SOCIO-ECONOMIC INFLUENCES ON DISTRIBUTION LEVELS IN WESTERN EUROPE

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ABSTRACT

W.N. BARNES: Socio-economic Influences on Distribution Levels in Western Europe

Most international marketing research reports are b ased on a skeleton of currently available international socio-economic, demographic and social indicators. These currently available indicators used by marketing analysts are in many cases inadequate for, or irrelevant to, the requirements of marketing. This project has as its objective the development of more useful indicators and the prediction of the different levels of retail distribution in Western Europe in terms of hypermarket and supermarket development. The limitations of available international indicators are analysed and alternatives proposed. Some of these required new research, others the restructuring of existing data. Prototype indicators are constructed and used in modelling and prediction. The main analyses are made at the level of the sub-national region and at national levels. The regional analysis is a basic pre-requisite for international marketing analysis.

Subsequent analysis is by correlation, regression and Automatic Interactor Detection (AID). The usefulness and validity of AID, in respect of aggregate data, using a comparatively limited number of observations is demonstrated. The end product is a set of revised hypotheses more refined than the original generally-accepted "naive" hypotheses. The project investigates the relationship between the hypermarket and the various size categories of supermarket and their environments more precisely than has hitherto been possible. The methodology is of more general applicability to marketing problems.

CONTENTS

PREFACE

This thesis is submitted in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy. During the programme of research I have not been a registered candidate for another award of the CNAA or a University. For a period during the research I was assisted by a research assistant. His work as affecting this thesis was confined to making direct contact with retail firms in the Republic of Ireland and in Ulster in order to obtain the distribution data in respect of these countries and to assisting in aggregating the minor region data in order to produce major region data.

Work towards the subject of this thesis was supported by an SSRC Project Grant. The Final Report (HR 3217) was submitted and accepted in November 1978.

During the research period, I have published and addressed conferences on the subject of this thesis as follows:

"Hypermarket Prediction in Western Europe" - paper delivered to Planning and Transport Research and Computation (PTRC) Annual Conference, Warwick University July 1975: published in Retailing - Procedures of the 1975 University of Warwick Seminar - PTRC 1976

"The Urgent Need for Specific and Realistic International Marketing and Distribution Indicators" - paper delivered to European Institute of

Advanced Studies in Management (EIASM) International Symposium on: Distribution - Structure and Management Brussels 29th and 30th May 1978: published in Proceedings.

Socio-Economic Influences on Distribution Levels in Western Europe SSRC Final Report 1978

"The Proposal of a Marketing Indicators Working Party" Journal of the Market Research Society Volume 21 No.3 1979

Monograph International Marketing Indicators published as European Journal of Marketing Vol.14 No.2 1980

As a consequence of these published papers, a European Marketing Indicators Working Party is currently being established. In this, marketing academics throughout Europe will work to produce realistic indicators of marketing factors and hypothesised causative socio-economic, demographic etc factors. Eight universities in seven European countries wish to date to participate in this project. Some have agreed to appoint research assistants specifically for this purpose. Luigi Bocconi University, Milan, has nominated a research team to research the Italian data. The Office of Population Censuses and Surveys (OPCS), A C Nielsen Company and The Market Research Society will appoint representatives to the working party. Outside funding is being sought by Research Bureau Ltd (Research International). Additionally to the European representation, Dr K H Lee of the Chinese University of Hong Kong is in the U.K in order to apply the methodology of the project to the Far East. Details of the working party are contained in Appendix 3.

During the programme of research the work and the problems involved have been discussed with most relevant European authorities. This includes discussions at the ESOMAR seminar Management Information for Retail Organisations, Luzern, 3 - 6 April 1974, and at the SSRC/EIASM seminar on Marketing and Public Policy at the University of Strathclyde 1978. There have been detailed discussions with:

Dr J B Jefferys, Director General of the International Association of Department Stores (IADS) Paris, and chairman of the Distribution Trades Economic Development Committee Common Market Working Party (contact has been frequent).

Mr M Norton, Vice President, Larry Smith Consulting, Paris (frequent contact).

Dr R Linda, Directorate General IV, Commission of the European Communities, Brussels (who has circulated copies of my EIASM paper to all member countries)

Mr J Besnard, Directorate General III, Commission of the European Communities, Brussels.

Professor Dr A G Heirman, Economische Hogeschool, Limburg, (frequent contact)

Professor A S C Ehrenberg, London Graduate School of Business.

Mr J Chahine, European Research Director, A C Nielsen Co., Paris.

Mr C Wallis, Public Relations Director, A C Nielsen Co., Oxford.

Mr T E Roberts, Research & Development Controller, ASDA Stores Ltd, Leeds.

Mr I Coomans, Counsellor, Comite Belge De La Distribution, Brussels.

Mr A Vandoren, Economic Consultant, Association Des Grandes Entreprises De Distribution En Belgique (AGED) Brussels.

Mr F C Treidell, Vice-President & Director General, Comite International Des Entreprises A Succursales (CIES) Paris.

Ms.D Larking-Coste, Research Officer, CIES, Paris. (frequent contact)

Dr H K Locker, Directorate B, Statistical Office of the European Communities, Luxembourg.

Mr R Kuhner, Directorate F, Statistical Office of the European Communities, Luxembourg.

Mr J R Blanc, Secretary General, La Confederation Generale Des Petites Et Moyennes Entreprises (CGMPE) Paris.

Mr E Thil, Marketing Director, Carrefour, Paris.

Mr B Anglade, Redacteur En Chef, Revue Francaise Du Marketing, Paris and Ms C Duchemin, Redactrice Adjoute.

Mr D Le Marchand, Secretary General, Federation Internationale Des Grandes Entreprises De Distribution (FIGED), Brussels.

Dr F Kempchen, Secretary General, Groupement Europeen Des Maisons D'Alimentation Et D'Approvisionnement A Succursales (GEMAS), Brussels

Mr R Schiller, Research Director, Hillier Parker May & Rowden, London

Mr E R S Whitefield, Managing Director, Management Horizons (UK) Ltd, Richmond.

Dr E Bell, OECD (Social Indicators) Paris.

Dr E Ezra, OECD (Regional Studies) Paris.

Dr S Blades, OECD (Economic and Financial Indicators) Paris.

Ms.D Le Coultre OECD (Female Labour Studies) Paris.

Ms B Ballard, Senior Research Officer, Office of Population Censuses & Surveys (OPCS) London.

Mr N Ahmed, Marketing Research Manager, Tesco Stores Ltd, Cheshunt.

Mr T Fisher, ISCED Studies, UNESCO, Paris

Mr B Pyemont, Managing Director, Research Bureau Ltd (Research International) London.

In addition this research has involved extensive and in many cases protracted correspondence with trade and professional organisations and national statistical offices in all the Western European countries studied.

CHAPTER 1

INTRODUCTION: METHOD AND AIMS

What may be called "marketing mythology" has absorbed numerous theories or hypotheses about the incidence and the causes of the incidence of supermarketing and hypermarketing in Europe, and the reasons for the disparities observed internationally in Europe. In the main these are based on catchment area studies and on, usually inadequate, national data or national environmental and trading stereotypes. The starting point in this research is the evaluation of these generalised hypotheses, and the construction of precise hypotheses that it might be possible to validate using aggregate data.

Since it is argued that the use of national data for this purpose is grossly insensitive, the main focus of the research is the analysis of aggregate data for the sub-national regions of Europe. The compilation of relevant indicators at regional level that are comparative is, however, a very considerable task. Therefore, an alternative analysis of the aggregate data at national level is also made, both to refine the initial hypotheses of the regional analysis and to suggest the indicators that might be explanatory of these hypotheses in a regional analysis, and subsequently to illustrate, explain and support, if this is applicable, the conclusions of the regional analysis.

The main focus of the research is on an explanation of the environmental factors affecting hypermarket development. Supermarketing is studied as a parallel or prior phenomenon affecting this development. The degree

of incidence of both these methods of retailing is argued as being indicative of the level of sophistication of retailing in general.

The regional data are subjected to correlation, regression and Automatic Interactor Detection (AID) analysis. The initial "naive" hypotheses are then revised in the light of these analyses to produce revised and precise hypotheses that are supported by empirical data.

The process, therefore, is the process that RILEY (1964) has characterised as working back and forth between theory and data (1). It is a process that Sonquist has summarised: "As explanatory research uncovers empirical regularities, one can look for clues to new ideas and explanations that might account for these findings" (2).

The final two chapters renew the discussion under topic heads and re-examine the initial hypotheses. The final research product is a series of revised and more precise hypotheses than have hitherto been proposed.

References: Chapter 1

(1) RILEY, M.W., "Sources and types of sociological data" in Faris, R.E. (ed), Handbook of Modern Sociology, Rand-McNally, Chicago, 1964.

(2) SONQUIST, J.A., Multivariate Model Building, Institute for Social Research, The University of Michigan, Ann Arbor, 1970.

CHAPTER 2

BACKGROUND TO METHODOLOGY IN COMPARATIVE MARKETING

2.1 Comparative marketing as a formal discipline is little more than fifteen years old - with a literature that is as yet largely spasmodic and arbitrarily focussed.

The classic statement of the true aims of comparative marketing is Bartels' (1963) (1) "not merely a description of foreign marketing experience, but an interpretation of it in terms of the socio-economic environment of foreign markets". He concluded at that time that no such studies existed and that, moreover, none was likely to be produced in the near future. With perhaps three exceptions he has not yet been proved wrong. To Bartels, "comparative marketing involves three types of interpretation: (a) of the relation between social conditions in a country and the manner in which marketing is practised there; (b) of the character and operation of the marketing mechanism itself; (c) of the patterns of personal behaviour and interaction in the socio-marketing activity".

Most analysts have so far been concerned with the second factor, the operation of the marketing mechanism only. Comparative studies of course exist. In the main they are descriptive.

What work there has been has mainly consisted of commentators, as Cundiff has complained, "Generalising from their own systems" (2) - in particular simple predictions that country X is, for example,

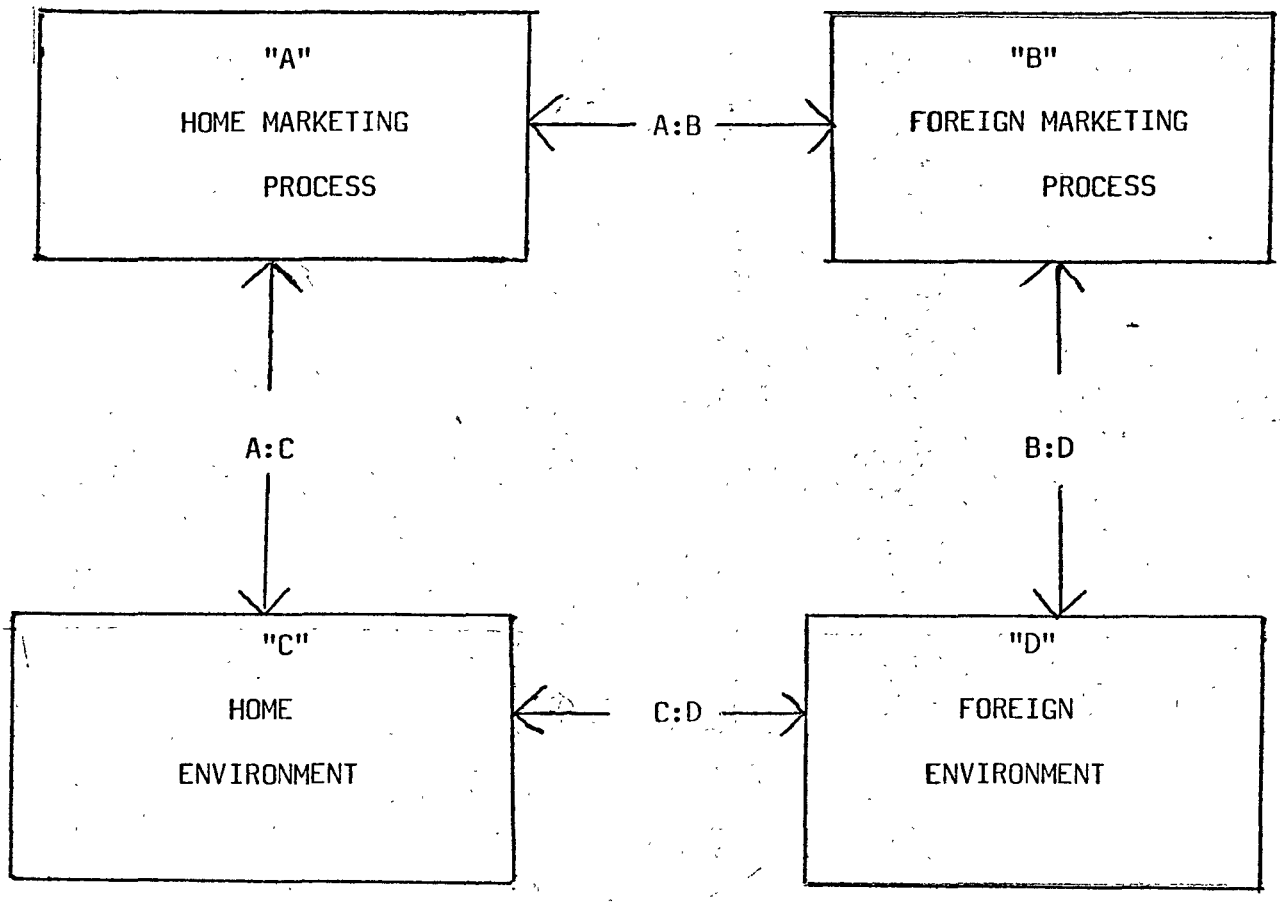
ten years behind America, so that its marketing institutions will be the same as America's in ten years' time. This basically, to Cundiff, is what Jefferys and Knee are doing in their Retailing in Europe (3) and according to Bartels, this is also what nearly every American commentator on international marketing is doing - tending "to judge business elsewhere from our own standpoint, without appreciating that our practices are as indigenous to our environment as those of other people are to theirs". (1)

It is the relationships between the relevant environment and marketing practice and institutions that are significant; and, if these variables are able to be comparatively quantified, one might then deal more precisely in "ratios" rather than "relationships".

Buxton (4), following the logic of Bartels, has produced the diagram in Figure 2.1. In this, comparative analysis is suggested by the equation A:C = B:D, "as A:B and C: D are merely descriptive studies of marketing systems, and A:C and B:D are simply statements concerning the environment".

The statistical precision of the comparisons made implied in such a formula is absent from almost every comparative study that has been produced to date. Studies exist, of course, that relate environmental factors to marketing practice; but almost entirely they are not of the kind that could result in any operational equation. In the main in such studies the comparisons made are (1) qualitative only and unsupported by comparative data (2) fragmented and random (3) simplistic

Figure 2.1 Comparison of the relationhsips between marketing and environment.



in that the concentration tends to be on contrasting third world countries with western industrialised nations. It can be argued that these features characterise the "standard text", the "comparative systems approach" of Carson (5).

Crucially Sherbini has commented in this context:

> "Very little attention has been given in the past to the comparative approach in the field of international marketing. Most of the existing literature represents individual and fragmented efforts, providing brief accounts that highlight certain aspects of marketing in individual countries. The absence of a derived analytical framework within which these contributions can be positioned makes meaningful comparisons extremely difficult". (6)

The formation of hypotheses as to relevant factors, the precise measurement of these factors, comparability and inclusivity within clearly defined boundaries - these are the prime requirements of an operationally useful comparative analysis. As yet such a methodological approach has been attempted by only a handful of researchers - these with varying degrees of ambition.

2.2 Approaches to quantified analysis

The genesis of quantified comparative analysis in marketing was a short article by Cundiff in the Journal of Marketing in 1965. (2) Here Cundiff advocated the investigation of comparative retailing by the method of development of hypotheses and the generation of inputs against which these hypotheses can be tested. Cundiff's concern in his study is the prerequisites of innovation in retailing and, as his main dependent variable measuring this, he chose the extent of provision of self-service. Cundiff complains that "paucity of information on marketing in other nations limits the comparison that can be made" - and, in fact, his inputs for independent variables are in the main, subjective and selective choices. For example:

> "Hypothesis 1. The development of self-service supports the hypothesis that retailing innovations evolve only in highly developed marketing systems".

His main input against which this can be tested is:

> "On a purely a priori basis, the America marketing system is widely accepted as the most advanced in the world today, and was at least among the most advanced in the 1920's when self-service was first introduced".

However, in testing the hypothesis that "the ability to adopt innovations is related directly to the level of economic development of a system" the dependent and independent variables chosen are as given in Table 2.1.

Table 2.1 A Comparative Ranking of Selected Nations with Respect to Economic Indices and Percent of Self-Service Stores

Country	Index of Production		Telephones in use		Self-service stores	
	Per capita	Rank	Per capita	Rank	% of total	Rank
United States	7.7	1	.42	1	10.0	1
U.K.	6.8	2	.16	7	1.3	8
Switzerland	6.7	3	.32	3	2.4	5
Canada	5.6	4	.315	4	6.0	2
Germany	5.3	5	.12	11	3.6	4
Sweden	4.4	6	.36	2	5.35	3
Denmark	4.3	7	.245	5	1.4	6
Australia	4.1	8	.215	6	1.0	10
Belgium	3.7	9	.133	10	0.13	12
France	3.2	10	.101	12	0.24	11
Netherlands	3.0	11	.1495	8	1.35	7
Venezuala	2.8	12	.0285	16	0.005	16
Italy	1.9	13	.0805	13	0.02	13
Finland	1.6	14	.1464	9	1.1	9
Spain	1.05	15	.062	15	0.014	14
Japan	1.0	16	.065	14	(N/A)	-
Mexico	0.7	17	.016	17	0.1	15
Phillippines	0.05	18	.004	18	(N/A)	-
India	0.03	19	.001	19	None	19
U.S.S.R.		-			0.1	-

The dependent variable "ability to adapt to innovation" is measured by "self-service stores as percentage of total stores". "Level of economic development" is measured by the independent variables "Indices of production" (per capita) and "telephones in use" (per capita). The factor "index per capita industrial productivity" is derived from: percentage of value added in world industry divided by percentage of world population. The factor "telephones in use (per capita)" is proposed as "a measure of a non-essential semi-luxury good".

