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Locational Choice Behaviour of Entrepreneurs: An Experimental Analysis

Harry Timmermans

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Summary. So far only a few studies have investigated the actual locational decision-making process of retailers. The purpose of the present article is to fill this gap. A decompositional multi-attribute preference model is used to study retailers' locational preferences under experimental conditions. It is found that accessibility, the size of a shopping centre and the presence of magnet stores are the most important factors influencing retailers' locational preferences. The study also suggests the potential of the experimental method in studying locational preferences. The experimental task was easy to implement and retailers were able to provide consistent preference judgements.

Introduction

Notwithstanding the extreme popularity of the study of retail location among geographers and regional scientists for several decades now, there still exists a lack of knowledge about the behavioural foundations of retailers' locational choices. In fact, a literature search among the mainstream journals and the best-known books on retail geography (Scott, 1970; Beaujeau-Garnier and Delobez, 1977; Davies, 1976; Dawson, 1979, 1980; Potter, 1982) suggests that only a few attempts (Kern et al., 1983; Miller, 1978) have been made so far to investigate directly the locational choice behaviour of retailers. In any case the vast majority of studies on retail location are concerned with a descriptive and correlational analysis of locational patterns of tertiary commercial activities within urban areas. Issues such as the identification of intra-urban central place hierarchies (e.g. Davies, 1972; Beavon, 1972; Clark, 1967; Potter, 1981), the importance of price variations (e.g. O'Farrell and Poole, 1972; Rowley, 1972; Parker, 1979), and the significance of form and size of a shopping area (Claus et al., 1972; Bouchard, 1973), trade area mix (Wallin et al., 1975; Lewison and Zerbst, 1977), proximity to urban

functions (Cohen and Lewis, 1967; Horton, 1968; Davies, 1973; Walters, 1974) and spatial affinities (e.g. Rogers, 1965, 1969; Getis and Getis, 1968; Dacey, 1972; Parker, 1972; Thomas, 1973; White, 1975; Guy, 1976; Lee and Koutsopoulos, 1978; Shepherd and Rowley, 1978; Lee, 1979) in determining the location of retail facilities, have received major attention in this respect. However, these studies have fundamentally remained descriptive and hence add little to our understanding of locational choice behaviour of entrepreneurs.

A fundamental problem of correlation analysis is that the derived functional expression is heavily dependent upon the observed real-world values of the independent variables. Obviously, such values are subsets of all possible values and hence it is difficult to generalise the results beyond the domain of experience. In addition, it is not readily evident that the results of the analysis can be interpreted in terms of individual decision-making; rather they might reflect the covariance structure in the data. Ideally, one would systematically vary the values of the independent variables with each other, as in experimental designs, and analyse the choice behaviour of retailers. However, such real-world experimentation is difficult if not impossible. At best one

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might attempt to use one of the quasi-experimental designs.

However, as Louviere and Wilson (1978) have argued, a viable alternative would be to assume that entrepreneurs can place themselves in hypothetical choice situations and analyse their choice behaviour under these hypothetical conditions. Obviously, this approach will only yield reliable results if it can be validly assumed that individuals' choice behaviour and decision-making under experimental conditions is systematically related to their real-world choice behaviour and, moreover, that reliable measurements of individual choice behaviour and decision-making can be obtained by means of particular experimental designs and psychological scaling methods. However, during the past decade, an overwhelming amount of empirical evidence has accumulated which suggests that these assumptions are supported in a variety of contexts relating to spatial and travel choices. Satisfactory predictive results have, for example, been obtained in the study of mode choice (Norman and Louviere, 1974; Levin, 1975, 1977; Louviere, 1976, 1978; Louviere and Norman, 1977) migration and residential choice behaviour (Lieber, 1978, 1979; Louviere, 1979), recreation (Lieber and Fesenmaier, 1984) and shopping centre choice (Recker and Schuler, 1981; Schuler, 1979; Timmermans, 1982; Timmermans et al., 1984). There is no obvious reason to believe that these assumptions cannot also be met in the study of locational choice behaviour.

This paper therefore presents the results of an attempt to gain further insight into the behavioural foundations of retailers' locational choices, by measuring and analysing their choice behaviour in an experimental situation. More specifically, the primary purpose of this paper is to examine the nature of the locational decision-making process. The paper is divided into four sections. The next section outlines the conceptual framework and methodology underlying the empirical analysis. This is followed, in section 3, by a presentation of the results of the experimental analysis. The paper is concluded by evaluating these results and suggesting some further research topics.

