided, but would secure some additional business from incidental shopping for groceries by people living beyond this inner zone, whose main purpose was to visit the larger stores.

The second zone extends to the boundary of the whole trade area, in which all major competitors should be analyzed on the basis of parking, accessibility, attractiveness, price/quality/choice of merchandise, sales turnover, selling ability and amenities.

The approximate trade area applicable to each major competitor is best determined by surveys at the competitive centre. This would also give further information on shopping habits. The following should be ascertained by the survey :

1. Place of residence.
2. Purpose of visit, i.e. convenience and/or durable goods.
3. Single or multipurpose trip, and trip frequency.
4. Method of transport and route adopted.
5. Number of shoppers per car, if applicable.
6. Reasons for choice of particular centre.

Once competitive facilities have been plotted and tabulated, subjective judgments must be made on 'trade interception potential' the power of the projected shopping centre to intercept some measure of business normally given to other centres. The assessment of the degree of interception should be based on factors outlined, especially the characteristics that shoppers would not go through one trade area to reach another having equal facilities, and would patronize the nearest centre having equal facilities. Greatest interception would occur on customers to the other centres whose normal route passes the subject location, and the extent of this potential may be gauged from the results of the survey outlined above.

3.4.8 Other Factors

1. Retail Distribution

The retail distribution facilities within and around the trade area should be considered, including the central warehousing provisions. The existing transport network, including trucking, rail freight yards and goods delivery

services should be analyzed, and the growth potential assessed, especially in terms of 24 hours service and maintenance.

2. Advertising Media

Advertising media such as newspaper, magazines, trade journals, poster facilities and local radio and television channels should be assessed in terms of effectiveness and coverage.

3.5 METHODS OF ASSESSING LOCATIONAL POTENTIAL

The general factors considered in this Chapter III constitute the bulk of research necessary to calculate the potential of a subject site. These factors are used in various ways in the different methods as follows :

1. The Cumbernauld Method
2. The King's Lynn Method
3. The Vacuum or Residual Method
4. The Market Share Method
5. The Haydock Method

For the purpose of this study, the King's Lynn Method was selected as it was the simplest among the various methods.

3.5.1 The King's Lynn Method

The King's Lynn Study (1962), supposedly derived from the Cumbernauld method, was based on 'straight line' projections of trends occurring between 1950 and 1961 in Britain. The stages in the analysis technique are enumerated as follows :

- 1. Calculate population and trade area
- 2. Calculate retail floor space
- 3. Sales turnover
- 4. Sales per head of population
- 5. Projections

Assuming that the percentage increases would continues at the same rate, the floor area required for certain target year e.g. 2020 is assessed on the formula previously noted, i.e.

Required floor area at 2020

$$\begin{array}{r} \text{(RM1996 value)} \\ \text{Sales per head at 2020 x Total Population at 2020} \\ = \frac{\text{Sales per square foot at 2020}}{\text{(RM1996 value)}} \end{array}$$

3.5.2 Disadvantages

1. The "straight line" projection method assumes a constant growth rate, which has to be proportional in each case. Little account could be taken of the possibilities of large overspill schemes now being planned in the area.
2. It was thought necessary to establish the relative efficiency and attraction of each shop by survey methods. This technique, even if on a sample basis, is lengthy, and depends on effective interviewing and data processing.
3. No account is taken of increased car ownership, or of different expenditure and changing shopping habits in the various income groups.

The number of assumptions made places the validity of the results of this particular study in doubt, and also emphasizes the necessity of obtaining accurate data from Census material, rather than forward and backward projections from a fixed intercensal date.