Cundiff then gives a rank order to each of the twenty nations studied in respect of each variable and compares the ranking as confirming or not confirming the hypothesis. He concludes: "a comparison of the data on production and consumption with self-service in the 20 countries shows a relationship between these factors. For example, 5 of the 6 leading nations in production are also leaders in penetration of self-service, or, to move further down the list, 11 of the top 12 are leaders in both".

We are not concerned with the validity of the variables, which Cundiff offers only as the best readily available (and one would presuppose the action of confounded variables) or with the method of rank-ordering, but with the method of compilation of at least designedly objective indicators and their subsequent comparison - notwithstanding the starkness of the indicators. It is symptomatic of the scarcity of quantified comparative studies that Cundiff's prototypical and, in retrospect, simple exercise was still being anthologised in 1971 (7) and continues to be cited.

The important and influential study of this concept of comparative analysis, however, is the monumental Comparative Analysis for International Marketing produced under the direction of Liander for the Management Science Institute of Philadelphia (8) - and one says this despite the methodological objections to this study raised by Sethi and Holton (9).

The first step for M.S.I. "involved examining a multitude of variables which may be used to describe any given society and determining those strategic to our purposes..." - in this case, those explanatory of marketing phenomena. The variables chosen were those considered indicative of the "socioeconomic landscape"; and multiple variables rather than single variables were chosen - in which respect, referring back to the Cundiff Study (Table 2.1) we could obviously be highly dubious about the use of "telephones per capita" as the unique indicator of consumption.

The following indices were chosen by the M.S.I. researchers as explanatory of marketing conditions:

Environmental

1. Total population
2. Population density
3. Annual percentage rate of increase in population
4. % of population of working age (15-64)
5. Agriculture population as % of total population
6. Urbanization. % population in cities over 20,000 population
7. Primacy. Population of the primate city as % of the total population of the four largest cities.
8. Literacy (% literate of the population, aged 15 and over)

Societal

9. Ethnographic Diversity. Number of ethnographic groups comprising one per cent of population.
10. Religious Homogeneity and Identification.
    Homogeneous: (one religion at least 75% predominant)
11. Racial homogeneity and identification.
    Homogeneous: (one major social stock at least 90% predominant)
12. Linguistic homogeneity: % of adult population which speaks a common language.

Within these characteristics countries were classified as Very High, High, Medium, Low, Very Low - and clusters were then identified according to number of attributes shared by countries. In the same way, but for a separate purpose, Economic, Health/Hygiene, Educational Level, Communications and Transport indicators were also devised.

The importance of the M.S.I. study is its insistance on the selection of sufficiently wide-ranging, international indices. In the same way, the attempt of objectivity is the virtue of that section of the Cundiff study utilized above.

The astonishingly almost virgin concept of comparative marketing that thus begins to emerge is:

1. the generation of hypotheses
2. the compilation of inputs against which these hypotheses can be tested.

3. the use, for international comparison, of the indicators so compiled, once these are proved to be relevant.

In the case of the M.S.I. study, the validation of the relevance of the variable is not one of its concerns. The underlying hypotheses are unstated - the indicators being selected for relevance by Delphi methods; so that the researchers are then concerned with classifying countries by means of variables that by wide consent are relevant. Cundiff, however, states his hypotheses explicitly, and, in the instance quoted, uses the method of testing these against "objective" data.

One urges it as axiomatic that at least the approach of Cundiff in which indicator data are generated to illustrate specific hypotheses, is the methodologically sound one. The M.S.I. alternative, in which "expert" opinion is canvassed to identify socioeconomic and cultural areas that are relevantly discriptive of all marketing environments, contains the challengeable assumption that "marketing" is a homogeneous activity - that a factor which is relevant for one marketing activity will be relevant for another: that "relevant to retailing" = "relevant to advertising" = "relevant to the export of capital goods". Additionally, the implicit argument of the M.S.I. study is that all factors carry equal weight: countries can therefore be clustered according to the number of attributes they have in common. This again seems simplistic. In this context in her study Selecting European Markets, which, in effect, can be seen as a follow-up study to the work of the M.S.I. Purnell, using cluster analysis, reaches the conclusion that to consider the characteristics of a market without

relating those to the characteristics of the proposed product and the producing company is unprofitable (10). In the terms of the present study the approach will be that no indicator will be adopted simply on the grounds that it "describes the market"; we take as starting point precise hypotheses as to factors influential in the adoption of retailing innovation. We attempt the construction of indicators to illustrate these factors.

As regards distribution analysis consequent on the work of the M.S.I. Heirman's 1976-1977 study (11) is I believe, the only one published to date, exempting such prototype studies as Cundiff to attempt formalised statistical relation of socio-economic and distribution variables on an international scale (volume 3 with reference to the EEC). Heirman uses the process of factor analysis. This is valuable in the generation of hypotheses (although, of course, the act of selecting an indicator for inclusion implies an hypothesis). If, for example, as in the Heirman study, the factors of concentration on agriculture, high unemployment and excess retail capacity cluster together, then conceivably one could from this form an hypothesis that levels of agricultural employment and levels of unemployment might predict retail capacity. Heirman also essays sub-national analysis, using available EEC Commission data (12).

2.3 Subjective Analysis via "expert opinion"

In comparative analysis properly quantified statistical analyses are few. The alternative is to analyse or weight the analysis via the medium of subjective opinion.

In any collection of variables, some variables are logically more significant in prediction than others. When "these yardsticks are put together in some sort of combination, the question arises as to what weight to give what factor" (13). This has been said to be the most intractable problem in comparative analysis (14). Regression can assign the weights, assuming the relevant variables are included in the regression programme. AID can help determine the form of the relationships. A simpler and simplistic course is to let "expert opinion" weight the factors, in addition to selecting the factors as in the "M.S.I. approach".

If this is the procedure adopted, then there is no need to quantify the variables. Nebulous concepts such as "labour organisations and attitudes" (Langeard) can be weighted for importance by "experts" and each country given by them a score. The weighted scores of all such factors can be added to produce a total score. This can comprise the whole of the analysis. It is a quick method.

Such a method is used by Business International S.A. Brussels, in assessing the future risk and opportunities for business in seventy countries. Since the future cannot be quantified it is a justifiable procedure. Business International proposes 55 environmental factors. The 55 factors, some of them such as "scenarios for social stability" inherently unquantifiable, are separated into three categories: those considered to generate risk, those considered to create opportunity, and those considered to affect on-going operations in a direct manner. Business International reports that

> "It is at this point that the temptation to transform the qualitative data into quantitative data becomes irresistible. Weights are assigned to each factor to express the significance of its impact on business and, as has been seen, scores are assigned to the predicted scenario for each year. Weighted averages can then be calculated to produce for each country a risk index, an opportunity index, and an operating conditions index.
>
> The weights used are the averages of weights actually assigned to these factors by 100 international companies. This is not only scientific but intelligent as the results therefore reflect the judgement of the business community at large". (14)

The company warns, however, that there can be "no absolute comparability. no statistical significance". As a qualifying input to the assessment of future markets the procedure is valid. In an analysis of existing markets as a guide to action, which is the main concern of comparative marketing, subjective weighting as a proxy for statistical weighting of "hard fact" is obviously sub-optimal.

Langeard (15) with a more precisely focussed objective, that of identifying countries with a potential for hypermarket development, selects the variables. These variables were then weighted "based on their experience, information and beliefs of a group of European retail managers". Countries were then scored out of 120 and marked accordingly. It is, he admits "a minimum of comparative analysis".

Meidan, 1976 (16) similarly concentrates his focus - on the international marketing of woollens and worsted fabrics; and proposes 13 relevant non-controllable variables. These were classified as to influential importance by a sample of 22 senior executives in the industry - each being asked to grade the influence of each variable on a five-

point scale. The end result is the rank ordering of the variables by degree of estimated probable importance, after a process of multi-dimensional scaling (though this, one would argue, is not essential to the exercise). The "variables", however, are composed of catch-all categories which cannot be operationalised as stated - categorics such as "change in demand due to economic factors like inflation, decline in income etc", "cultural differences due to differences in religion, social environment etc", and "political disturbances". Meidan has identified those broad areas of influence that a sample of "expert opinion" considers most influential. This has a value as a preliminary analytical step. Meidan has tested, in effect, if his generalised hypotheses are in accordance with the hypotheses generally current in the trade.

The next step would be to attempt to operationalise these non-controllable variables by the construction of quantified and comparative indicators that are able to substantiate such concepts; then to relate these statistically to constructed indicators of export success in the woollens and worsted fabrics industry. The construction of valid indicators,of, in many cases, very nebulous concepts, is of course the problematic step - and the difficulties in many areas are enormous. This is the direction, however, in which useful research results inevitably lie. By definition, the assessing of average practitioner opinion cannot produce any new insight. It is useful to know what opinions are generally held: it is a limited research objective.

2.4 HYPERMARKET MICRO STUDIES

2.4.1 The above studies have been concerned with analysis (statistical or otherwise) using aggregate data. An alternative is to use disaggregate data. The main focus of this present research is on the factors conducive to hypermarket development in Europe. In the main, in fact, both practitioners and researchers derive their conclusions as to these factors from the micro-analysis of the characteristic patronage of individual existing stores, and, to a limited extent, of the environmental factors peculiar to successful and unsuccessful stores. This is obviously a logical and, to the firm concerned, an essential operational exercise. In each case, however, the conclusions are particular to those stores and to those specific locations. Such studies have been almost entirely retail impact studios. A by-product has been the production of customer profiles.

Obviously, however, at least theoretically, if enough consumer profiles are established in respect of a sufficient member of differently located hypermarkets, and this is done trans-nationally, and the environmental factors relevant to these hypermarkets are coded or quantified, then generalisations supported by data could be attempted about hypermarkets in general. This, after all, is basically the approach adopted in Applebaum's analog model of retail site location for individual firms (17), which approach was developed, though subsequently criticised, in the UK by Gallup Poll (18, 19).

These location studies, however, are, as stated, in the main each concerned with one particular store operated by one particular company in one particular region of one country. The problems of generalisation derive essentially from this fact, and from the varying value of the different catchment area reports.

The difficulties of interpreting and generalising from catchment area studies can be illustrated by reference to the principal reports to date on British hypermarkets. These are:

(1) Carrefour hypermarket, Caerphilly: study by Thorpe and McGoldrick for the Retail Outlets Research Unit (RORU), Manchester Business School. Final publication 1974. (20)

(2) Carrefour hypermarket, Caerphilly: study by Lee, Jones and Leach for the surveyors Donaldson and Sons. Published 1973 (21)

(3) Carrefour hypermarket, Eastleigh: study by Wood for the Department of the Environment. Published 1976 (22)

(4) Carrefour hypermarket, Eastleigh: study by Wood for the Departments of Environment and Transport. Published 1978 (23)

(5) Asda superstores in North Manchester: study by Thorpe and McGoldrick for the Retail Outlets Research Unit (RORU) Manchester Business School. Published 1974 (24)

(6) Fine Fare superstore, St Ninians, Stirling: study by Malcolm and Aitken for the University of Glasgow. Published 1977 (25)

(7) Asda superstores in general: survey by Gordon Simmons Research Ltd in 1972. Published 1974. (26)

These and other catchment area studies are referred to elsewhere in this thesis under particular hypothesis heads. They are not all equally useful as information sources. Wood's studies for the Department of the Environment are valuable inputs to retailing research. This section focusses in particular, however, on the studies by Thorpe and McGoldrick for the Retail Outlets Research Unit (RORU), a unit which was commissioned by The Institute of Grocery Distribution to monitor and research new hypermarket openings as a continuing series.

The concern in this chapter is with method, interpretation and reportage, and the possibility of generalisation from the combined findings of such studies. Though catchment area reports are not equal in scope and value, they all face initially the same methodological problems. The usefulness of the data they contain is affected by the research design, the sample size, the format of analysis and the presentation. The first two of these factors are a function, to some extent, of the research budget.

2.4.2 The problem of research design in catchment area studies

The basic question of "whom to question where?" is critical to validity. Shopping behaviour can be examined by interviewing consumers (1) at the store or shopping centre - as was done by the Donaldson researchers at Caerphilly, by Malcolm and Aitken at St Ninians, and on behalf of Asda superstores by Gordon Simmons Research (2) in their homes - as was done in the Retail Outlets Research Unit Caerphilly Study (3) by conducting both these exercises as an integral part of the same

research - as was done by Wood at Eastleigh and RORU in North Manchester. The first two approaches are inherently problematic.

In a comparative analysis based on catchment area surveys, the performance and levels of patronage at any one store need to be considered in relation to the environment of that store. This environment is bound to be particular to that area and idiosyncratic to greater or less extent. In-store interviewing is concerned to answer the question "What are the characteristics of the customers of this hypermarket?" This by itself tells us nothing about preferential attraction. If, for example, all the hypermarket's customers are found to be of A, B or C1 social class one cannot deduce from this that the hypermarket has no attraction for lower socio-economic groups: there may be none or few of these living in the catchment area. If sixty per cent of customers are observed to be working wives, one cannot say that the hypermarket particularly attracts working wives: The average statistic for that area might be sixty per cent, in which case the hypermarket is only averagely attractive to that group. Rousseau (27) juxtaposes the figures for eight French hypermarkets of percentage patronage according to the socio-professional category of the customer's head of family. The eight distributions differ widely. He subjectively concludes that the ambient populations concerned must respectively also differ widely. The comparative analyst is concerned with the plus or minus variations from the ambient averages.

Most studies based solely on in-store interviewing attempt an environmental comparison of some sort. Malcolm and Aitken in their

St Ninians study (25) do not. They simply present us with "shopper characteristics". The Donaldson researchers at Caerphilly (21) relate each shopper characteristic to the average of that characteristic for the whole of Wales. One would assume, however, that the Cardiff area differs significantly from, for example, central rural Wales. The Gordon Simmons Survey (26)of approximately two thirds of all Asda stores compares the characteristics of Asda shoppers with parallel characteristics of all housewives nationwide. Since Asda operates nationwide (though certainly in 1972 concentrated in the north) this can be argued as being justified as indicating approximate preferential patronage of that particular store group over the limited number of consumer characteristics covered by the survey. In general, however, for our purposes in-store interviewing produces the least useful data.

An alternative approach is to question people in their homes and thereby attempt to discover in what ways those who shop at the hypermarket differ from those who do not. This in theory produces valid answers to the questions that the comparative analyst is concerned to ask. Used as the sole analytical approach, however, it encounters very considerable problems: in particular, the catchment area is only subjectively identified, and sample sizes need to be large if sufficient users and non-users are to be identified. It is the method adopted by the Retail Research Unit at Caerphilly (20), which piece of research and the problems generated are discussed at length below.

The optimum method is to conduct both an in-store survey and a house-

hold survey. The in-store survey identifies the realistic catchment area. The household survey provides the environmental comparison. Both sets of figures can be compared. It is, in particular, the method adopted in the methodologically rigorous Eastleigh hypermarket study made by Wood for the Department of the Environment (23) and the method attempted by the Retail Outlets Research Unit at North Manchester (24).

2.4.3 Study by the Retail Outlets Research Unit (RORU) of the Caerphilly hypermarket, as illustrating the problems involved in accepting catchment area studies.

In the production of useful data on consumer characteristics the essential element is the in-home survey. The "in-home" study conducted by The Retail Outlets Research Unit (RORU) at Caerphilly (20), a study based entirely on door-step interviews, can usefully be examined in some detail. It is not precisely true to say that it is typical of all such catchment area studies: methodologically and analytically it verges on the incoherent. Neverless, it has received very considerable publicity, and highlights many of the problems involved in interpreting and accepting catchment area statistics.

The Caerphilly hypermarket opened in Autumn 1972. In August and September 1973 the RORU researchers surveyed 1210 households in twelve selected parts of the store's hypothesised catchment area. This research was the subject of a conference held very rapidly after completion of the survey, and reportage of the conference was published as early as November 1973, two months after the fieldwork (28).

As published, this conference was given overall catchment area statistics

It was noted that the survey showed that, as to the type of consumer attracted to the hypermarket, "the image of the young ABC1 housewife with her own car and 2.5 children is not confirmed. Admittedly the survey does show that more regular hypermarket shoppers do belong to upper income groups, but there is an even spread through all socio-economic class divisions and a similar even spread through age groups". The conference was told that this corresponded with the similar findings of the slightly earlier RORU study of superstores in Manchester: "So this is not purely a South Wales phenomenon". The validity of this observation as regards the Manchester study is discussed below. The figures published in general supported this conclusion as regards Caerphilly in all respects except perhaps that of age.*

A year later, in December 1974, the Retail Outlets Research Unit published its report (20). In this it warned specifically on three matters of interpretation:

(1) All cross-tabulation other than by age refer only to those shoppers under fifty, since "generally speaking those aged below 50 and those aged above 50, and particularly above 60, react in a different way". It can be noted that, for better or worse, this is a novel method of presenting catchment area statistics; and is a qualification to the data ignored in almost every published summary of the research report. Approximately 20 per cent of all the Carrefour's regular customers are aged 50 or over.

*As regards age, the published statistics suggest that the hypermarket appeals most strongly to the housewife under 40 and progressively loses its attraction after this age - though the fact that the 40-49 age dissection cross adds to only 92 per cent and, less seriously, the 30-39 dissection sums to 103 per cent does not assist interpretation.