Conceptual Framework and Methodology

The conceptual framework underlying this study can be summarised in terms of a number of assump-

tions and equations. First, assume that an individual entrepreneur is faced with a set T of I multi-attribute alternatives. Each alternative is assumed to consist of a bundle of attributes S . Thus each alternative i can be represented by a set of attributes X_i :

$$X_i = \{x_{i1}, x_{i2}, \dots, x_{ij}, \dots, x_{iJ}\}, \forall j \in S; \forall i \in T \quad (1)$$

The problem then is to predict the probability that each potential alternative is chosen, or, alternatively to predict each individual's first choice given the attribute levels of the choice alternatives.

It is assumed that the alternatives which are available or with which he is familiar, constitute the choice set A of an individual. Let I' ($I' < I$) denote the number of alternatives in an individual's choice set. Further, it is assumed that the locational choice process involves evaluating each of the I' alternatives in an individual's choice set and choosing that alternative with the best overall evaluation score. More specifically it is assumed that:

$$e_{ij} = f_j(x_{ij}), \forall i \in A \in T, \forall j \in V \in S \quad (2)$$

$$E_i = g(e_{ij}), \forall i \in A \in T, \forall j \in V \in S \quad (3)$$

where,

e_{ij} is the subjective evaluation of the j th attribute of the i th choice alternative;

f_j is an attribute-specific function;

V is the subset of attributes ($J' < J$) on the basis of which an individual evaluates the choice alternatives;

E_i is the overall evaluation of the i th alternative;

g is some integration function.

Equation (3) indicates that an individual is assumed to cognitively integrate his component evaluations according to some algebraic function, and that this integration process does not necessarily involve all choice alternatives nor all attributes. Finally, it is assumed that an individual will choose that choice alternative which has the highest overall evaluation score. Hence:

$$p(i|A) = \begin{cases} 1 & \text{if } E_i > E_k, \forall i, k \in A; i \neq k \\ 0 & \text{otherwise} \end{cases} \quad (4)$$

Of course, equation (4) can easily be implemented for any set of alternatives within an individual's choice set, providing equation (3) is estimated. However, the estimation of equation (3) itself is less

obvious. In fact, it constitutes the most fundamental component of the conceptual framework since it refers to the way in which individuals combine their separate attribute evaluations to arrive at a choice.

Several procedures may be used to capture the nature of this decision-making process (Timmermans, 1984). One way to proceed would be to use a compositional approach in which the overall evaluation of the multi-attribute choice alternative is obtained as some function of the alternative's perceived attribute levels as separately and explicitly evaluated by an individual. The approach is based on the assumption that an individual can provide valid and accurate evaluations of each alternative's attributes independently of any specific context. If, however, these evaluations can not be measured properly, the compositional approach will likely yield biased results.

In this study a decompositional approach was therefore adopted. This approach attempts to derive the component evaluations of the various attribute levels by decomposing some overall evaluation measure into scale values for the attribute levels, given some type of composition rule. In particular, an individual is requested to provide a measure of overall evaluation for a set of hypothetical choice alternatives, which is designed according to the principles of experimental design. If the total number of attributes and attribute levels is small, factorial designs have proved to be useful. In this case the attribute levels are combined in every possible way, yielding $\prod_{j=1}^J n_j$ hypothetical choice alternatives, where n_j is the number of attributable levels of the j th attribute. If, however, the total number of attributes or attribute levels is large, the factorial designs are too demanding and hence might yield unreliable measurements.

In this case one of the more sophisticated experimental designs should be preferably used, the ultimate choice of which depends upon some countervailing considerations (for a discussion see Timmermans, 1984). This study chooses to make use of a fractional factorial design. In using fractional factorial designs one obtains a small number of hypothetical choice alternatives at the cost of no longer being able to measure all possible interaction effects. Usually, at the most only all single-attribute main effects and two-attribute interaction effects can

be estimated, but all higher interaction effects are assumed to be negligible and, hence, are ignored. The most parsimonious designs are the orthogonal arrays. If the number of attributes is the same for all attributes, symmetric arrays can be used, if not one should use asymmetric arrays. Lists of these designs are readily available (e.g. Plackett and Burman, 1946; Addelman, 1962). Orthogonal designs allow estimation of the main effects.