(2) As a result of cross tabulations some figures may relate to very small numbers of individuals. In the RORU table reproduced here as Table 2.2 a figure in brackets "means that it relates to between 3 and 9 shoppers only"; even on this evidence, it is logical to suppose that in some of the unbracketed cells the percentages quoted are percentages of numbers only marginally larger

(3) The sample relates to twelve separate areas. It is not known if these are representative of the total catchment area, "whatever that might be". In contradistinction to their conference presentation, the researchers warn that to amalgamate the data from those twelve areas to produce a claimed global picture of patronage is dangerous. To study differential impact eleven of the twelve areas are statistically grouped into four zones: Caerphilly, Inner Valleys, Cardiff, Outer Valleys - and in the main the analyses are made in respect of these four zones. It is the comparisons between behaviour in each of these four zones that are of interest.

These warnings by the RORU researchers as to the interpretation of their analyses illustrate the difficulties of using catchment area data - certainly so in attempting to make any well-founded generalisation. The factors of this problem as epitomised above are considered in the sub-sections following.

2.4.4 Catchment studies: the problems of analysis and interpretation

The RORU Caerphilly report refers almost entirely to shoppers under the age of fity. Survey data are in most cases capable of various

Table 2.2 Retail Outlets Research Unit Table of Fortnightly Users of Caerphilly Carrefour: Socio-demographic characteristics of Customer Profile

		Caerphilly %	Inner Valleys %	Cardiff %	Outer Valleys %
	30	23	21	10	29
	30-39	35	29	40	26
AGE	40-49	34	21	40	29
	50-59	11	21	10	9
	60+	8	10	0	8
CAR	No car	15	3	(13)	9
OWNERSHIP	1 car	70	89	(75)	87
	2+ cars	15	8	(13)	4
	AB	19	16	(71)	9
	C1	20	9	(0)	20
CLASS	C2	34	43	(29)	37
	DE	21	30	(0)	33
	£1000	0	0		6
INCOME	£1000-1499	7	13		24
	£1500-1999	29	51	N/A	48
	£2000-2999	50	31		18
	£3000+	13	5		4
YOUNG	Yes	39	44	13	35
FAMILY	No	61	56	88	65
JOB	Yes	40	36	56	36
STATUS	No	59	64	44	64
NO.SHOPPED	2	9	11	(0)	4
FOR	3	33	48	(44)	44
	4	36	27	(22)	29
	5+	23	14	(33)	18
MAIN SOURCE	Carrefour	85	91	56	74
OF	Co-op	6	0	11	9
GROCERIES	Multiple	6	9	33	13
	Independent	3	0	0	4

interpretations and levels and methods of analysis. Interpretation of such reports for any specific purpose requires detailed study of the supportive data and research peculiarities. This is rarely done in references to these reports. Gresham's law of the diffusion of information applies: the simple slogan will crowd out the complex message (29). There are three importantly different sources in the process of diffusion of catchment area information:

(1) The peripheral source - reportage in trade and marketing journals and the press. This is the main source by means of which generalisations on hypermarketing enter what has been called "marketing mythology". In the main such reportage concentrates on the "Summary Conclusions" contained in the research reports.

(2) The intermediate source - the research report "Conclusions". The research conclusions that the researchers derive from their data that are considered by them important are made explicit in the report, usually in a three or four page section of "Summary Conclusions".

(3) The primary source - the data. This is the actual data contained in the body of the report. The quality of data varies greatly between reports.

In many cases the information that can be derived from each of these sources is alarmingly different in respect of the same piece of research. A usual practice in reportage is to quote out of context any sentence from the "General Conclusions" that seems to make a positive statement. A prime example is the out-of-context mis-reportage

by Cox (30) of a finding in the "Summary and Major Conclusions" section of the RORU Caerphilly report that is itself a mis-reportage of the evidence of the data in the body of the report. Several statements in the RORU Caerphilly report conclusions are directly at variance with the body of data presented. And, in most of the reports quoted, generalised statements in the "Summary Conclusions" can be shown to be in need of modification when the supportive data are consulted. The scrupulous Department of Environment Eastleigh report prepared over two years is an exception. Significantly it is the only one to be heavily criticised in reportage - for the lack of strong generalisation in its conclusions ("DOE hypermarket report - waste of planners' time" (31)) Most catchment area reports are low-budget operations, hastily produced in many cases with an eye to topicality.

2.4.5 Catchment Studies : the problems of sample size

Of financial necessity, sample sizes are usually small. The RORU Caerphilly study illustrates the problems. A sample of 1200 is ample for a homogeneous population. But if this 1200 is sub-divided, for example, geographically (in the RORU case divided here by twelve for data collection - these twelve divisions then aggregated to four for the analysis, one of the twelve, the Gaer-Newport area, being discarded), and each sub-division is then divided into those aged under fifty and those over fifty, and the under-fifty segment is then divided into "shoppers" and "non-shoppers", and the "shoppers" segment is then divided into regular shoppers or not, and the regular shoppers are then divided by socio-economic trait (in the RORU case

divided at this stage by up to five, even in the summary tables) - then many of the resultant statistical cells are going to contain very few observations.

The RORU study is avowedly punctilious in identifying these cells in which the percentages are calculated on a total population of less than ten. Nevertheless, all we know from this is that, if a percentage of twenty is quoted and if it is not in brackets, this represents at least two persons, and not one, having that particular attribute. It can, for example, be calculated through from the base percentages* that in Table 2.2 the percentage division by age group of customers from the Cardiff area is the expression in percentages of a sample of only ten - in which case the actual numbers involved would obviously be:

		%	No
Age	30	10	1
	30-39	40	4
	40-49	40	4
	50-59	10	1
	60+	0	0
		100	10

This distribution has obviously little statistical significance. Its expression in percentages tends to conceal that fact. And the subsequent dissections of the under-fifty age group in Cardiff in Table 2.2 are apparently based on a sample of nine. Although the

* The report provides an appendix giving for each of the twelve areas the number of persons interviewed. It would therefore be theoretically possible to calculate the base figures for each cell of each table by successive steps through the report - except that no dissections are made of the sample size of the under-fifty age group, and it is on the basis of this that almost all the tables in the report are compiled.

actual numbers involved in the other columns of that table are considerably higher, it is quite clear that in general one should not read too much into any percentage difference between cells unless this is substantial. Lacking the base figures in each cell, we cannot know how substantial the difference needs to be.

In considerable contrast, the Department of the Environment Eastleigh Survey exercise undertook 7,439 in-home interviews, in addition to the 1987 interviews in-store. In the analysis presentation, in addition to the percentages in each consumer-attribute cell, the absolute numbers are quoted in each instance, and are substantial.

An in-store exercise conducted in isolation does not require such a massive number of observations as does the in-home survey, though as stated it faces the problem of relating shopper-attribute percentages to the parallel environmental percentages. Nevertheless one would consider the 343 in-store interviews conducted by the Donaldson researchers at the Caerphilly Carrefour to be approaching the minimum.

Malcolm and Aitken present a two-part report on their survey at the Fine Fare superstore at St Ninians without giving any details at all of sample size.

In this context, reference can be made to the RORU 1972 and 1973 study of the patronage of the Asda superstores at Castleton and Chadderton in the North Manchester area (24). The Kwik Save discount

store at Rochdale and the Arndale centre at Middleton were also studied, but the findings here are not specific to a study of hypermarkets and superstores.

In-store interviews were conducted at Asda, Chadderton (340 interviews) and Asda, Castleton (456 interviews). Supporting interviews were made to homes in "selected residential areas" (879 interviews in twelve areas): probably only half these home interviews, however, were relevant to the Asda stores.

In the "Summary" conclusions it is stated that "housewives with a job most normally use a small shop for their main grocery shopping. Asda also achieves a higher level of patronage from this type of shopper than from those without a job". The supportive data in the body of the report are of patronage levels compared with levels for all shoppers below the age of fifty, and are data collected by the in-house survey only.

Small shops	+ 13%
Asda	+ 3%
Arndale	- 2%
Town Centres	- 8%
Kwik Save	- 9%

The general conclusion that the working housewife will prefer to use small shops is contrary to most hypotheses, and, if valid on the basis of the in-home count, is almost certainly location - specific ("When examining Greater Manchester as a whole, there are..... surprisingly few large supermarkets" page 12 of the report). The 3

per cent above norm of working wives shopping at Asda is almost certainly not statistically significant on the basis of the probable sample size of housewives in the two Asda catchment areas.

If commentators concentrate on the "Summary Conclusions", as they almost invariably tend to do, undue emphasis may be put on minor variation in customer profiles derived from limited or comparatively limited samples.

2.4.6 Catchment studies: the problem of micro-studies being location-specific

A report is obviously as good as its methodology. Of financial necessity the RORU Caerphilly researchers surveyed consumers "at home" only in selected parts of an assumed catchment area. The choice of these twelve localities was apparently entirely subjective, within the constraint that they should represent "localities at varying distances and directions from the store". In the event, one of these localities, Gaer-Newport, was found not to be in the catchment area. (Virtually no-one used the hypermarket: 85 per cent had not even visited it (28)). More importantly the survey sample bore no relation to population size in the different localities. As a result the Cardiff households are heavily under-represented. What was measured in the RORU survey was "penetration" in a 100 households in each of twelve randomly - chosen localities. "Penetration" in the two Cardiff areas was extremely light. "Penetration x population" was probably significant. The global

picture is not representative, and the attempt to produce one was abandoned by the researchers subsequent to their initial conference.* The analysis thereafter was concentrated, as it was forced to be, on inter-area difference within the catchment area - which differences are nevertheless of interest. Ab initio, however, it is clear that the more the researchers try to make the neighbourhoods chosen for study representative of the different segments (differentiated on whatever basis) of the total catchment area population, the more will the inter-segment differences be more significant than the sum of the findings - and the more elusive is any possibly transferable conclusion. If the extent and nature of patronage is as location-specific within the catchment area as the RORU researchers suggest it is, then it is logical to suppose that different catchment area reports in respect of different localities in Europe will be even more location-specific.

The RORU researchers at Caerphilly also note that their previous hypermarket surveys in the North West had shown that trade was lost to new hypermarkets initially by the small shops, whereas the Caerphilly survey showed that trade was lost to the hypermarket mainly by the large supermarkets already in the area. They propose that this was inevitable in that hypermarkets were developing in South Wales from a base of existing supermarket provision; whereas in the North West of England there had not been a tradition of supermarkets, and the region had progressed dramatically direct from the small shop to the hypermarket. The evidence of these localised surveys on the important question of the retail infrastructure conducive to hypermarket development is therefore conflicting - except, of course, to suggest that it is not an

*In methodological contrast, in Wood's research for the Department of the Environment, the initial sample of 5000 addresses was drawn randomly from the electoral registers for an area within the 20 minute driving time isochrone of the Eastleigh Carrefour.

important factor. To suggest this, however, would be to generalise from a small number of observations in two regions. The importance in hypermarket development of the existing retail infrastructure is discussed at length in Chapter 8.

In the context of this section, specific reference can again be made to this earlier RORU study, the study of the Asda Castleton and Chadderton stores in the Manchester area (24). On the question of patronage of these stores according to socio-economic class, the "summary" conclusion to this report states: "The home survey evidence suggests that, when location is allowed for, the appeal of the stores is approximately the same for all social classes. This is an important conclusion, for it is often supposed that superstores are liable to be class selective".

The supportive data in the body of the report are the following figures derived from the in-home survey:

Relative patronage levels of different socio-economic groups.

	ARNDALE CENTRE	ASDA CHADDERTON	ASDA CASTLETON	KWIK SAVE CENTRE
AB	+40	+28	+5	+40
C1	-10	+45	+16	-32
C2	+17	-5	+57	+26
DE	+67	+2	-2	+16
RETIRED	-20	-47	-41	+8

"Figures indicate % (± the average for a particular zone) of customers from each group attracted to the store".

The methodology of the RORU researchers is obviously correct: we are concerned with the plus or minus deviations from the ambient averages. The conclusions drawn from the figures produced by applying the method need comment, however.

Taking the whole span of the data across all four retail centres the conclusion of an appeal to all classes except the retired is substantiated. The Arndale shopping centre and the Kwik-Save discount centre, however, are operations different in kind to the two full-range and free-standing superstores. This therefore is not a useful generalisation to make. Considering only the two Asda superstores, therefore, if both are considered together then the generalisation largely stands: the one or the other has an above average attraction to socio-economic classes A, B, C1 and C2 and is of average attraction to classes D and E. If each superstore is considered separately, however, and this in context is the crucial point, then two diametnically different profiles emerge of Asda superstore customers. On the evidence of these figures, at Chadderton the Asda store particularly attracts the "upper" socio-economic groups (Groups A and B, the upper middle and middle classes, and group C1, non-manual workers) and is not preferentially attractive at all to group C2, the skilled manual worker. But the patronage figures for the Asda store at Castleton similarly adjusted to take account of social class representation in the ambient population, draw an exactly opposite customer profile. Asda here, these figures state, attracts this latter group, the C2 skilled manual worker, dramatically more strongly than any other socio-economic group.

Had only the Asda store at Chadderton been investigated in this study, then the profile of an Asda customer (or the profile of a "superstore" customer, depending on how far one wishes to generalise from the particular) would have appeared very differently indeed from the profile obtained from the Castleton Asda data. In addition, Asda operated another superstore in that same North Manchester area, the 33,000 square feet superstore at Bolton. Now if the patronage of that third superstore had been also studied, that might, one does not know, have weighted the findings on attraction specific to socio-economic class to one or other of the two extremes recorded. One does not know; and that is the point to be made. But one can say almost categorically that the effect of a third set of observations would be highly unlikely to have been neutral.

Most hypermarket or superstore catchment area studies are studies of customers and environment at one store only. In this example, diametrically different customer profiles (by socio-economic classification) were obtained in two stores operated by the same company in the same urban agglomeration and under four miles apart. There is little need, therefore, to emphasise the difficulties inherent in attempting to generalise from micro-study data trans-nationally in Europe.

2.4.7 The questioned possibility of trans-national generalisation from catchment area data

Entering a plea for more catchment area studies, Malcolm and Aitken (25) also note "a surprising lack of detail in many of the so-called

'impact' studies, while the methodology employed is either highly suspect or simply not stated". If there existed a data bank quantifying the information of a great number of catchment area studies from every part of Europe - and if these studies were as methodologically rigorous as the DOE Eastleigh study - the possibility of international generalisation might exist, at least as regards customer characteristics and previous ambient trade structure. Such a data bank does not exist and will not exist in the future. A measure of this is the prolonged and repeated attention paid in the literature and trade press to every new publication of a micro-level report.

These reports are few - contrary to the claim of Thorpe, who listed definitively in 1978 (32) 41 references concerning 27 UK "superstores, hypermarkets and other developments" the catchment areas of which had been the subject of study up to that date. If one excludes the "other developments" and studies purely of price, traffic or impact on other shops, he has identified twelve reports appearing over a period of seven years. The most publicised of these have been noted above.

The main reason for the funding of hypermarket micro-studies is to discover their impact on existing retail structure as a guide in the granting of planning permission. Customer data are a by-product of the research, useful if they help explain impact. In monitoring relevant micro-studies, therefore, we are in effect monitoring impact studies. In 1975 the Grocers' Gazette and Grocery Management was writing:

> "unfortunately, the number of completed independent surveys on the effect superstores and hypermarkets have on UK town centre retailers can be counted on one hand. The number which specifically refer to food outlets - which, after all, is who the superstores/hypermarkets are most likely to hit - is nil. (There are, of course, many available from the States and the continent but different trading conditions make fair comparisons difficult, if not impossible"). (33)

Three years later Lee (34) maintained that "there is now a wide range of studies on hypermarket operations and impact". He quotes in example four of the studies discussed above and two others and comments: "the findings are consistent with studies in other parts of the world ranging from Paris to Johannesburg". The reference is to the consistency of impact.

Both these commentators, differing though they do as to the extent of UK provision, imply a wide range of relevant impact studies existing elsewhere in Europe. This is not the case. Germany, for example has by a considerable extent in absolute terms the greatest number of hypermarkets in Europe. Nevertheless "despite the existence of very large numbers of hypermarkets and superstores in a wide variety of locations, but particularly outside established shopping centres, there are few studies available that attempt to assess the impact of such stores". (35)

France is traditionally regarded as the home of the hypermarket. In the early 1970s in Great Britain potential hypermarket operators and the planning authorities looked to France for precedents. However, few French hypermarket studies have been recognised in this country as being of value. There are the three very specialised Taboulet and Desplanques reports on the impact of hypermarkets on clothing shops and on department stores in Province (36, 37, 38). There

is the hypermarket customer report compiled for the Chambre De Commerce De L'Industrie De L'Oise in 1971 (39). A 1970 hypermarket impact study in Lyon was the sole continental input to the first British hypermarket planning enquiry, the Chandlers Ford enquiry of 1971 (40). Reference has already been made to the juxtapositioning by Rousseau of the percentage patronage by occupational status in eight French hypermarkets (27). Even such limited quantified comparisons are few. The Comite International Des Entreprises A Succursales (C.I.E.S.) in Paris, which is always assiduous in responding to such requests, was not able to recommend positively any French hypermarket catchment area study. The private Paris-based research company, Marketing Office, currently analyses the patronage and image of twelve hypermarket chains and eight supermarket chains throughout all the regions of France. This information is presented by region. It derives its data from a total sample of 3000 households - so that, even allowing for overlap between catchment areas, the observations in respect of any one hypermarket are obviously necessarily small. The cost of the report in 1980 was £2000 (41). The cost is a measure of the scarcity of this type of information.

The value of hypermarket and superstore micro-studies is in the generation of hypotheses. Sherbini's observations on existing international marketing literature in general are applicable to catchment area studies. These represent "individual and fragmented efforts". There is an important need for an "analytical framework within which these contributions can be positioned" (6). This is the aim of this study.

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CHAPTER 3

THE VALIDITY OF THE DEVELOPMENTS OF SELF-SERVICE AS MEASURING THE LEVEL OF DISTRIBUTION DEVELOPMENT

3.1 This chapter proposes that the degree of development of self-service, as manifested in the supermarket and importantly in the hypermarket, in a region is the current optimum indicator of the level of sophistication of general retailing in that region. A twin concept of "problem-full" and "problem free" retailing is proposed. The concept of "problem-full" and "problem-free" products has been suggested by G.Gross. Pilditch made reference to it in 1969.

> "Problem-free products require no personal selling. The packaging can tell the story and the customer can judge for himself. These are ideal for self-service. Problem-full products, on the other hand, require more information; they require personal selling, sometimes by experts.
>
> A question to ask is to what extent can packaging convert a problem-full product, depending on the disappearing salesman, into a problem-free product requiring none. A successful solution to this question could have an obvious impact on the sales of many products."(1)

Perhaps more importantly, however, a solution to this question over an increasing range of products improves the ability of the large-scale retail operator to expand the sections of the market in which he is able to operate to advantage. A concept of problem-free operation is proposed. The recent history of the growth of the large retail organisation can be generalised as reflecting the changing of what were formerly "problem-full" retail operations into "problem-free" operations. In the latter instance, the organisation is able to employ mass-merchandising techniques, head-

office and specialist managerial efficiency, it's capital intensiveness, without the operation being negated by many bottlenecks at the point of sale and success resting ultimately on the ability of junior local staff to match the expertise of the smaller "career" operator.

It could be said that the unstated objective of the large firm is to have the efficiency of a machine, using "efficiency" in the technical meaning as measuring the ratio of a machine's output of energy to input. It could also be said journalistically that the only justification for the large capital-intensive organisation is that such an organisation can run a "machine" much more efficiently and economically than a small man can run himself. This does not necessarily imply a cold operation - "cool but not cold" Lumsden phrased it (2). The "machine" can be "programmed" to cater for such "human" aspects of distribution as play centres for children (as with Carrefour) conscious friendliness on the part of check-out staff (as, at least designedly by Fine Fare). The "machine" (i.e. the systematised firm), having computed these to be desirable, computes how they may be provided "problem-free" as far as the smooth working of the system is concerned. Hollander says, in justification of multinational retailing: "They thus reinforce the innovative firm's basic role in creating supply systems that deliver greater value to the consumer for less money" (3). This, of course, is the justification for large-scale operation in retailing in general. The attainment of "efficiency", in the sense described here, is proposed in this study as a desired objective of distribution.

Jefferys wrote in the 1950's, of "the need to develop both among management and working people --- an appreciation that retailing

is not a 'mystery'": it is an "essential and practical function" that needs to be performed efficiently. It is with this taking of the 'mystery' out of distribution that this chapter is basically concerned (i.e. the movement to efficiency); it is when this 'mystery' - flair, craftsman's expertise at the point of sale - ceases to be supremely important that systematic operation can function.

A hundred years ago, almost every product sold retail was a "problem-full" product:

> "Like craftsmen they served an apprenticeship, and in all the leading trades there was much to learn. Where to buy from wholesalers or manufacturers or individual craftsmen, how to bargain with them for the right purchase and mix. Goods were not of standard quality, not even textiles. Every consignment had to be expertly valued and priced, both for buying and for selling again in the shop. A typical butcher had to judge and bargain for his meat 'on the hoof' and know how to slaughter and dress it in his own shed --- Grocers had to understand how to choose, blend and grind as well as weigh and package much of their stock. Even haberdashers bought cotton and thread by the pound and disentangled it and folded it into hanks for sale. Every trade needed its own knowledge and skill" (4).

The difference between conditions existing today in most of Western Europe and those described above can be summarised as: the substitution of uniformity for variance, and systematic management for intuitive management. This concept of transition in the direction of "problem-free" retailing is, of course, not limited to point-of-sale. Rationalisation (the introduction of uniformity and system in what were previously "skill" and "craft" operations in the sense described above) is observable in most sections of the modern, e.g. British, distribution system. As an example in what was previously a highly problem-charged operation, in Britain today as opposed to most

of Europe the market for made-to-measure suits is such that multiples such as Burtons and United Drapery Stores are able to buy cloth in bulk and pre-cut it; the suits are put together "like pieces of a jig-saw puzzle"(5). when the customer's measurements are known. An equivalent rationalisation is evidenced in W.H. Smith's establishment of a computerised depot as a solution to the problem of matching central stocks to very fluctuating regional demand across a range of 50,000 book titles, many of them held in shallow depth.

As a generalised hypothesis, therefore, it is proposed that the state of retail development in a country can be measured by the extent to which its retailing has moved from being a problem-full operation to being a problem-free one, in the broad sense described - and so amenable to "scientific method".

For this generalised hypothesis to be useful, some precise measure is needed by which the degree of this transition can be assessed. As measures of this transition, the following are adopted:

(1) the extent of self-service provision
(2) the extent of supermarket provision
(3) the extent of hypermarket provision

these to be measured by indicators listed in chapter 4.

The basis for this choice of dependent variables is the growing evidence that it is these innovations, self-service and its subsequent developments, that have created and continue to create the greatest pressures for change in distribution.

Basically, conditions conducive to "problem-free" retailing are created by standardisation - standardisation firstly of the manufacturer's product; then standardisation of selling procedures, merchandising and display; standardisation of control systems; standardisation of staff (i.e. division of labour).

It is proposed that the prime agents for standardisation in distribution have been, and are, self-service and the developments of self-service.

3.2 SELF-SERVICE AND THE STANDARDISATION OF THE RECEIVED PRODUCT

Just as Dorothy Davis comments above that, for most of the last century, goods, including textiles, were not of standard quality - that "each consignment had to be expertly valued and priced" at the retail level - so a prerequisite of standardisation of the retail operation is standardisation of the manufacturer's product coming into the system. The last century also, however, saw the emergence of widespread manufacturer branding, whereby the manufacturer, avowedly or tacitly, accepted responsibility for quality and standardisation - the retailer's buying task being in this case to choose a quality level and manufacturers geared to supply this level at an acceptable price (or, where this is not possible, to integrate backwards, either formally or informally).

Given the ability of manufacturers to produce consistent quality, Gross and Pilditch (1) are obviously correct: the key to trouble-free retail operation is packaging - and hence the perennial "chicken and egg" controversy: Who owes most to whom - self-service or packaging?

Certainly, the fact that the great bulk of grocery products had for a long time been pre-packed, and were expected by the customer to be pre-packed enabled the self-service pioneers to begin operation: food-canning with tin-plate as an industry is a hundred years old. The use of glass and paper package is obviously older. The first high-coloured plastic, however, was not seen in Britain before the Wembley exhibition in 1926. Polythene, PVC, polystyrene appeard in the 1930's. The Packaging Revolution - "the great period when unpackaged goods started to be packaged" - was a phenomenon of the fifties. It came to life coincident with self-service and because of it; and forty per cent of all packaging in Britain and probably Europe is still used by the food industry. The packaging industry today is not recognisable as the industry of thirty years ago, when European self-service was embryonic.

As expounded by Gross (1), the task of packaging is to change problem-full products into problem-free. In this it has transformed the methods of selling over a vast range of foods and non-foods, and turns its attention to a steadily widening range of non-food products, thus stimulating the development of the hypermarket: any product so made problem-free is usable by the mass-merchandiser.

3.3 SELF-SERVICE AND THE STANDARDISATION OF SELLING, MERCHANDISING AND DISPLAY

It is possible to identify three stages in the transition of food retailing from being a "problem-full" craft, traditionally perhaps the most "problem-full" retailing operation, to being so "problem-free" that it now provides the context for the most vigorous expansion of organised retailing that has yet occured:

Stage 1: the retailer as craftsman

Stage 2: the retailer as entrepreneur - innovator

Stage 3: the retailer as "manager"

As illustration it will be useful to isolate exemplary figures associated with the respective stages of this development. In Britain, for example, such archetypes can be seen in John Sainsbury, Sir John Cohen, James Gulliver - despite the fact that the organisations they represent, Sainsbury's, Tesco, Fine Fare, have all now progressed into the third ("management") phase.

3.3.1 Stage 1: The food retailer as craftsman - specialist

In 1969, sober photographs were published in many journals of the early Sainsbury shops. The occasion was the Sainsbury centenary. For it was in 1869 that John Sainsbury opened a shop and styled himself "John Sainsbury, Dairyman. Drury Lane." He was one dairyman among many, offering, however, a novel product, cleanliness. By 1875 he had become "J. Sainsbury, Provision Merchant" with a growing number of shops serviced by "J. Sainsbury" horse-drawn vans. These shops served outwards onto the street - almost obliterated (in one picture) by a rich profusion of hanging fowl. Ranged in front of the shop (in this picture) stand the staff, immaculate in aprons, with high white collars, black bow-ties. In such pictures as these nobody smiles: they are craftsmen in front of the evidence of their craft. A craft indeed it was in 1882, when John Sainsbury opened the first of his new-style grocery branches, at Croydon - "a double-fronted shop that had room for shelves, two counters and space for customers to push a pram the whole length of the shop"(6). What really impressed, though, were the tiled - mosaic walls and

floor, the marble-topped mahogany counters, the polished teak in the office - the combination of the opulent and the clinical "in an age of sawdust, wood and canvas". Other such shops followed: the Sainsbury legend became established. John died in 1928, the first only in a line of Grocer-Sainsburys (His last words: "Keep the shops well lit"). He was 84. He left 185 grocery shops in a radius round London - and a family eager to continue the business.

Extant also is a photograph of one of these early "new-style" Sainsbury Shops (either Blackfriars or Croydon); it is printed in the homely brown colour that photographs of that time had. In perspective, the marble and mahogany counters, from right and left foreground, converge on the solid, polished wood cash and accounts office; in a window in this a moustached head shows. The entire right hand counter and the unbroken shelving behind are laden with meats: sides of bacon, hams, sausages; hams hang from the ceiling; turkeys are advertised in symmetrical stickers on the wall. The left-hand counter supports a mountain of whole and half and quarter cheeses: Cheddar, Camembert, Gorgonzola, "The Stilton". On this side only, the wall steadies its lining of packets and tins; notices say "Tea". In this world of perishables the grocer worked. Here, to qote The Sunday Times (6) "sugar was weighed into gritty, thick, blue paper bags; vinegar poured from wooden casks; and mustard pickle from earthenware pots into containers that customers brought along themselves". In such a world, tangy with bacon, the good grocer learned his skills over many years (and many hours per day) of pupilage; the long hours being, in part, dicatated by the highly perishable nature of his stock.

Such the type of pre-Retailing Revolution/pre Packaging - Revolution craftsman food-retailer. He exists today in parts of the trade in France, is predominant perhaps in Portugal, Spain and Italy.

In Italy in the 1950's such a grocer was so universally found that some observers considered that the traditional demands made on him were such as to preclude the possibility of establishing self-service at all:

"The same ham has to be cut in a different way for each customer; one only wants lean, another wants a tiny bit of fat and a third as much fat as lean, so that the salesman has to incline his knife at different angles for each special case ---" (7).

By the time of the First World war, however, the marketing conditions that fostered the existence of this type of craftsman food-retailer had in many developed countries undergone change - particularly in the United States. At that time in the U.S.A. the following marketing factors were observed by some independent food-retailers under economic pressure:

(1) economic pressure generally on shops
(2) the success of Frank Woolworth in selling mainly non-foods by open display, on the basis of low prices and high volume allied to a policy of no-credit and no-delivery and the minimum of service thus keeping prices low.
(3) the boost to impulse sales that resulted from this "getting the customer amongst the stock"
(4) the steady growth of pre-packed pre-processed food as a proportion of grocer's stock

(5) the growth of national advertising of branded food products by manufacturers, so that the leading grocery products no longer needed "selling".

They drew what we now accept to be the right conclusions as affecting their trade. After unsuccessful experiments in "self-service" by retailers in California, Clarence Saunders of Tennessee devised in 1916 a method of operating in such a way that the business was profitable. His utilisation of one only entry point, free access on the part of the customer to price-marked goods, a controlled exit and pay-point is established as thebasis of "self-service".

It will be useful in the later construction of hypotheses to list here the generally accepted advantages of self-service.

(a) Accepted advantages of Self-Service to the customer

(1) She can shop at her own speed - either quickly or slowly.

(2) She can examine and handle all the stock in the store, and compare the prices of different lines: she does not need a shopping list.

(3) She can examine unfamiliar lines at her leisure.

(4) Prices will probably be cheaper, since the shop-keeper is saving on staff.

(5) She can compare prices of one store against another.

(6) She is not antagonised by unhelpful staff.

(7) The appearance is hygienic: the entire store is open for inspection.

(b) Accepted advantages of Self-Service to the Store operator

(1) In a time of rising staff costs he reduces these.

(2) He is not dependent on trained assistants, who are scarce, for most of the work; he can employ untrained staff.

(3) Much of the staff working time can be planned without reference to customer flow.

(4) He can make use of maximum floor space as selling area.

(5) The fact that customers are exposed to the full range of his stock and handle the stock increases impulse sales

(6) His displays and sales aids are selling for him all the time.

(7) He can pass on staff economies to the customer in the form of lower prices - although the popularity of self-service with the customer has been found not to depend on a price advantage.

In the United States the adoption of self-service as the medium through which to sell food and general groceries has been almost universal. By 1976 self-service accounted for virtually a hundred per cent of total U.S. grocery sales (8). Additionally, it is the selling medium in many non-food stores, including specialist stores.

Only recently since the late 1950's has self-service proved itself to be a phenomenon in Europe with the same dynamic that self-service has had in America. In 1948, according to one estimation, (9), there were only 164 self-service stores in Europe disposed as follows:

Belgium 3, Ireland 1, Netherlands 1, Norway 2,
Sweden 22, Switzerland 5, UK 130.

the lead in the United Kingdom being provided by the Cooperative Societies.

As late as 1954, when the number of self-service stores had grown to an estimated 6036. Jefferys could write that the approach of European retailers to self-service was "cautious" even "hesitant"(7). The great growth in self-service in Europe, however, since 1957 has been variously documented. In 1961 the number of such units had grown to 46,480, and by 1971 to approximately 190,000 (10). By 1976 counter-service for groceries had virtually disappeared in Sweden, and by 1978 self-service sales as per cent of total grocery sales was over 90 per cent in Switzerland, the Netherlands, Germany and France (8).

This rapid expansion of self-service, however, cannot be considered unrelated to the growth of the supermarket.

3.3.2 Self-service and the development of the supermarket

In 1930, Michael Cullen, a former executive of the Kroger Grocery and Baking Company of San Fransico, introduced into the United States the first "supermarket", as now in retrospect considered. He had proposed to the Kroger management that stores be opened in off-centre locations in which 300 items would be sold at cost, 200 items at 5% above cost, 300 items at 15% above cost, and 300 items at 20% above cost (11): a concept of low price to generate volume. Consequent upon Kroger's emphatic lack of interest, Cullen opened his own store in Jamaica, New York; with instant success. When Cullen died six years later he owned fifteen such enterprises trading under the name of "King Cullen". His methods

can be summarised as follows:

(1) to take the largest, most inexpensive premises that could be got, preferably in outlying districts where rents were cheap e.g. abandoned factories;

(2) to use the cheapest possible fittings;

(3) to buy in the largest possible quantities and sell at "rock-bottom prices";

(4) operate by self-service with the minimum staff.

The King Cullen stores and the successful followers of these such as Big Bear Market of New Jersey were rough and ready operations geared to the needs of the Great Depression. Catchment areas of up to a hundred miles were reported for these stores at this time. Their success, however, was based on a correct analysis of the logic of selling pre-packaged goods and proved to be independent of depression conditions. Appel (12) has categorised the period 1936-1941 as the period of "acceptance and growth" for the U.S. supermarket: at the end of this period supermarkets in the U.S.A. were estimated to a number over 9,000, accounting for 25% of industry sales. In this period and subsequently the U.S. supermarket as an institution has consistently traded-up, in location, fittings, range of stock and price levels without any loss of impetus. In 1978 the supermarket industry accounted for 74 per cent by turnover of total grocery sales in the USA (8).

As a consequence of the late development here of self-service, in Europe the dynamic increase in supermarket growth has been comparatively recent. In 1961, as measured by the 400 m^2 criterion there were 483 supermarkets in Europe. In 1971 there were more

than 10,545 (10). At the end of 1973 free-standing supermarkets in Europe numbered 13,075 (13). The most vigorous in the development of this large self-service unit has been Germany.

The advantages of self-service (the advantages of a particular method of selling) are by now almost inextricably confused - in the public mind and in statistics - with the advantages of supermarketing (the advantages of the large-scale self-service operation). The generally accepted advantages accruing from the increased scale of supermarket operations can be summarised as follows:

(a) Accepted benefits to the customer deriving from the scale of operations of a supermarket

(1) The range of goods is increased to include fresh meat, fruit and vegetables - so that "one-stop shopping" for food can be achieved, if the customer wishes. The range of grocery items is increased.

(2) Prices can be cheaper, since the higher turnover enables the operator to buy in greater bulk or have larger ex-manufacturer deliveries, and because his rate of stockturn is greater.

(3) Prices can be cheaper, since productivity of staff increases with the size of establishment.

(4) Owing to better-paid management the efficiency, attractiveness and hygiene of the store are increased.

(5) Owing to the increased size of establishment, more money per unit is able to be invested profitably in equipment (e.g. refrigeration).

(b) Accepted benefits to the operator deriving from the scale of operations of a supermarket

(1) Customers are able to concentrate their food purchases in one establishment, increasing the amount of sales per customer transaction.

(2) An increasingly motorised public will increasingly demand the facilities of "one-stop shopping".

(3) With the mass displays possible, impulse buying is increased.

(4) If the store image permits it, this impulse buying can be increasingly extended to include higher profit-margin non-food lines.

(5) Bulk-buying, or maximum ex-manufacturer drop, enables favourable terms to be negotiated with suppliers. This enables lower prices to be passed on to the customer.

(6) Cost of delivery from own-warehouses is less.

(7) Staff-productivity is higher, and staff expenses as a proportion of turnover lower - again permitting a low-price policy.

(8) The quality of unit management is increased. (At store manager level and above, management can be recruited from outside the grocery trade.)

(9) Direct head-office control over a comparatively small number of large supermarkets is more effective than over a large number of small outlets.