The most appropriate estimation method in this case is ordinary least squares which minimises the sums of squared deviations between predicted and manifest overall evaluation values. The estimation of the parameters is straightforward. Consider the general main effects decompositional model, which can be written as:

$$U_i = \sum_{j=1}^J \sum_{l=1}^{n_j} \alpha_{jl} z_{jl} \tag{5}$$

where, U_i represents the overall evaluation of alternative i ;

α_{jl} is the evaluation associated with the l th level of the j th attribute;

z_{jl} is the presence or absence of the l th level of attribute j .

In order to estimate the component evaluations α_{jl} only $\sum_{j=1}^J (n_j - 1)$ linearly independent variables are required to completely specify the evaluation model. Hence, dummy coding (or, alternatively effect or orthogonal coding) can be used for the estimation of the model. That is, each attribute with n_j levels is converted into $(n_j - 1)$ dummy variables, where the j th dummy variable takes the value 1 for the j th level and 0 otherwise, implying that the n_j th level serves as a reference. The model is then estimated as:

$$U_i = \beta_0 + \sum_{j=1}^J \sum_{l=1}^{n_j-1} \beta_{jl} z_{jl} \tag{6}$$

where, β_0 represents the overall evaluation for the choice alternative which has been coded zero for all attributes;

β_{jl} denotes the incremental component evaluation of the l th level of the j th attribute;

$z_{jl} = 1$ if the level l of the j th attribute is present in a choice alternative and $z_{jl} = 0$ otherwise.

An Empirical Application

Method

An experiment was constructed and administered to all 39 retailers whose shops are located in the village of Meyel. The participants provided answers to a wide range of questions but for the present analysis only those data pertaining to the experimental design are relevant. The purpose of the experiment is to gain insight into the nature of the decision-making process of the participants in providing preference statements for a series of hypothetical centres to locate a shop. Hence, before constructing the design it is necessary to elicit the factors influencing the retailers' location decision. Nine factors were identified on the basis of a literature search: accessibility, size of the shopping centre, extension possibilities, distance to competing shops, presence/absence of magnet stores; presence/absence of banks, presence/absence of restaurants and bars, distance to shops of a different type and fixed costs. The relevance of these factors was partially validated on the basis of in-depth interviews with three retailers.

The next step involved the actual construction of the design. Each of the nine attributes was defined in terms of two attribute levels (see Table 1). Combining these attribute levels in all possible ways would yield $2^9 = 512$ experimental conditions. Obviously, this would be a too demanding experimental task for the participants and hence it was decided to use an

Table 1

Attribute and Attribute Levels

Attribute	Levels
1. Accessibility	(1) = excellent (2) = bad
2. Size of centre	(1) = large (2) = small
3. Extension possibilities	(1) = good (2) = bad
4. Distance with respect to competing stores	(1) = large (2) = small
5. Magnet stores	(1) = present (2) = absent
6. Banks	(1) = present (2) = absent
7. Restaurants, bars	(1) = present (2) = absent
8. Distance with respect to other types of shops	(1) = small (2) = large
9. Fixed costs	(1) = low (2) = high

Table 2

The Fractional Factorial Design

Condition	Attribute								
	1	2	3	4	5	6	7	8	9
1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	2	2	1	2	2
3	1	1	1	2	1	2	2	1	2
4	1	1	1	2	2	1	2	2	1
5	1	2	2	1	1	1	1	2	2
6	1	2	2	1	2	2	1	1	1
7	1	2	2	2	1	2	2	2	1
8	1	2	2	2	2	1	2	1	2
9	2	1	2	1	1	1	2	1	2
10	2	1	2	1	2	2	2	2	1
11	2	1	2	2	1	2	1	1	1
12	2	1	2	2	2	1	1	2	2
13	2	2	1	1	1	1	2	2	1
14	2	2	1	1	2	2	2	1	2
15	2	2	1	2	1	2	1	2	2
16	2	2	1	2	2	1	1	1	1

orthogonal fractional factorial design, involving only 16 experimental conditions, which allows the estimation of all main effects (Table 2). Each experimental condition was described on an index card, and each retailer was asked to rank each hypothetical location in terms of his overall preference. More specifically, each retailer was asked first to select the description which he prefers most. Next he was asked to rank the remaining 15 descriptions in terms of overall preference.