(10) In particular, computerisation of stock control is more effective.

(11) High turnover enables more capital to be invested profitably in fixed plant.

The logic of these arguments impelling towards the larger unit has only recently been accepted without major reservations in Europe.

Many of the pre-1970's supermarkets are now referred to as the "first generation" of supermarkets. They grew up in the "fight for sites" in the 1960's when the major chains fought for national dominance. In general terms the majority of them were by the 1970's considered to be (1) too small (2) badly sited (3) without car-parking (4) of inadequate structural and environmental quality. It was "quite ridiculous", according to Michael Brook of Key Markets, to expect the badly-planned ones to survive.

This entrepreneurial surge of self-service and supermarket development in the 1950's and 1960's in Europe, however, marked the end of the dominance of the "craftsman - food-retailer" in most countries of Europe.

3.3.3 Stage 2. The food retailer as entrepreneur - innovator

To the extent that food retailing, via the processes of pre-packaging, self-service and supermarketing, moved from consisting of a problem-full customer interface involving problem-full products to being an impersonal and systematic operation, so it attracted to it men of a very different type from the specialist craftsman-grocer. The craftsman-grocer was providing, and charging for, a service that was no longer required in conditions of pre-packaging and pre-advertising; this stimulated the emergence in Europe in the 1950's of a new dominant type of food retailer: the innovator-entrepreneur. So "craft divorced" now appeared the requirements of modern food-retailing that such entrepreneurs were attracted to it from diverse fields.

In France in 1949 Edouard Leclerc quit a training for the priesthood in order to open his first rough discount store in his home town of Landerneau near Brest, so, in effect, starting the first of the extensive French Centres E. Leclerc: his intention was to break a "wicked system" of commerce that kept food prices to the public high. The most important of Leclerc's dogmas as regards methods of retailing is that "commerce must give way to the notion of 'distribution'. The tradesman exists simply to put goods on the market at the minimum extra cost to the public, concentrating on large, rapid turnover and allotting himself a fee for his services" (14). Ignoring the socialist message, the dogma is the dogma of the supermarket. It appears that this mesaage was often the more easily understood by "outsiders" not brought up in food retailing. When, for example, in 1958, Leclerc moved his operation to Grenoble, his chief imitator and competitor was an engineer.

The same point has been made by Abbott in 1963 (15):

> "Initiative has come in Britain mainly from --- a Canadian biscuit and bread manufacturer, a large milk chain, and a department store group. In Italy, three-quarters of the new supermarkets have been set up by retail chains like Rinascente-Upim and Standa which were already experienced in the organisation of mass distribution but not previously very active in the food trade. The biggest supermarkets firm in France is controlled by the Brussels department store L'Innovation. In Spain, the first 50 supermarkets were set up by the Government."

The point of view is valid despite the somewhat selective nature of the examples quoted by Abbott. Lewis comments: "This situation presents an interesting parallel to the development of supermarkets in the United States. The first supermarkets here were opened by new entrepreneurs rather than by established food chains"(16).

In Britain, the archetype figure of the food-retailer as innovator-entrepreneur is, perhaps, Sir John Cohen. He was indeed a grocer prior to the advent of self-service - but a grocer significantly removed from the type of specialist craftsman.

In 1919, an ex-R.A.F. mechanic and out of a job, Cohen was selling rather battered ex-NAAFI stock in Hammersmith market ("I put them on someone else's stall"). Ten years later he had prospered enough to open six small shops under a company name "Tesco". By the outbreak of war in 1939 these six had grown to ninety, still run like market stalls, many of them little more than "shutter-fronted holes in the ground - with a pitcher shouting the odds outside"(17). At the end of the war Tesco went public, and experimented in self-service, in 1947. Despite an initial failure, all Cohen's stores were converted to self-service in the next ten years, and the first four Tesco super-markets were opened. Thereafter, both geographically and in terms of business done, Tesco grew rapidly year by year, by means of both new openings and the acquisition of other companies less dynamic. Any grocery business that Tesco took over was converted to self-service as a matter of urgency: the 200 stores of the John Irwin grocery chain were all running as self-service outlets within two years of takeover in 1960. There was by the late 1950's no question in the mind of Tesco management as to what business they were in: the self-service business was a better description of intent in the case of Tesco than "grocery business", fifteen per cent of Tesco's self-service trade is currently done outside of food and groceries.

By 1968 Tesco ranked number two in Management Today's "British Business Growth League 1968" (18). By 1972 it was by turnover the largest retail "grocery" company in the United Kingdom.

Cohen, however, had a greater influence on the development of self-service in Britain than even the growth of Tesco suggests (19). His nephew Mossy Vanger, initially working for Cohen, started his own Elmo supermarkets (later sold to O.K. Bazaars, and finally to Tesco itself, to complete a circle); another nephew, Sidney Ingram, founded Anthony Jackson and controlled over thirty Foodfare supermarkets, before selling out to Fine Fare; his brother-in-law Michael Kaye, backed by Cohen, started the successful Pricerite supermarket chain, by the 1970's rated as the tenth largest food-retailing operation in Britain, and subsequently bought by British American Tobacco.

With William Cohen & Co's Victor Value Supermarkets (there is no family connection) these were outsiders "making the running" in the early days (and Tesco later bought up Victor Value). They were almost unknown men competing against the established retail chains with an aggression and an approach to retailing alien to the craftsman. Cohen, like Leclerc, has made no secret of his contempt for the small retailer-craftsman: "I have millions of customers", he said in 1967, "and I don't know one of them" (20).

The entrepreneurial nature of Cohen's management of Tesco has been suggested by Foster, who was stating in 1968 that at top level Tesco "still functions like a small firm", that it thrives on "constant, spot decisions" about what to buy and where to build. Foster quotes Cohen's "Something exiting must happen every day" (21). By 1969, however, the dominant importance of this quality of innovative-entrepreneurism had receded in large-scale food-retailing in the U.K. During the financial year ended February 1970, the Board of

Tesco "instructed McKinsey & Company, Management Consultants, to advise on the group's management structure and administration at all levels, bearing in mind the rapid expansion that has taken place in the past, and which the Board intends to continue during the 1970's". (22). As one result of McKinsey's report, Cohen relinquished his office of Joint Chairman. The report also recommended the centralisation of administrative departments, "Including, in particular, the buying, computer and data processing functions in a new 100,000 sq.ft. office block". The presentation of the McKinsey report in March 1970 marks, as it were, the end of this entrepreneurial phase in Tesco's development: future growth was to be designedly systematised, less instinctive.

3.3.4 Stage 3. The Food Retailer as Manager

One view of the supermarket scene as at 1972, when the supermarket was no longer an advancing phenomenon but an accepted method of retailing in many countries, is that of W.S. Mitchell, president in the U.S.A. of Safeway: "One supermarket is very much the same as another supermarket - they all have Campbell's soup on their shelves and sell it at about the same price" (23). To the extent that this applies so success comes to depend on the maximising of the efficiency of each aspect of the operation, which is the sense in which Mitchell intended his comment. In 1962, for example, the U.K. supermarket chain Fine Fare was making a loss of £2 million; and in 1965, when it was the largest supermarket chain in Europe, its pre-tax profits were only £85,000. In that year Garfield Weston called in James Gulliver to manage the company.

Gulliver's experience of large-scale food-retailing was small. At the time he was chairman of Weston's building and shopfitting subsidiary. Previously he had been with management consultant's Urwick Orr, and before that, for two years, had attended the Harvard Business School. His consultancy work had moved from production problems (such as work in shipyards on cranes to "the whole relation of a company towards its market and profit requirements". Gulliver is, to quote Management Today, "a relatively new kind of top manager for retailing, a professed (and nearly professorial)expert in business techniques" (24). He is an argument in favour of the proposition that, at a certain stage of development, general management skills become more important than retailing expertise - for the transformation in Fine Fare's performance was immediate and progressive; thus:

Pre-tax profits	1964	£211,000
(Source: Fine Fare reports)	1965	£ 85,000
	1966	£673,000
	1967	£2.6 million
	1968	£3.6 "
	1969	£4.5 "
	1970	£4.9 "
	1971	£4.2 "
	1972	£5.2 "
	1973	£5.9 "
	1974	£7.4 "

At the beginning of 1967, after roughly a year in office, Gulliver circulated an internal paper listing ten management techniques that were being employed in the recovery. These were:

Organisational planning; management by objectives; budgetary planning and control; manpower audit; management development; operational research (stock control); work-measured incentive scheme (warehouse); long-range planning; marketing; computer.

"It was", Andrew Lumsden has commented, "the fullarmoury of modern management practice, none of it avant garde" (24). He concludes that "the recovery itself --- was a cool but not a cold operation: the application of business logic to problems that had defied attempts to apply retailing mystique".

In 1973 Gulliver left Fine Fare to found his own conglomerate, Argyll Foods. By general admission, he left behind him an organisation far better equipped to face a competitive future than when he joined it. Associated British Foods in accepting his resignation, defensively wrote in a clause that he was not to engage in competitive retailing for at least a year.

As has been said, the companies represented by the above three British archetypical figures have all now progressed into this tertiary "management" phase, - and perhaps also into the "phase of the future" hypothesised by Drucker, that of the "entrepreneurial management team" (25).

As in most European countries, food-retailing in Britain has shed most of the "mystery" criticised by Jefferys, and has proven to be susceptible to logical analysis and standardisation. The agent that gave the impetus to and made possible this rationalisation of an industry was self-service.

3.4 SELF-SERVICE AND THE STANDARDISATION OF CONTROL SYSTEMS

Drucker has called the fifty years up to the outbreak of World War I the "Age of the Entrepreneur". In the fifty years subsequent to this, he maintains the premium has been on "management". In this latter period "the great need has been for the productive organisation of large numbers of people to do what could already be planned, projected and laid out, that is, for doing something that was already reasonable well-known"(25). This description is applicable to the state of supermarketing in Europe. It has been proposed above that the need for "management" emerged here as a dominant priority during the late 1960's. The fact that the selling operation is able, in fact, to be "planned, projected and laid out" and so susceptible to "management" is inherent in the nature of self-service.

With minimum "interference" from the local personality of a particular store or its staff, a self-service chain is able to compute the profitability of any line of merchandise on the basis of the following information: location in the store, with reference to customer flow and height from ground; amount of shelf-space occupied; space occupied by each unit; gross profit per unit; rate of purchase (which is, in turn, partly a function of the first two factors). With this information, optimum stock levels, shelf-space and even optimum location within the store can be computed for each line of merchandise. The impersonality of self-service ensures that this computation is applicable to all stores of similar design within the group. The computer, given correct information, can check the sales rate in the store against minimum stock levels and reorder automatically as these are reached. In this case quite

simply "the retailer's computer talks to the manufacturer's computer" (26). When point-of-sale computerisation is generally introduced the above calculations will be automatic.

Computerisation is advanced in retailing generally. A survey by the National Computing Centre in the early days of computerisation in 1967 found the retail function to be outstanding in its development of computer usage for stock control and sales forecasting, and that computers were even then being used by major retailing firms for at least 17 different types of operation (27). In supermarketing and hypermarketing, however, if one excepts Carrefour, computerisation has increasingly meant that the store manager is ceasing to have any authority at all over his range of stock or stock levels. With the advent of point-of-sale computerisation his lack of authority in these areas will be total. To the extent that economic ways are found to enable current information to be received by the computer this centralisation of control increases.

The self-service field, in which personal salesmanship factors are of minimal importance, has logically been the field in which the mathematical assessment of retail site potential has made important progress. In the U.S.A. in 1971 the Minnesota voluntary group Super Valu, by computerising data in respect of 97 factors hypothesised as affecting self-service grocery sales, produced a model which was claimed to be able to predict actual sales volume to an accuracy of five per cent (28). In the U.K. in the 1960's, Tesco could claim with some pride that it assessed potential sites by instinct: "I have five chaps who can assess sites. We know how much money there is in a town. We can assess how much we can take ---."(29).

Currently, however, Sainsbury is using its own adaptation of the Gallup Poll model for site location and for assessing store performance, a model based on analogue techniques and using step-wise regression, with reported good results.

3.5 SELF-SERVICE AND THE STANDARDISATION OF STAFF (i.e. Division of Labour)

Traditionally in retailing the store manager has been "craftsman and generalist", responsible for all aspects of the operation of his store. In May 1971, however, when James Gulliver, chairman of Fine Fare (Holdings) Ltd., looking at the increasing size of new supermarkets and looking forward to the coming hypermarkets of up to 150,000 sq. ft. commented on the increased responsibilities of the modern supermarket manager, he also said that this, however, would be within the context of increasing control and direction from head office.

> "His role will therefore tend more and more to be that of an administrator, carrying out highly defined company policies through a larger and increasingly specialist staff --- Indeed, he is likely to have little control over sales and gross profit in the traditional sense and can only influence these in the negative way of not adhering to company policy"(30).

The principal independent duties of a supermarket manager today, in conditions of increasing computerisation, are not concerned with selling, ordering or merchandising. As outlined by Gulliver, they can be summarised as:

(1) Implementing company policy

(2) Recruitment, training and motivation of staff

(3) Industrial relations

(4) Attending to government and local authority legislation on consumer-protection

(5) Combating pilferage

(6) Management of perishable goods

(7) Control of local advertising (perhaps).

Similarly, Gulliver foresees a changed role for the stores supervisor, again traditionally a generalist, "a travelling super-manager": "He is likely to become one of a team of specialist supervisor/ merchandisers with responsibility for one major area of the stores that he visits, to ensure with the store manager that the company's policies are being adhered to with regard to pricing, space allocation and the like".

At the centre of the supermarket organisation there will be an increasing number of head office specialists and an increasingly specialist and professional top management. In this way, the main selling responsibility has moved from the craftsman - specialist at store level to the "management" specialist and specialist in management techniques at head-office level. As outlined above, increasingly the main duty of those below head-office level is to carry out in detail instructions emanating from head-office.

Henksmeier wrote in 1960 that "self-service is neither more nor less than the application to distribution of the basic principles of the division of labour, and as such it is a product of the industrial-isation of economic life"(9). He did not envisage the situation described here, but the comment is now more precisely applicable.

This is not necessarily to say that this concentration on the principle of division of labour is conducive to greater job satisfaction on the part of the lower orders of staff. Table 3.1 possibly indicates this dimension - whilst at the same time indicating the increased possibility of the use of unskilled, partly-skilled and part-time labour, as the rate of adoption of self-service and the average size of retail unit increase.

Table 3.1. U.K. Grocery Shop Staff: Interchangeability of Staff on Jobs, by Type of Outlet

	Counter Service	All Self Service	Small Self Service	Large Self Service	Super-markets
Staff interchangeable	92%	69%	84%	79%	63%
Staff on one job only	8%	31%	16%	21%	37%

SOURCE: DEP Sample Enquiry 1965 (31).

Nevertheless, the emphasis on "management" as opposed to "craft" and the de-emphasis of the customer-interface as a consequence of self-service have been factors in the raising of the status of retailing as a management career. "It would be next to impossible", it was said in 1843, "to apply to a well-dressed man in the street a more offensive appeletion than 'shopman'"(32). And as late as 1969 Sir Roy Harrod, in a letter to The Times, could say that in his boyhood he was looked down on in some quarters because he was in "the trade" (i.e. Harrods). In 1971, however, Gulliver noted that: "The intellectual and business challenges of being involved in

running large food-chains can now attract high quality management which hitherto tended to look down on retailing and made its career with food manufacturers. In fact over the last ten years the more interesting innovations have taken place in food retailing rather than in manufacturing, and this has contributed to the desire of many good men to get top retailing experience"(30).

3.6 SELF-SERVICE AND THE DEVELOPMENT OF SELF-SERVICE AS A MEASURE OF RETAIL DEVELOPMENT: VALIDATION BY COMPUTATION OF PRODUCTIVITY INCREASE

The above validation of the selection of self-service and the developments of self-service as measures of the state of retailing development and innovation is supported by research by George for the Department of Applied Economics, University of Cambridge (as commissioned by the Economic Development Committee for the Distributive Trades) into productivity and capital expenditure in retailing - in particular, his analysis "Productivity and Technical Change" (33).

The part-findings of this section are summarised in Table 3.2.

Table 3.2 Productivity and Technical Change 1961-66: by kind of business

Changes in	Co-ops	Dept. Stores	Grocers	Annual cumulative percentages CTN	Other	Mail Order	'All Firms'
Output	0.14	2.47	7.64	5.09	6.52	---	5.37
Labour input	1.66	.99	4.29	3.93	2.66	---	2.25
Labour productivity: of which, due to changes in	1.80	1.48	3.35	1.16	3.86	3.46	3.12
Capital per head	1.89	0.80	1.12	0.70	3.02	1.00	1.86
Technical and organisational knowledge	0.09	0.68	2.23	0.56	0.84	2.46	1.26

The procedure adopted to derive these figures was "to estimate the contributions made to the growth in output by increases in labour and capital over a period". This was done by multiplying the observed increases in these inputs by "observed factor prices". When the result is deducted from the overall growth in output, the "residual" is then attributed to technical progress - i.e. it is progress as measured by increase in output (turnover) over and above that attributable to increases in thelabour or capital employed.

George comments that, looking along the bottom row of the table, "there is a striking difference between the grocers and the mail order forms on the one hand and the remaining categories of firms on the other with regard to the absolute importance of technical and organisational knowledge. The high rate of "progress" for grocers is undoubtedly a reflection on the importance of the growth of self-service in this area of retailing".

The conclusion to be drawn, therefore, is that profitable innovation as such is best studied, at least in Britain, in grocery and mail order firms. As regards grocers, George links their high "technical and organisational knowledge" contribution to output with the growth of self-service.

Table 3.2, incidentally, indicates that "mail order" could be a fruitful alternative field of study. This would be so, however, strictly in its own right. Its techniques are particular, not pervasive, and have had little impact on general retail method.

The later Cambridge researcher Ward (34) specifically identifies the importance of the productivity increase attributable to self-service (defining productivity as labour productivity measured in "turnover per person engaged"). The basis of his calculations here is summarised in Table 3.3.

Table 3.3 Self-Service Trading in U.K. Grocery Stores as related to labour productivity 1957-1966

	1957	1961	1966	% change in real terms 1957-1966
Self-Service Sales as % of total	8.9	21.2	44.9	
Turnover per person engaged (£)				
Self-Service	5672	6200	8413	+ 24.1
Other Shops	4073	4634	5657	+ 16.2
All Shops	4179	4896	6631	+ 32.8

SOURCE: Board of Trade Journal, 20 December 1963 and Report on the Census of Distribution 1966. Volume 2

It can be seen that the proportion of grocery sales sold by self-service method increased from nine per cent in 1957 to 45 per cent in 1966. During this time labour productivity in self-service stores increased by 24 per cent as compared with 16 per cent in other shops. That the overall productivity increase is greater than either of these figures is due to the fact of the greatly increased share of trade taken by the self-service sector. Ward calculates that "If the same proportion of grocery sales had been sold on a self-productivity basis in 1966 as in 1957, the overal productivity increase would have been reduced from 33 per cent to less than 17 per cent" - and that, taking only the period 1961 to 1966, this type of conjectural

calculation gives a productivity increase in the grocery trade of only six per cent as opposed to an actual 18 per cent over this period. Much of the overall gain in grocery sector productivity can therefore be attributed to the growth in the porportion of sales that are taking place in self-service stores.

Ward then observes that this increase in the productivity of the UK grocery sector resulting from the adoption of self-service has had a noticable impact on the productivity of UK retailing in general:

> "Essentially we ask the question how many people would have been employed in retailing in 1966, had the proportion of self-service sales been the aame in 1966 as in 1961 and had the rise in productivity been identical in self-service stores to that in counter-service shops. On this basis, we calculate that an additional 50,995 'full-time equivalent' persons would have been required to retail the amount of grocery sales in 1966, which represents an increase of 12 per cent over those that were actually employed. This is equivalent to a rise of 2.4 per cent in the total persons engaged in retailing as a whole, which implies that the productivity growth of the retail trades over this period would have been reduced from 10.0 per cent to 7.4 per cent. In other words, of the total increase in productivity that occurred over the period 1961 to 1966, 26 per cent can be attributed to the growth of the self-service method of selling ....." (34).

Ward makes the additional point (a point to be emphasised in the context of this present study) that the adoption of self-service is, on current data, only statistically measurable in the grocery trade - but that self-service techniques or modified forms of these techniques have been adopted to a considerable extent in other retailing sectors. If one could calculate the extent of this more widespread adoption, then the gain in overall retail productivity attributable to self-service would inevitably be even more pronounced.

Within the self-service grocery sector itself there is continuing evidence that the larger the selling unit the higher the productivity. Management Horizons (35) has produced the figures tabulated here in Table 3.4. "The figures in the report make it clear that the most successful operators must be those who have superstores" - that is to say, those whose superstores predominate in their stores mix. This applies to the top performing companies. Tesco has a fleet of small shops in addition to superstores and performs below the average.

Table 3.4 The productivity of large-scale self-service operations. U.K. 1978

	Sales per employee £	Sales per sq.ft. £
Kwik Save	81,425	-
Cartiers Superfoods	52,942	-
Carrefour		-
ASDA	36,000-41,000	235
William Morrison		-
Safeway		-
Sainsbury	35,627	314
Tesco	30,900	173
Multiple grocery sector average	34,700	200

The figures need qualification, however, in that the numerator in both calculations should optimally be gross profit and not sales. This would improve the recorded performance of, in particular, Carrefour, ASDA and Tesco - companies for whom high margin non-food

sales are an important ingredient in total sales. This is to say that the hypermarket proper selling significantly non-foods is even more labour and space productive than the figures in Table 3.4 indicate.

These studies support an hypothesis of self-service and its consequent large-scale developments as the dominant mid-century and current agents of retail change.

3.7 "SELF-SERVICE AND THE DEVELOPMENTS OF SELF-SERVICE" AS A MEASURE OF RETAIL DEVELOPMENT: VALIDATION BY GOVERNMENT SUPPORT

Support for this selection of self-service and its developments as the current preeminent measure of retailing advance is to be found also in the support (direct and indirect) given to self-service and supermarketing development by governments as the prime means of increasing efficiency in the food distributions systems of those countries.

(1) In France, despite political opposition from the small shop-keepers and from the established chains, at crucial moments (August 1953, 1958 and 1960) the government supported the self-service and supermarket innovators (e.g. Leclerc) in their fight against Resale Price Maintenance and the stoppage of supply by manufacturers - as of course, other countries have done; but not, perhaps, in the face of such violent and effective opposition.

(2) In Spain, self-service has become "an instrument of economic policy" in order to bring down retail food prices and to

increase the efficiency of the retail trade by strengthening effective competition: the initiative in introducing self-service was taken first by the State, and not by private enterprise. The first self-service shops were opened in 1957 within the semi-official cooperative Conauta (National Self-Service Cooperative). The first supermarkets were set up by a state agency, the government-owned CAT (Comisaria De Abastecimientos Y Transportes - Office of Supplies and Transport) in 1958). (How many supermarkets CAT has opened, or stimulated to open since this date is a matter of choice between statistics: Henksmeier, writing in 1960, (9) gives the state the credit for the existence then of fifty supermarkets - averaging 700-800 square metres; in 1971, however The International Self-Service Organisation reports the existence in 1961 of only twenty-four supermarkets in Italy - using the normal European definition of a supermarket: 400 square metres minimum selling space;(1)) - and the Department De Autoservicio, Cajas Registradoras National S.A., noted 44 supermarkets only (400 m^2 criterion) at the end of 1962 (36). Modern Retailing (27) (German version:1966) credits CAT with having stimulated the opening of 300 supermarkets in Spain, "with a further 300 expected to be opened in the near future": The International Self-Service Organisation, however, credits Spain with 138 supermarkets only as at 1971 (10). This reflects how extremely blurred distributional statistics were until very recently indeed. That they remain idiosyncratic to particular countries and observers is noted in Chapter 4 and 5).

The Spanish government, additionally, set aside 50 million pesetas in loans for retailers willing to convert their shops into self-service units, and gave privately owned supermarkets, on conditions, substantial advantages including tax incentives: Henksmeier reports that an additional aim of the State in taking the above initiative was to develop the industries that supply supermarkets with goods or equipment, such as manufacturers of shopfittings, packing material, frozen foods etc.(9). - that is, stimulating a "retailing revolution" in order to promote a "packaging revolution."

Parenthetically one can note that this strong participation by the Spanish government in self-service and especially supermarket development initially hastened what whould otherwise be the normal proportion of self-service new openings that were of supermarket size. By 1961 the supermarket share of the total number of self-service outlets was higher in Spain, at 12.2 per cent, than anywhere else in Europe. In 1971, this percentage figure had shrunk to 0.2 as a result of Spain becoming well-equipped in smaller units (well-equipped, that is, in the context of economic standing - and better equipped in relation to population than, for example, Italy) (38).

(3) In Italy it was in part similar motivations that impelled the state-owned financial corporation IRI to acquire the seven stores of Romana Supermarkets S.P.A. in 1967 (39).

(4) Currently as from 1980 Argentina is opening up its food and drink market to overseas supermarket operators. It is

offering 80 per cent loans on the cost of building and equipping supermarkets in the country. The first two years of the loan will be interest free (40).

The promotion of self-service and supermarketing by governments as indicated above, as a prime means of increasing the efficiency of their distribution systems, endorses the selection of self-service developments as the major indicators of retailing change.

3.8 HYPERMARKET PROVISION AS THE PRIME MEASURE OF DISTRIBUTION DEVELOPMENT

The hypermarket is the logical and, to date, ultimate development of self-service operation. By most, but not all, definitions of "hypermarket", hypermarketing is synonymous with low prices to the public, both for foods and non-foods. As John Fairclough, managing director of Hypermarket Holdings, the joint company set up by Carrefour and Wheatsheaf to develop hypermarkets in Britain, says: "The method of operating a hypermarket results in much greater efficiency in storage and handling of goods, and this reduces prices for the customer" (41).

A price advantage is not, however, the only attraction of the hypermarket. T. Grinnel, the general manager of Savacentre, the Sainsbury - British Homes Stores subsidiary, has noted that "the most important advantages of hypermarkets are cheaper prices, the convenience of ground level car parking, and late shopping hours. Furthermore their size enables shoppers to satisfy a considerable proportion of their shopping needs in one trip"(41).

In that the hypermarket offers one-stop shopping at low prices over and extended and continually extending range of foods and non-foods with the convenience of adjacent car parking, its provision is proposed as the prime single indicator of general retailing efficiency on a progressive continuum self-service - supermarket - hypermarket. "Hypermarkets and superstores are in many ways only an extension of the shopping revolution that the supermarkets ushered in during the 1960's. The concept of self-service, cheaper prices, a wider range of goods and brighter shops was resisted by the old-fashioned retailers but quickly accepted by the public" (41). The argument that trading economics and customer acclimatisation logically propel the self-service operator progressively towards the larger unit is contained in Chapter 6.

As a consequence of the expanding size of store and consequent progressively extending range of foods supplied by multiple grocers, the gorcery sector is making deep inroads into what were formerly specialist businesses. The extent of their impact as at 1979 on the sale of specialist perishable foods is shown in Table 3.5, as compiled by Stockbrokers W. Greenwell and Co. (42).

Table 3.5 Fresh food sales through U.K. grocers - market shares

Retailer	Meat	Fruit & Veg.	Eggs	Total
Grocer	28%	25%	40%	28%
Butcher	60	-	4	31
Greengrocer/Street Trader	-	70	4	27
Other	12	5	52	14
	100%	100%	100%	100%

in which respect George Cattell, a former director-general of the National Farmers Union, told a meeting of farmers in 1979 that he predicted that the grocers' 28 per cent share of the meat trade shown in Table 3.5 would rise to 43 per cent by 1985. "The wholesale meat trade is one in which marketing and modern management techniques are relative strangers", and he forecast that the multiple grocers, in their search for overall operating efficiency, would set up their own slaughterhouses in the 1980's (43).

In the same way grocers are taking an increasing share of the off-licence liquour trade. In 1977 that share was 41.2 per cent (44). Currently it is approaching 50 per cent.

Progressively these shares of all-food trade are being captured by the superstores.

Additionally, the range of non-foods carried by the hypermarket, in the main at discounted prices, is continually increasing. Any non-food item made problem-free at the sales point by packaging or the minimal need for explanation is usable by the self-service mass merchandiser. Associated Dairies' ASDA superstores, for example currently carry 27,000 lines, of which only 6000 are edible (45). A.C. Nielsen Company (46) listed in 1977 the range of merchandise then stocked by "grocery" superstores. The list is given as Table 3.6.

Table 3.6 Range of merchandise stocked by grocery superstores, Great Britain, 1977

Proportion stocking-:	
Groceries, Meat & Poultry, Fruit & Green Groceries, Confectionery, Alcoholic drinks, Tobacco, Toiletries, Household Hardware ...	100%
Stationery/Toys/Games	99.1%
Garden Tools	97.4%
Decorating Supplies	95.7%
Car Accessories	95.7%
Clothing	94.0%
D.I.Y. Hand Tools	93.2%
Soft Furnishings	92.3%
Records/Cassettes	91.5%
Minor Electrical goods	86.3%
T.V. sets	77.8%
Major electrical appliances	76.1%
D.I.Y. materials	70.1%
Proprietary medicines	68.4%
Delicatessen	59.8%
Footwear	54.7%
Jewellery	38.5%
Furniture	36.8%
Photographic equipment	36.8%
Goods from own bakery	32.5%

The importance of non-foods logically increases with the size of unit. The stockbrokers W.S. Greenwell and Co., have calculated that for a typical 35,000 square feet superstore non-foods account for 20 per cent of sales but 33 per cent of profit; and for large hypermarkets of, for example, 90,000 square feet for a probable 45 per cent of sales and 60 per cent of profit (47). Greenwell's breakdown of the figures for the superstore category is given as table 3.7.

Table 3.7 Typical Superstore Non-Food Sales

	Non-Food Sales % of Store Turnover	Gross Profit Margin	Contribution to Store Profit
Health and Beauty Aids	3.0%	30%	5.8%
Clothing	5.1%	28	9.3%
Toys	2.5	30	4.9%
D.I.Y. & Leisure (electrical, decor, motor accessories, garden)	5.1	20	6.7%
Durables (brown & white Goods, Furniture)	2.6	20	3.4%

The gross profit margins are low compared with those in the specialist trade, but high in comparison with discounted grocery margins. This compounds the need of the operator for the larger unit where non-foods can be merchandised. Ian MacLaurin, Tesco's managing director, commented in 1978 that "supermarkets who are staying just with food will have a hell of a time of it without the cushion of non-foods" (49). As a general observation this remains valid, despite Tesco's subsequent temporary contraction of

its non-food operations in 1980 as a consequence of recession. The escalating size of the store unit mirrors the escalating thrust for non-food sales.

The impact of superstores and hypermarkets in a country or region is disproportionate to their numbers. In the UK Fine Fare, for example, has 684 stores, but among these 35 per cent of its total business is done through its 33 superstores (49). Progressively throughout Europe hypermarkets and superstores have become or are becoming the dominant components in the stores mix of what were once grocery-only firms. Hoare Govett and Company, in fact, predicted in 1980 that by 1990 the traditional High Street supermarket will have disappeared and that only the superstores and hypermarkets and the limited-range discount stores will remain as supply sources for everyday purchases (50). And the maximum economic size of the self-service hypermarket has not yet been established : the Carrefour hypermarket opened at Toulouse in 1972 has 260,000 square feet of selling space; in Germany, the four Wertkauf "Self-Service discount department stores" are each over 400,000 square feet (51).

3.9 THEY HYPERMARKET AS AN AGENT FOR THE NATIONALISATION OF RETAILING AS AN INDUSTRY

The "hypermarket" can be seen as the ultimate manifestation to date of a rationalisation of retailing that has followed the widespread adoption of self-service. As epitomised in Table 3.6, the hypermarket has been instrumental in breaking down the barriers between retail sectors. This includes the retailing of intangibles. Tesco's superstore at Pitsea includes a travel agent. In this it

follows the now well-established lead of hypermarkets in France and Belguim, where travel and tourism are sold as an actual self-service operation. Tesco in 1980 was considering entering the market for insurance selling low-premium insurance in a mass-merchandising operation. It also sees itself in the future as possibly selling shares through the medium of stockbroker concessionaires. When Manwaring of Midland Bank said in 1979 "Banking is the right environment for selling insurance - it does not sell well across the bacon counter" (52), there is an element of defence noticable in the remark.

In that the hypermarket is concerned to sell both foods and non-foods and now noticably intangibles, with the proportion of food-stuffs sold decreasing logically with increase in size of building, it is attracting to it both food-retailers and non-food retailers, and also non-retailers. Tanburn has described the situation in Germany in which nearly every conventional type of retailer is concerned in the development of the "hypermarket":

> "The Plaza outlets have been developed by the co-operatives; wholesaler sponsored groups have developed them to protect their business from competition in particular areas; and the multiples have moved in too. The department store operators, besides developing their more conventional sites are also developing out of town, with self-service discount department store operations --- The operators of the highly successful Wertkaufs --- moved into this type of business from the furniture trade; while Massa-Markte is run by developers who saw an investment opportunity but had no previous operational experience in the retail field". (51)

The chief innovator in hypermarketing in France and Europe is Marcel Fournier, chairman of Carrefour, who is a former Annecy draper.

The spread of hypermarketing in Europe is an important contributor to the continuing breaking down of the divisions between different branches of retailing that was previously evidenced in the development of the supermarket. The department stores are particularly affected. In Europe generally department store management is still in the process of appraising its position in the future development of distribution. Whereas in 1968 Donald B. Smiley, executive vice-president of Macy's of New York, could say "From a financial point of view give me Marks and Spencer any day, but we're just not in that kind of business", (53), this attitude is being progressively abandoned in Europe today. In 1972, the U.K. department store group Debenhams opened its first Scan superstore at Nottingham and made the decision to develop a chain of such superstores. At the same time it acquired Caters, the supermarket chain. On these developments Sir Anthony Burney, Debenham's chairman commented: "We're no longer just department store operators, we're retailers" (54). The fact that neither of these ventures was a success does not affect the philosophy.

Commenting on the data given in Table 3.6 on superstore expansion into non-food areas, A.C. Nielsen Company gives its opinion that this illustrates "just why superstores are regarded as the modern leaders of the retail revolution" (46). This continuing rationalisation of retailing as a total industry is directly related, it has been proposed above, to the progressive development of self-service to hypermarket level.

3.10 SYSTEMS EFFICIENCY AS A DESIRED OBJECTIVE OF DISTRIBUTION

This chapter has traced the progressive introduction of management science and systems efficiency into the process of retailing that were made possible by the degree of standardisation and routinisation that successive developments of basic self-service method made possible. The benefits to the operators and to the public are measurable.

There are counter-arguments to an emphasis on systems efficiency. These arguments concentrate on the ease or otherwise of entry by newcomers and innovators, on the provision of variety, on retailing as a social activity. Small retailers and conservationists in particular have urged these as important factors at public enquiries throughout Europe - and not in many cases without some justification. The stance taken in this study is similar to that adopted by Reavis Cox:

> "Do we really want efficiency in this sense? There also are those who maintain that a society constructed to an engineer's technocratic blueprint, even it it worked out as planned, would be a nightmare for human beings. It might reduce costs substantially, the argument runs, but only by doing violence to other fundamental principles upon which our culture has been constructed. These include a belief in the need to rely upon individual initiative and inventiveness to keep our economy advancing and a fear that binding people into an efficient system would endanger these qualities by imposing rigidities of various sorts.
>
> In response to such arguments we can only agree that they have merit, but their importance should not be exaggerated. In this country, we do not seem to be in any serious danger of stifling humanity by overemphasis upon engineering concepts in distribution. It seems better to accept the conclusion that while efficiency in marketing has increased over the last century, it has lagged behind other sectors

of the economy - and more especially behind agriculture - in its rate of improvement. Much stronger evidence than any we now have available will be necessary if we are to treat this fact as anything more than a challenge to the ingenuity and energy of those whose business it is to make marketing work as well as we know how"(55).