Analysis and Results

The first step in the analysis involved testing the internal validity of the measurement procedure. Ordinary least squares regression analysis involving dummy coding was used to estimate the part-worth contributions of the attribute levels to overall preference. It should be stressed that such a procedure is strictly speaking not valid since the dependent variable has been measured only on an ordinal scale, and is bounded rather than continuous, but simulation studies (Cattin and Wittink, 1976; Carmone et al., 1978) have shown that ordinary regression analysis is a very robust technique, while it has the advantages of efficiency and economy.

The analysis was performed for each retailer separately. The results indicated that the internal validity of the measurement model was very good. The average r -squared was 0.984, the lowest explained variance was still 0.936. Still another, al-

though not always usable, test of validity is to check for departures from monotonicity in *a priori* anticipated directions. Basically such a test should be interpreted as a test of the face validity of the measurement model. It tests whether the estimated part-worth utilities are in agreement with theoretical expectations.

It is evident that it is not always clear what one should expect from a theoretical point of view and in such cases no such monotonicity test can be performed. In the present analysis it was assumed that the first level of all nine attributes was the best; hence we assumed decreasing part-worth utility functions. That is, we assumed that retailers prefer *ceteris paribus* an accessible location to a less accessible location, a large shopping centre to a small shopping centre, good extension possibilities to bad extension possibilities, a long distance to competing shops to a short distance to competing shops, the presence of magnet stores to the absence of magnet stores, the presence of respectively banks and restaurants to the absence of these facilities, a short distance to such shops and, finally, low fixed costs to high fixed costs. It should be emphasised beforehand however, that these assumptions are not necessarily valid. In fact, the findings of some empirical studies suggest that considerable variation in preference functions exists. Hence, even if an estimated part-worth utility function is not monotonically related with the theoretical expectations stipulated above, one cannot conclude that the model is invalid.

A summary of this monotonicity test is given in Table 3. Table 3 shows that the estimated part-worth utilities associated with the accessibility variable are of the anticipated direction for all retailers. All retailers' preference functions indicate a preference

for accessible locations. Table 3 also demonstrates that a vast majority of the retailers appear to prefer a larger shopping centre to a smaller shopping centre, good extension possibilities to bad extension possibilities, the presence of respectively magnet stores and banks and low fixed costs to high fixed costs, *ceteris paribus*. The results for the remaining three attributes, including the two distance variables, however, are less clear. Although the estimated part-worth utilities still correspond to theoretical expectations for most retailers, there nevertheless is a substantial number of retailers whose estimated utility functions deviate from our theoretical expectations. It is not readily evident why these results have been obtained. In principle it is possible that the unexpected findings are the result of interactions between the attributes, although if this were the case one would expect such effects to occur in other variables than the distance attributes. The unexpected findings may however also have a more substantial meaning in the sense that for a subgroup of retailers a close distance to other shops, regardless of their type, is preferred. Apparently, agglomeration effects are considered important by these retailers. Finally, the relatively low percentage associated with the attribute 'presence/absence of restaurants, bars etc.' might be explained by the specific situation in Meyel. Meyel is a small village and consequently the distance to the shops is relatively short, the shops do not attract much trade from other villages, and most shops sell convenience goods. Under such circumstances it seems logical that the presence of restaurants and other such facilities is not necessarily preferred to the absence of these facilities.

The estimated part-worth utilities, normalised such that they sum to zero for each attribute, are given in Table 4. More specifically, Table 4 provides the normalised estimated part-worth utilities for the first level of each attribute. A number of interesting conclusions may be drawn from the results of the analysis. First, Table 4 again illustrates that not all retailers have consistently decreasing part-worth utility functions. Second, the slope of the utility functions differs considerably between subjects and between attributes, but in general the results suggest that the attributes accessibility, size of the centre and, the presence of magnet stores have the largest slope. Third, the estimated part-worth utility for the first level of the attribute 'distance with respect to other shops' is frequently equal to 0.0. This would indicate that a relatively large number of retailers

Table 3
Test for Monotonicity

Attribute	Frequency	Percentage
1. Accessibility	39	100
2. Size of centre	33	85
3. Extension possibilities	36	92
4. Distance to competing stores	26	67
5. Presence/absence of magnet stores	32	82
6. Presence/absence of banks	32	82
7. Presence/absence of restaurants, bars, etc.	23	59
8. Distance to other types of shops	31	79
9. Fixed costs	33	85