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CHAPTER 4

INDICATOR CONSTRUCTION AND PROPOSED RESEARCH IN INDICATOR CONSTRUCTION

4.1 International demographic, economic and social indicators available to the marketer are chronically blunt for marketing purposes. This is the premise of this chapter. They nevertheless form the statistical skeleton upon which nearly every international marketing research report is built, despite the fact that many of these indicators are fallible as regards international comparability and relevance to marketing to an extent that makes them not just irrelevant but positively misleading. They are data that are readily available: therefore they are used. There is an urgent need for a programme to produce realistic and comparative international indicators specifically constructed to aid the comparative analysis of markets.

In the study of marketing and public policy interaction, attention has focused almost entirely on the extent to which political action can, and should, limit marketing action. Very little attention has been paid to the dependency of the process of marketing analysis itself on current political goals. Yet these goals decide the statistics that governments command statistical offices to produce - and these statistics profoundly influence marketing action. This is especially so in international marketing. It is difficult for a marketer to have an "instinctive feel" for a foreign market. His assessments are, to a large extent, based on available "comparative" data. It is argued in this chapter, however, that the international indicators

most quoted in marketing circles have little comparative value. They are incidental statistics compiled for other purposes.

It would be idle to pretend that the correction of this is an easy task. In some cases the production of data usable in marketing requires only the restructuring of existing data to produce a new and relevant synthesis or presentation. In other cases specific basic research is necessary. "First generation" work, however, can obviously be done by co-ordinated international private group research.

The argument here, therefore, is for the establishment of a Marketing Indicators Working Party, optimally eventually within the authorities of EEC and OECD. It will be argued in this paper that "marketing" is not a homogeneous activity and that such a working party should consist of a "distribution" sub-section, an "advertising" sub-section and so on. The working party would (1) propose optimal marketing indicators, (2) liaise with other indicator constructors (e.g., of economic, demographic, social, etc. indicators) as regards communal ground and practicability, and work towards the construction of specific marketing indicators. The first sub-committee of such a working party, one oriented towards indicators relevant to distribution, is currently in process of formation. The generative factor has been the writer's published papers. The list of participant representatives of European countries as at the time of writing is given in Appendix 3.

This chapter deals with problematic areas in indicator construction accordingly as they have been encountered in a project in comparative distribution analysis. The argument, however, is applicable to all aspects of marketing.

4.1.2 Time Factor

Given that the lack of a programme as proposed is important (and this, as we have said, will be argued below), the time for effective remedy is short, if this is to involve "official" participation. A process of revaluation of statistical need is currently taking place generally in Europe - with impetus from EEC, OECD and nationally (in which respect subsequent and relevant reference is made to the OECD and EEC Social Indicators Programmes). Once this reorientation has been achieved it will be difficult to propose an alternative dimension or modification to then agreed international indicator series.

4.2 THE BASIS OF INDICATOR CONSTRUCTION: THE HYPOTHESIS

A distribution sub-committee of a Marketing Indicators Working Party would, it is suggested, postulate no indicator simply on the grounds that it "describes the market" but would take as starting point precise hypotheses as to factors influential specifically in the adoption of, for example, retailing innovation and would do this having considered how, in this instance, "retailing innovation" is best currently measured, and how it is likely to be best measured in the future.

The steps in the process of comparative marketing analysis are, therefore, proposed to be as follows:

(1) The specification of the marketing aspect to be measured. In this case, we mean the state of retail development = (first approximation), the level of "systematised" retailing =(second approximation) level of self-service, supermarket and hypermarket provision. The

argument is the argument of Chapter 3. Or simply we can state that we are measuring these last factors. Then follows the attempted construction of internationally comparable indicators of self-service, supermarketing and hypermarketing.

(2) The specification of the socio-economic etc. factors hypothesised as affecting the marketing aspect. In the illustrative study, for example, our analysis is based on the following hypothesis: the level of distribution in a Western European country or sub-national region is positively related to:

(a) the degree of concentration of population in that country or region,

(b) the extent of car-ownership and provision for that car-ownership,

(c) the level of individual prosperity,

(d) the level of "female emancipation",

(e) the shortage of labour and cost of labour,

(f) the level of industrialisation,

(g) the level of retail integration,

and, in relation to hypermarketing only

(h) the level of existing supermarket provision.

which hypothesis are briefly amplified below and further discussed and/or revised in Chapters 8 and 9.

The hypotheses may be generated by various means. They are not hypotheses necessarily relevant to any generalised concept of "marketing". It is argued this has little meaning. In our instance, they relate

specifically to self service, supermarket and hypermarket development. Each hypothesis needs to be operationalised by indicators - probably by several. Each indicator will be an approximation.

An "MSI Approach" (the term is not used derogatively) as noted in section 2.2, is to see what indicators are available generally internationally, then to ask of each: "Is it relevant?". A discipline of the prior hypothesis demands the proposal of "ideal" indicators to illustrate specific factors: then the construction of indicators as nearly embodying each factor as possible. The difference can be crucial. Additionally, starting from the hypothesis one is concerned to confirm an assumption (refute the null hypothesis) statistically. In this case one is vitally concerned with the precision and comparability of the data. If one is on what Ehrenberg (1) has called the "fishing trip" of factor or cluster analysis without prior hypothesis, there is no similar compulsion.

Additionally, attempting to confirm an hypothesis highlights national and regional distinctions and leads to a search for the aberrations from observed general trends, hypothesised and otherwise supported by the data.

The generality of national statistics, however, is inadequate for marketing analysis of this attempted precision or, it is argued, any precision.

4.3 THE ANALOGY OF SOCIAL INDICATOR PROGRAMMES

The marketing problem, in this respect, is similar to that of those attempting to measure comparative social welfare and social provision. It is generally agreed that the national statistics normally produced to date are inadequate to represent this factor. (In fact, to Cazes (2) the whole question of the search for social indicators "can be boiled down, with a good deal of simplification, to an attempt to correct the concept of GNP".) Neither are national statistics designed to measure market potential. The social welfare lobby, however, is effective. Both OECD and the EEC have Social Indicators Programmes and working parties (3). Eventually participant member countries of these organisations will be producing statistics on a national and ultimately regional basis specifically to measure welfare level and these statistics will be, at least eventually, comparative.

The OECD has been concerned to develop specific social indicators since a ministerial declaration of intent in 1970, the EEC since its Social Action Programme was approved by resolution of Council in 1975. EEC has produced its first volume of social indicators at the national level (4).

OECD has defined the characteristics and objectives of its programme of action.

(a) Comparative indicators are to be produced more descriptive of overall welfare of individuals than GNP, income-based etc. data. The aim is not a single weighted index of well-being but "rather a minimal number of separate indicators which could yield a meaningful although not a complete picture of 'measurable welfare'".

(b) Agreement has been sought and achieved among representatives of member countries as to what aspects of well-being need to be measured as a basis for indicator construction.

(c) Internationally comparable indicators are sought at national and also sub-national level.

(d) A Working Party for social indicator development was formed mainly of those concerned with social indicators from each member country, with working party decisions ratified at ministerial level.

(e) The decision has been made to concentrate initially on what is "most helpful now": that is, on a "perhaps elementary 'first generation' set of indicators", to be modified later by specific research and more sophisticated indicators.

The OECD sequence of working party procedure therefore was, and is, in respect of each aspect of "social welfare", to:

(a) specify the concept to be measured;

(b) specify the ideal indicators needed to measure this concept;

(c) concentrate initially, but only initially, on currently available data = (in many cases) the use of "less than ideal" proxy indicators, e.g., as derived from the System of National Accounts. Such a programme and such a sequence are proposed as an urgent marketing requirement.

Hard or Soft Data

The requirement is for usable basic data. If one classifies data as either "hard" (= factual/behaviour) or "soft" (= attitude) then it is strongly urged that the current need is for meaningful and relevant "hard" marketing data. Once this has been achieved, the insights of behavioural economics may put flesh on that skeleton. First one needs a skeleton.

4.4 LEVEL OF MEASUREMENT: THE CRITICAL FACTOR

The critical factor in aggregate research is that of establishing boundaries. Comparative marketing research has previously normally accepted the nation as unit of analysis. The basic assumption of those who analyse by nation (who do so for reasons other than availability of statistics) is that the nation is more homogenous than it is disparate - that, for example, Northern Italy is more akin to Southern Italy than it is to Southern France. Obviously this is not necessarily so.

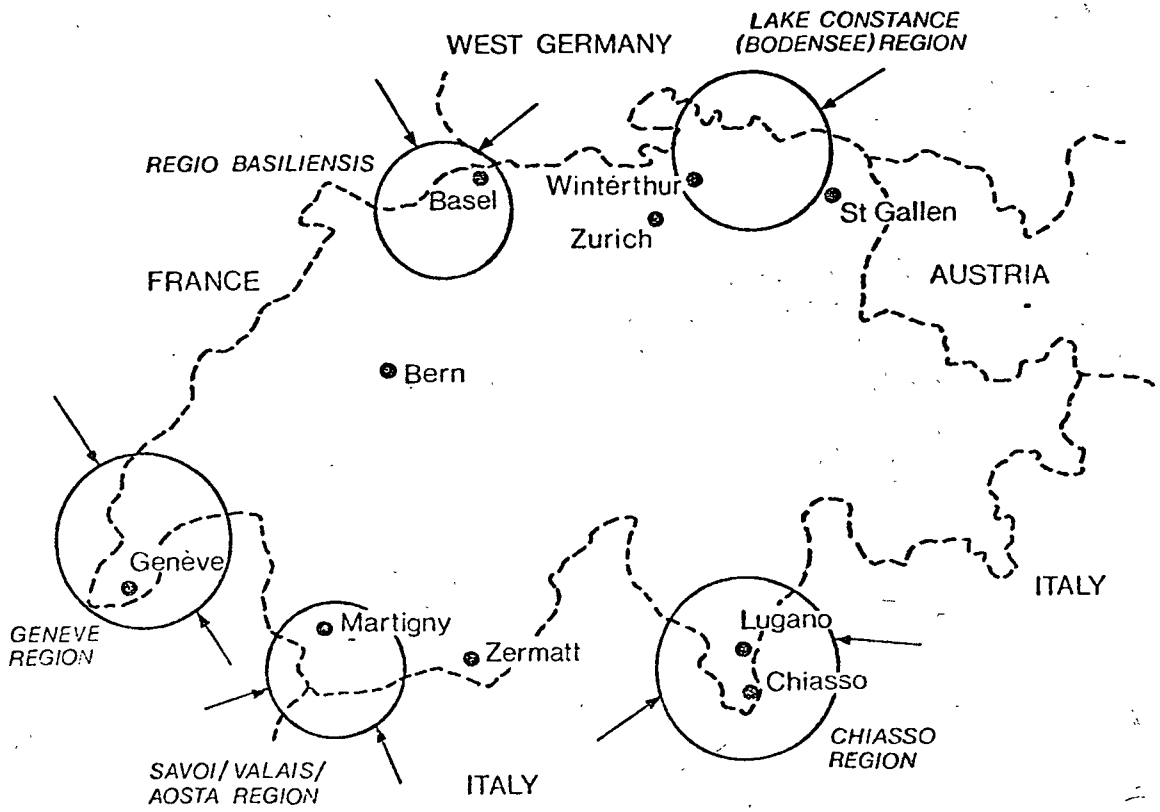
The Italian example is well-known. The position however deserves restatement. Although the Mezzorgiorno's "centuries old isolation" has been broken down somewhat now by the construction of highways, airports and telecommunications, it remains one of the poorest areas in Europe, and is, in effect a separate nation compared to the prosperous north of Italy. To quote the more readily available statistics: average incomes in Southern Italy in 1978 were just over 60 per cent of the national average. In Calabria, Italy's poorest region, they fall to 40 per cent of the national average. The unemployment rate in the Mezzorgiorno as a whole is well above that of the richer north - 10 per cent as compared with 6 per cent (5). National averages of these factors have therefore little operational meaning. The fact is notorious in the Italian example, but the same applies in varying degrees to every country in Europe. The regional disparities in Spain, though less discussed than those of Italy, are as pronounced. Spain is divided statistically into fifty provinces. In the four richest provinces the income per capita is double the

national average and almost three times greater than that of the five most depressed provinces. In such circumstances the computation of national average income, for example, is, to say the least, a grossly insensitive exercise. Such national averages are not operational instruments.

The inhabitants of a "frontier" region may be, in fact, more oriented as consumers towards a nearby magnet town in a neighbouring country than they are oriented inwards inside the national boundary. The simple geography of straight line distance determines this. "Holland is a small country, the Dutch never tire of saying. But it still encompasses striking regional variations and for people living in the most south-easterly province of Limburg the bright lights of Dusseldorf and Brussels are nearer than Amsterdam and the Hague" (6). Examples could be picked from frontier regions in almost every European mainland country.

Switzerland, bordering onto four countries, is the prime example of inward migration both for work and leisure. The frontier towns recruit "frontalier" workers from the neighbouring countries into industries often specifically located for this purpose. Vast numbers of French workers, for example, "commute across the borders from the eastern regions of France reporting for work either in Basel or Geneva, whilst nearly 20,000 Italians, half of whom originated in Southern Italy have taken up residence in Northern Italy to be able to work in Chiasso" in Southern Switzerland (7). Figure 4.1 shows the main commuting routes into Switzerland, and graphically illustrates the limitations of the concept of "nation" for other than political purposes. Geneva has more

Figure 4.1 Main Commuting Routes into Switzerland



Source: Gower Press

in common as regards consumer behaviour with Lyon and Chambery than it has with German-speaking Zurich - and her prosperity is to a large extent linked to the strength of the French economy.

The insensitivity of national statistics is especially misleading where the subject of study is retailing, a localised activity. The urgent need in comparative marketing studies in general, however, is for the production of internationally comparable marketing data at sub-national level - and the crucial factor which decides the validity of the analysis is what precisely that level of measurement should be.

The minimum level possible must obviously be the lowest level at which socio-economic and demographic statistics are produced by governments, the Basic Administrative Unit (the UAB in EEC abbreviation). For the countries studied this lowest level is shown in Table 4.1, column 2. On average we have socio-economic statistics for each parcel of 200,000 inhabitants in Norway and Switzerland. The UK, on the other hand, in general recognises statistically only 11 regions, and most aggregate analyses can be no more sensitive than is possible with five-million inhabitant groupings.

For most marketing purposes the relative size of the region is not the most important factor within broad upper and lower limits (too small and "boundary corssing" makes some of the data meaningless; too large and an average is untypical). Inter-relationships are not meaningful between regions that each subsume disparate populations. The essential requirement is that the unit chosen or finally formed is homogeneous and preferably, at least in a retailing study, also nodal. Regional

Table 4.1 Sub-National Regions in Europe as Relevant to Marketing Analysis

1	2		3	4		
Country	Approximate population (millons) 1973[1]	Smallest territorial unit for general statistical provision No. of such units per country and national population divided by number of units		Larger regional territorial units (if any) for general statistical provision. No. of such units per country	Tentative suggested divisions of countries into "regions" most nearly "homogeneous". Numbers of such "regions" per country and national population divid by no. of such "regions"		
		No.	Pop.		No.	Pop.	Basis
Austria	8	9	0.9	-	2	4.0	Nielsen as basis
Belgium	10	9	1.1	3	3(?)	3.3	Approximately the two "language" areas + Brabar
Denmark	5	16	0.3	3	3	1.7	EEC Classification
Germany	62	34[2]	1.8	11	-	-	-
France	52	22	2.4	8	8	6.5	ZEAT
Ireland	3	31	0.1	4	2	1.5	Eastern Planning Region - rest of Ireland
Italy	55	20	2.7	11	11	5.0	Community Regions
Netherlands	13	11	1.2	5	5	2.6	Landsdelen
Norway	4	20	0.2	-	4	1.0	Trade Regions
Sweden	8	25	0.3	-	5	1.6	Nielsen (Approx.)
Switzerland	6	25	0.2	-	5	1.2	See text
UK	56	11[3]	5.1	-	-	-	-

(1) "Target-date" of research project.

(2) Research project analysis not made at this level: 11 Lander not homogeneous.

(3) Considered not homogeneous.