Table 4*Normalised Estimated Part-Worth Utilities*

Subject	Attribute								
	1	2	3	4	5	6	7	8	9
1	2.50	2.50	0.00	-0.20	1.13	0.58	0.45	2.38	0.31
2	2.50	3.50	0.00	0.00	1.50	0.50	0.00	0.00	0.00
3	1.50	3.25	0.25	0.10	2.75	0.15	-0.10	0.00	0.62
4	1.50	2.63	0.13	-0.16	3.37	0.04	-0.09	0.00	0.65
5	2.50	3.50	0.00	-0.33	0.00	0.33	0.08	1.50	0.31
6	1.63	3.50	0.12	0.00	2.38	0.63	-0.13	-0.13	0.00
7	1.50	2.75	0.25	3.18	-0.37	0.44	-0.18	-0.13	0.27
8	2.00	4.00	0.00	-0.39	-0.12	0.02	-0.11	0.12	1.08
9	4.00	-0.75	1.25	0.18	-0.37	1.19	1.07	-0.13	1.27
10	1.50	2.50	0.00	-0.33	3.50	0.33	0.08	0.00	0.31
11	1.75	3.13	0.38	1.67	2.25	0.08	-0.17	-0.12	-0.19
12	3.25	1.50	0.25	0.10	2.75	0.65	-0.10	-0.25	0.12
13	2.00	4.00	0.00	0.00	1.00	0.00	0.00	0.00	0.50
14	1.25	3.38	0.13	1.59	1.62	-0.21	1.41	0.25	0.15
15	1.25	3.38	0.13	1.59	1.62	-0.21	1.41	0.25	0.15
16	4.00	-0.50	1.00	1.12	-0.50	1.13	0.13	0.00	1.04
17	1.50	3.38	0.13	0.11	2.62	0.02	-0.11	0.00	0.58
18	2.00	0.38	0.63	0.21	4.00	0.04	-0.21	0.13	0.65
19	2.00	-0.25	0.75	-0.08	4.00	0.08	0.08	0.00	0.81
20	2.00	4.00	0.00	0.77	-0.25	0.48	-0.02	0.00	0.42
21	2.25	3.50	-0.25	-0.17	0.25	0.67	-0.08	1.75	0.19
22	2.25	3.50	0.25	-0.10	0.50	0.10	1.85	-0.25	0.38
23	2.25	3.50	-0.25	-0.17	0.25	0.17	-0.08	1.75	0.69
24	2.00	3.13	0.38	2.17	1.50	0.08	-0.17	-0.13	-0.19
25	4.00	-0.50	0.50	0.08	-0.50	1.67	0.67	0.25	1.69
26	2.50	2.13	0.12	1.31	2.50	0.19	1.19	-0.12	-0.23
27	2.00	4.00	0.00	0.50	0.00	1.00	0.00	0.00	0.00
28	2.00	4.00	0.00	-0.38	0.75	0.63	0.13	0.00	0.54
29	1.38	2.75	-0.38	1.78	0.00	-0.03	2.35	1.50	-0.12
30	4.00	0.00	1.00	-0.08	2.00	0.33	0.33	0.00	0.31
31	1.63	3.13	0.00	1.99	0.75	-0.24	-0.12	1.88	0.04
32	3.38	2.00	0.62	-0.02	-0.13	-0.11	-0.11	2.13	0.58
33	3.50	2.50	0.00	0.00	1.50	0.00	0.00	0.00	-0.50
34	3.00	-0.25	0.75	1.56	2.50	-0.31	1.44	0.00	-0.23
35	1.62	1.13	0.00	2.44	3.38	-0.07	-0.07	0.00	-0.27
36	4.00	0.00	2.00	0.25	0.00	0.25	0.50	0.00	1.00
37	2.00	4.00	0.00	0.00	1.00	0.00	0.00	0.00	0.50
38	4.00	-0.50	1.50	-0.54	0.00	1.54	0.04	0.00	0.15
39	4.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00	0.50

are indifferent to the distance with respect to other types of shops. Apparently they consider multi-purpose trips unimportant.

The importance retailers attach to each of the nine selected attributes can be derived as the absolute difference between the part-worth utilities estimated for the attribute levels associated with that attribute. Next, these importance weights can be normalised such that they sum to unity. The results are provided in Table 5, which shows that on average the attributes 'accessibility' and 'size of the shopping centre' are the most important for the locational preferences of the sample of retailers. The derived import-

ance weight for these attributes is respectively 0.28 and 0.27, implying that these two attributes when combined account for more than 50 per cent of the variation in utility. Table 5 also shows that the attribute 'presence of magnet stores' ranks third in importance. However, as is evident from Table 4, not all retailers consider the presence of magnet stores as an advantage.

Some retailers apparently think that the magnet stores may influence their trade volume adversely, while others seem to believe that magnet stores attract more trade from greater distances so that on the whole they experience a positive effect on their

Table 5

Derived Normalised Importance Weights

Subject	Attribute								
	1	2	3	4	5	6	7	8	9
1	0.25	0.25	0.00	0.02	0.11	0.06	0.05	0.24	0.03
2	0.31	0.44	0.00	0.00	0.19	0.06	0.00	0.00	0.00
3	0.17	0.37	0.03	0.01	0.32	0.02	0.01	0.00	0.07
4	0.18	0.31	0.01	0.02	0.39	0.00	0.01	0.00	0.08
5	0.29	0.41	0.00	0.04	0.00	0.04	0.01	0.18	0.04
6	0.19	0.41	0.01	0.00	0.28	0.07	0.01	0.01	0.00
7	0.17	0.30	0.03	0.35	0.04	0.05	0.02	0.01	0.03
8	0.25	0.51	0.00	0.05	0.02	0.00	0.01	0.02	0.14
9	0.39	0.07	0.12	0.02	0.04	0.12	0.10	0.01	0.12
10	0.18	0.29	0.00	0.04	0.41	0.04	0.01	0.00	0.04
11	0.18	0.32	0.04	0.17	0.23	0.01	0.02	0.01	0.02
12	0.36	0.17	0.03	0.01	0.31	0.07	0.01	0.03	0.01
13	0.27	0.53	0.00	0.00	0.13	0.00	0.00	0.00	0.07
14	0.13	0.34	0.01	0.16	0.16	0.02	0.14	0.03	0.02
15	0.13	0.34	0.01	0.16	0.16	0.02	0.14	0.03	0.02
16	0.42	0.05	0.11	0.12	0.05	0.12	0.01	0.00	0.11
17	0.18	0.40	0.01	0.01	0.31	0.00	0.01	0.00	0.07
18	0.24	0.05	0.08	0.03	0.49	0.00	0.03	0.02	0.08
19	0.25	0.03	0.09	0.01	0.50	0.01	0.01	0.00	0.10
20	0.25	0.50	0.00	0.10	0.03	0.06	0.00	0.00	0.05
21	0.25	0.38	0.03	0.02	0.03	0.07	0.01	0.19	0.02
22	0.25	0.38	0.03	0.01	0.05	0.01	0.20	0.03	0.04
23	0.25	0.38	0.03	0.02	0.03	0.02	0.01	0.19	0.08
24	0.21	0.32	0.04	0.22	0.15	0.01	0.02	0.01	0.02
25	0.41	0.05	0.05	0.01	0.05	0.17	0.07	0.03	0.17
26	0.24	0.21	0.01	0.13	0.24	0.02	0.12	0.01	0.02
27	0.27	0.53	0.00	0.07	0.00	0.13	0.00	0.00	0.00
28	0.24	0.47	0.00	0.05	0.09	0.08	0.02	0.00	0.06
29	0.13	0.27	0.04	0.17	0.00	0.00	0.23	0.15	0.01
30	0.50	0.00	0.12	0.01	0.25	0.04	0.04	0.00	0.04
31	0.17	0.32	0.00	0.20	0.08	0.02	0.01	0.19	0.00
32	0.37	0.22	0.07	0.00	0.01	0.01	0.01	0.23	0.06
33	0.44	0.31	0.00	0.00	0.19	0.00	0.00	0.00	0.06
34	0.30	0.02	0.07	0.16	0.25	0.03	0.14	0.00	0.12
35	0.18	0.13	0.00	0.27	0.38	0.01	0.01	0.00	0.03
36	0.50	0.00	0.25	0.03	0.00	0.03	0.06	0.00	0.13
37	0.27	0.53	0.00	0.00	0.13	0.00	0.00	0.00	0.07
38	0.48	0.06	0.18	0.07	0.00	0.19	0.00	0.00	0.02
39	0.53	0.00	0.13	0.00	0.27	0.00	0.00	0.00	0.07
Mean:	0.28	0.27	0.04	0.07	0.16	0.04	0.04	0.04	0.05

turnover from the presence of magnet stores. It would be interesting to analyse whether such differences in part-worth utilities are related to variables such as shop type, but in the present study such an analysis was not performed due to the small sample size. Finally, Table 5 indicates that the remaining attributes are far less important in a retailers location decision. The average normalised importance weights for the attributes ‘extension possibilities’, presence of banks, presence of restaurants, bars and distance with respect to other types of shops are all equal to 0.04, the attributes ‘distance with respect to

competing stores’ and ‘fixed costs’ seem somewhat more important with an average importance weight of 0.07 and 0.05 respectively. Table 5 suggests the existence of large differences in importance weights associated with these attributes between retailers.

Conclusion and Discussion

The main thrust of the present paper has been to apply a decompositional multi-attribute preference model to the study of entrepreneurial locational decision-making processes. In particular, the prefer-

ences of retailers for a set of hypothetical locations have been studied using a simple part-worth main effects additive preference model. The model is estimated on the basis of data pertaining to experimental conditions and hence, in theory at least, the approach offers a viable alternative to descriptive, correlational analyses in studying locational choice behaviour and decision-making processes. In the present study, data were gathered for only 39 retailers and hence the findings should remain tentative.

Keeping this in mind, the results of this study suggests the rich potential of the experimental method in studying locational behaviour. The study indicates that the experimental task is easy to implement and that retailers are able to provide consistent preference judgements, providing they are motivated to participate in the experiment. This is not to say that the fractional factorial design as employed in this study necessarily provides the most reliable results. In fact, one might argue that individuals may find it difficult to grasp the meaning of descriptions involving a large number of attributes, and that they might therefore reduce the complexity of the experimental task by ignoring some attributes in providing their preference judgements. Of course, this would mean that the estimated part-worth utilities or perhaps even the functional form of the preference model are invalid. Future research should therefore address the issue of the most appropriate experimental design.

In essence, the present study has indicated that a retailer's locational decision-making seems primarily to be influenced by the accessibility and size of a shopping centre, while the presence of magnet stores also seems to be a third important factor in a retailer's location decision, at least for some retailers. Hence, one would conclude that the economic factors seem to be most important. The results of the study suggest that distance factors and the presence of non-retailing functions are far less important in influencing a retailer's locational preference. At the same time, however, this study has demonstrated substantial differences in utility functions and importance weights between retailers. Future research endeavours should therefore address the issue of whether these differences are systematically related to organisational and business type factors.

Perhaps the major potential advantage of the decompositional approach is that choice behaviour and preferences can be observed beyond the domain

of experience. As such the results of the modelling approach can be used in a planning context. The approach provides an opportunity to identify retailer's preferences or utilities for planned new locations, provided these can be described in terms of the attributes included in the experiment. In addition, this kind of analysis can, in theory at least, form the basis for studying or predicting retailers' choices made among a set of locations. It should be noted however that the approach as described in the present paper, should be linked to a few other modelling steps if it is to be useful in an urban planning context.

Urban planning is basically concerned with manipulating some objective characteristics of the environment. This implies that the subjectively measured attributes should be related to some corresponding objective characteristic, or alternatively, some set of objective characteristics, which can be manipulated by planners. In the present study this is quite straightforward for most selected attributes, but evidently the interpretation of the 'accessibility' attribute is more difficult to establish. In other studies, in depth interviews or joint space analysis have been used to identify the factors related to such 'abstract' attributes. The actual functional relationship between objective and subjective measurement can be identified by means of non-linear regression analysis. This additional modelling step allows the planner to predict the likely retailers' utilities or preferences for planned locations. In this case the modelling approach is used to assess a plan. Alternatively, however, the measurements can also be used to determine some optimal configuration of attribute levels. In this case, the analysis is directed towards identifying that combination of attribute levels which maximises retailers' utilities.

If one intends to predict actual choice behaviour, the preference measurements should be linked to actual behaviour. Basically, this additional modelling step requires the researcher first to identify all choice set constraints which may limit actual choice behaviour and then, given these constraints, to establish the functional relationship between preferences and overt choice behaviour. Information levels, planning regulations but also entrepreneurs' access to capital may act as choice set constraints. Deterministic decision rules which state that the location which receives the highest overall utility will invariably be chosen, can be used but, alternatively,

probabilistic decision rules which assume that overt choice behaviour is only probabilistically related to utilities may be more appropriate. The interested reader is referred to Timmermans (1984) for more details. Such additional modelling steps have the potential of increasing the planning relevancy of the experimental approach.

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