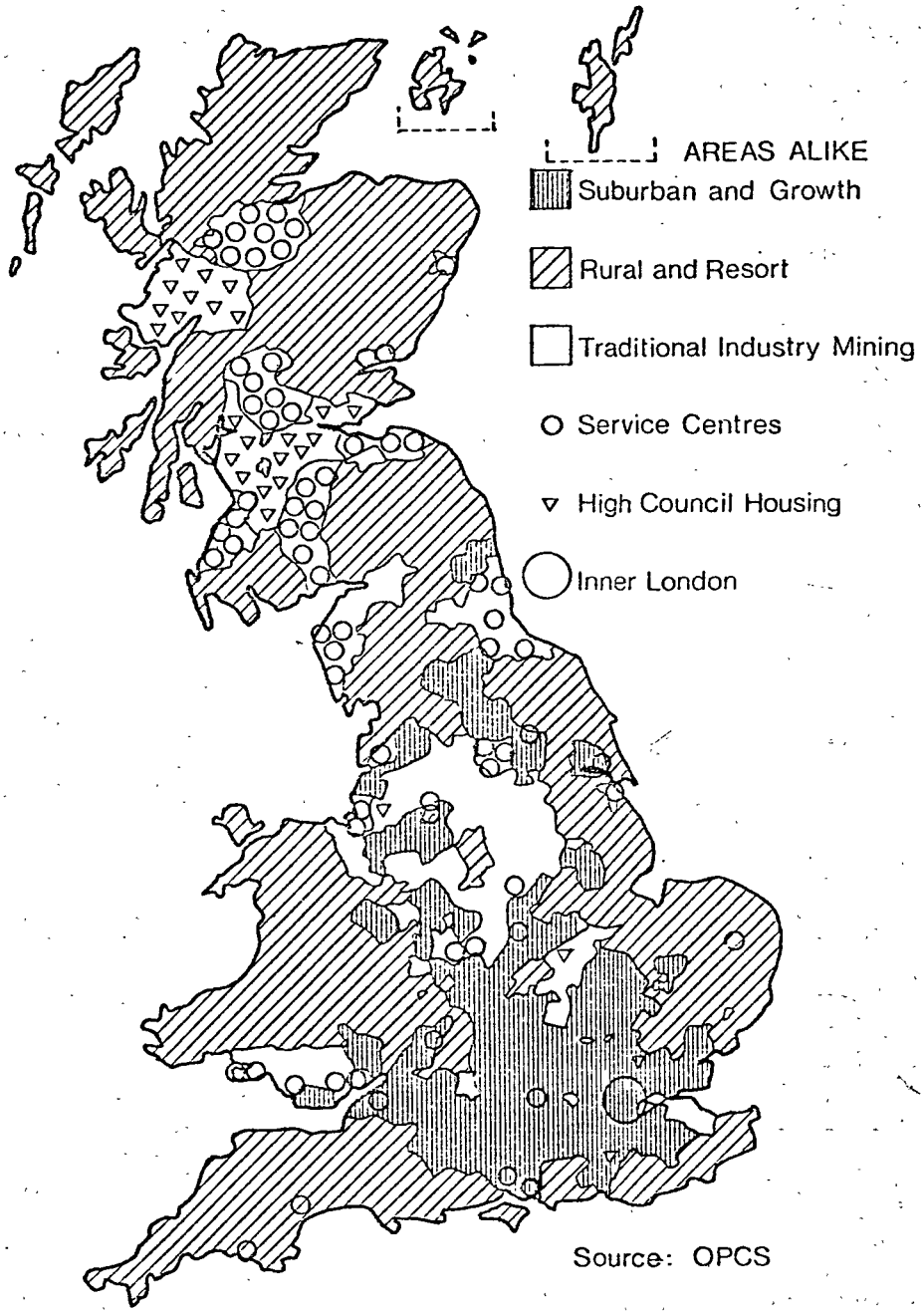
boundaries are historical; but where these "basic administrative units" are small in size, they can be grouped into economically homogeneous blocks and these then are viable units for analysis. The smaller the "basic administrative units", therefore, the more useful in many respects as "building blocks" in the construction of regions relevant to the analysis. (An alternative advertising study, for example, might group such "building blocks" into approximate TV regions)..

This construction of regions relevant to marketing (or for that matter, with a different synthesis, to any form of planning) is, however, not an easy task. We have noted that Spain has no less than fifty provinces. These "are too many for effective inter-regional planning. Some aggregation is needed. Yet, over the past two decades or so, Spanish economists and planners have suggested literally scores of alternative delimitations, ranging from about five to fifty regions " (8). At least in Spain, however, the analyst does have the option open to him, to the extent that regional statistics are provided, of being able to group these small regions into larger regional units in a way that seems logical to his particular analysis. In the UK, on the other hand, he has, in general, as we have noted, no such choice. Few complete sets of regional statistics are compiled below the level of the UK Standard Region. (One says this despite the disaggregation recently of some, however only some, indicators to county or broadly eqivalent area level (9)). The 56 million population is thus divided for most statistical purposes into only eleven regions, and no further manipulation of much of the regional data is possible, unless it is by further aggregation of these regions.

This would not matter if those regions were usably homogeneous. However, they are not. Richard Webber and John Craig have, for the UK Office of Population Censuses and Surveys, attempted to draw a map of Great Britain based on the similarity or dissimilarity of socio-economic and demographic factors in the different local authority areas (10). A version of this map is given in Figure 4.2. Although the variables chosen as inputs to the model can perhaps be challenged (11), the exercise is instructive. It can be seen, even without an explanation of the six basic types of area postulated (an explanation not central to this thesis) that the demarcation by Webber and Craig of socio-economically "homogeneous" areas has little correspondence with the boundaries of the Standard Regions. If, however, all regional statistics were in fact provided in respect of territorial units smaller than the Standard Region, one might be able to isolate, for example, industrialised South Wales from the rest of Wales, and approach nearer the concept of the "homogeneous" region. The present position of UK regional statistics is unsatisfactory to the analyst or planner, especially so to the marketing analyst, and is out of line with the rest of Europe. That it is out of line with the rest of the EEC has been emphasised by the Statistical Office of the European Communities (12).

In contradistinction, in some, in fact in many, other European countries (Switzerland, Norway, Sweden, Denmark, Ireland, Spain) the regional statistical unit is too small to be used as the unit of marketing analysis. In some cases, for example, such regions do not even subsume hypermarket catchment areas. Also, of course, information based on sample surveys cannot be reliably disaggregated to this extent. Nevertheless, as we have said, where reliable information exists for

Figure 4.2 Socio-economic Classification of Local Authority Areas in Great Britain.



these regions, these units can be used as "building blocks" and aggregated to form larger and more relevant regions by the analyst himself, provided he has access to the raw data behind the current regional statistics.

In Europe generally regional boundaries are arbitrary as regards contemporary relevance, but in some countries these historic regions have been grouped statistically and for planning purposes into more relevant and larger regions. Thus in the folliwng countries the territorial units mentioned might theoretically be meaningful in a regional analysis: France (the 8 ZEAT); Italy (the 11 Community Regions); The Netherlands (the 5 Landsdelen); UK (the 11 Standard Regions); Ireland (the 8 Planning Regions: these, however, since they divide by eight a population of only three million, are more useful as "building blocks"). Intra-regional homogeneity, however, varies as between these countries. With the exception of Ireland the regions noted are all EEC Community Regions (RCE), and the EEC has commented that "the delimitation of these areas proved difficult and the solutions applied today do not respond adequately to the objectives pursued. The RCE do not always obey socio-economic criteria ..." (13).

N evertheless we have employed these statistical units of these countries as the basis of our main regional analysis for these countries - except in the case of Ireland where it was considered that the logical grouping of planning regions would be:

(1) the Eastern region (Dublin and surrounding territory,

(2) the rest of Ireland.

In other countries the analyst must make his own grouping of "building blocks" aggregating UAB-level data in the most logical way relevant to the analysis. In respect of countries not listed above, the following "regions", made or adopted, seem to us at least usably homogeneous.

Norway: The 4 trade regions.

Sweden: Approximately the 5 Nielsen regions.

Austria: Two groupings (East and West) based on Nielsen regions, but subsuming Vienna into the Eastern region because of its high population density within strictly limited boundaries.

Switzerland: Cantons grouped in 5 "regions" on the basis of hypothesised urban-magnets and communication links (not language). These "regions" are based on the following centres: (1) Geneva/ Lausanne, (2) Bern/Basel, (3) Zurich/Luzern, (4) St. Gallen, (5) Graubunden/Ticino.

Denmark: Three regions as distinguished by EEC i.e., (1) Greater Copenhagen, (2) land east of the Great Belt excluding Greater Copenhagen, (3) land west of the Great Belt. (Alternative groupings based on the islands are also possible and viable).

Germany: Distribution data was only obtained at Lander level - therefore the Regierungsbezirke "building blocks" were not usable by us, and not researched for groupings more optimal than the Lander. As regards the Lander, EEC notes adversely their

"heterogeneity and institutional character". Work carried out in the Federal Republic of Germany as part of the regional development programme aims to divide the land into 37 functional territorial units. These could, it is thought, perhaps form a better basis of statistics than do the existing Regierungsbezirke. There is a research requirement in Germany to determine the grouping optimal to marketing of Regierungsbezirke or of the new functional units if and when these are adopted as the basis of regional statistics.

Belgium: The regionalisation in this project of Belgium into approximately the two "language" areas + Brabant is not considered entirely satisfactory.

Finland, Spain, Portugal, Greece, Luxembourg: The first two of these countries were analysed only nationally. The final three were not included in the research. For the purposes of regional analysis Luxembourg is a "region".

Emphasis and Proposed Research Requirement

The validity of comparative marketing analysis depends on the homogeneity and relevance to marketing of the regional statistical unit (the Trade Region concept of Norway). Statistical series produced in respect of regional units that have been researched and agreed as distinctive and homogeneous are a main marketing priority. Aggregation of "minor region" statistics and do-it-yourself construction of viable market territories should not be a necessary pre-requisite of analysis.

4.4 INDICATORS OF THE MARKET ASPECT: THE DEPENDENT VARIABLES

Since it is argued that indicator construction starts with the precise specification of the dependent (e.g. marketing) aspect to be evaluated, the availability and comparability of distribution data are considered first. The concern is with the comparative measurement of self-service, supermarket and hypermarket provision in Europe. Subsequent sections have important general marketing relevance. Even in this section, however, the types of comparability problems noted are not specific to retail distribution.

4.5.1 The Indicators of Retail Development: Self-Service, Supermarket and Hypermarket Provision

There are problems both of definition and data.

(1) Self-Service Provision

The accepted indicator is: "inhabitants per self-service food store". These data are obtainable for most West European countries nationally. To include also non-food self-service stores raises problems of definition and measurement. The indicator, however, has historical interest only. After approximately 1964, with the growth of the larger self-service unit and the parallel closure of a larger number of smaller units, it progressively loses its usefulness as a measure of advance. This research has used these data as at 1962 only. At the intra-national regional level, a similar indicator could no doubt be constructed across a range of countries. But it is currently insensitive.

The viable current indicator would be: "self-service food sales as per cent of total food sales". This is independent of the ratio of size and number but presents considerable problems of comparability and measurement. Therefore, a proxy indicator is sometimes attempted: "self-service grocery store trade as per cent of total grocery trade".

Such was computed for 1973 and 1976 by A.C. Nielsen Company (14), but Nielsen's definition of "grocery trade" varies from country to country(15). The areas of incomparibility are detailed by Nielsen with characteristic thoroughness. It is the starting point for a more precise, if difficult to assemble, indicator. We have not attempted to construct it. We have accepted that the supermarket and hypermarket indicators are the more significant now.

(2) Supermarket Provision

Talking on retailing in general, Jefferys has warned: "Many published statements pointing to similarities or dissimilarities in retailing trends between countries are sheer rubbish, as like is not being compared with like by the authors" (16). This is true of supermarket studies.

The international comparison of supermarket provision raises inter-related problems of definition and measurement. These concern (1) size, (2) assortment and (3) location.

Size. The "accepted" continental minimum size for a supermarket below which significant economies of scale, for example, are not likely to operate, is 400 square metres selling space. Whether 400 square metres

is the optimal minimum current "cut off" level is arguable. Four hundred square metres, it can be maintained, is probably now too low and the interesting unit of analysis starts perhaps above this figure already in 1982. In a few years' time a 400 square metres criterion may no longer generate statistics of interest. But at this moment an indicator "inhabitants per supermarket" based on a 400 square metres minimum remains, it is generally considered, meaningful.

Categorising by this basic statistical requirement, however, presents problems, at least at regional level, and in some countries at national level. At the national level, however, one can, without access to raw data, compare the summary statistics of different international and national organisations and investigate differences. (In some cases these are substantial). This type of investigation is not assisted by the "fine tuning" to suit local conditions of national definitions of "supermarket", which results in summary statistics produced nationally being incomparable. In Denmark and Norway "supermarket" is defined on the basis of assortment range and a minimum turnover requirement - as in Sweden up to 1975. Generally in the Netherlands the categcr-isation is a function of assortment only. In the UK and Ireland statistics are still compiled b ased on a 2,000 square feet minimum.

The serious problems of data search arise when this analysis is attempted at the level of the sub-national region. We have established "supermarket" data by region as at January 1973 based on a "400 square metres minimum" criterion for all countries of study except Switzerland, as is shown in row 1 of Table 4.2. Switzerland presents particular problems.

Most countries stipulate an upper size limit of 2,500 square metres beyond which a "supermarket" becomes a unit identifiably different: "hypermarket", "superstore", "self-service multiple store", etc. German statistics do not recognise a change of status at this particular level.

Assortment. The universe of "supermarkets" from which we will eliminate, if by national definition this has not already been done, those units of under 400 square metres selling space, is decided in most countries on the basis of food assortment offered (with or without an additional space or turnover criterion). Most countries stipulate "full range of provisions". Some, for example France, include specifically "fresh meat". Whether such distinctions produce significantly different statistics to those based purely on space depends in the main on the extent of the operations of limited-range discounters. In the UK and Ireland the distinction was not important in 1973 and not emphasised in the trade. In Belgium, where both sets of statistics are available summarised nationally, the distinction is shown as significant, and it is significant also in Germany, Austria and Switzerland.

Additionally some countries stipulate specifically that a "supermarket" be predominantly a food store - with "predominantly" quantified in terms of food as per cent of total sales (e.g.,in Austria this minimum percentage is 70; in Denmark 80). Although these precentages are obviously guidelines only, the approach can be queried. For example, the Austrian 1975 operational definitions of the "self-service" study group of OIV include (in summary):

Supermarket. Self-service. Sales area minimum 400 square metres (no maximum limits). Proportion of turnover of groceries including perishables, more than 70 per cent.

Self-Service Centre. Predominantly self-service. Sales area 1,000-2,500 square metres. Proportion of turnover of groceries less than 70 per cent (17).

German definitions also distinguish at 1,000 square metres. The definitions of both countries are influenced by the extent of the operations of limited-range discounters. Nevertheless, to take the Austrian example, from the "supermarket" universe stores with a full range of foods but more than 30 per cent turnover in non-foods have "dropped out" as compared with some other European countries. Yet a store of 900 square metres with 60 per cent of its turnover in food may, probably will, offer a wider food range than a store of 400 square metres with a 70 per cent food turnover ratio ($60\% \times 900 > 70\% \times 400$). On the other hand many stores in the "self-service centre" category would qualify as "supermarkets" in most other countries. The German case is similar.

One can argue with these eliminating definitions (in the previous context, both Jefferys and ICA, Sweden, for instance, are, in personal discussion of this topic, baffled by the particular significance of "fresh" as applied to meat) but the point to be strongly made is that our "universe" for indicator construction is bounded, at least in national intention, by these definitions.

Row 6 and row 7 in Table 4.2 distinguish between data obtained at the regional level where a "full assortment" criterion, however worded, has been applied and data obtained based on a size criterion only. As regards UK and Ireland, since large-scale limited-assortment discount-grocery operations are exceptional, the regional observations can probably be compared, without statistical violence, to the regional data of other countries, with the proviso that in this respect they will be if anything overstated.

Location. Supermarket provision can yet again be calculated in alternative ways:

(1) "free-standing" supermarkets;

(2) "Free-standing" supermarkets plus supermarkets 400 square metres +) in variety and department stores.

Depending on the aims of the analysis either one of these sets of data may be the more useful. In some countries the statistical increase produced by the more inclusive concept is considerable. In Italy, for example, a "free-standing" absolute national total of 550 supermarkets (January 1974) is increased by 37 per cent to 756 in the second calculation: in the UK, on theother hand, the parallel increase is only 2 per cent (18). For most countries the difference is significant.

Ideally we would produce both sets of figures for each country. At the obviously more difficult regional level, the extent to which we have been able to do this can be seen in rows 2 and 3 of Table 4.2.

Calculation by selling area. To the extent that, in each country, the smaller supermarkets are being closed and replaced by a lesser number of larger units, so absolute numbers of supermarkets per country or region will start to lose significance, and indicators such as "inhabitants per ..." that are based on absolute numbers in broad categories will become obsolescent at lower size levels.

Therefore the future crucial data will be based on sales area - e.g., "inhabitants per supermarket of selling space 800 square metres and over" (or 1,000 square metres and over, etc.). Alternatively, with the 400 square metres minimum cut off point retained, the calculation can become: "Supermarket selling space: square metres per 1,000 inhabitants".

Countries where we have been able to calculate these statistics at the sub-national level are indicated in rows 4 and 5 of Table 4.2.

(3) Hypermarket Provision

The "hypermarket" definition adopted is the International Self-Service Organisation (ISSO) definition, minus the "car parking" requirement. (There is the problem of specifying minimum car park size. Does an adjacent public car park qualify? If so, what is the definition of "adjacent"?). Minimum size for inclusion is 2,500 square metres (UK and Ireland 25,000 square feet). We have not distinguished units at higher levels of space provision. Nor have we specified out-of-town or fringe location. The argument for this as part of the criterion was never valid. Location is a means to an end (= low cost operation, accessibility, parking space). As such it has no necessary place in the criterion. Few argue today that it does. (Currently,for instance,

Table 4.2 Project: "Socio-economic Influences on Distribution Levels in Western Europe"

Supermarket and Hypermarket Calculations at Sub-National Region Level

	Austria	Belg.	Den.	Germ.	Franc	Ire.	Italy	Neth.	Nor.	Swed.	Switz.	UK
1. Regional supermarket data based on 400 square metres minimum calculated	+	+	+	+	+	+	+	+	+	+		+
2. Calculations made exclusive of SMS in variety and department stores	+	+	+	+		+	+					+
3. Calculations made inclusive of SMS in variety and department stores	+	+	+	+	+		+	+	+	+		N Ireland only
4. Regional totals of SM selling space calculated		+	+		+	+	+					
5. No. of SMs and selling space dissected into size categories (e.g.800-2,500 square metres)		+	+		+	+	+					
6. Calculations made based on SM definition that requires "full range" + "minimum size" (400 square metres)	+	+	+	+	+		+	+	+	+		
7. Calculations made based on "minimum size" (400 square metres) definition only		+				+						+
8. No. of hypermarkets (2,500 square metres+) calculated	+	+	+		+	+	+	+	+	+	+	+
9. Total selling space of hypermarkets (2,500 square metres+) calculated		+	+		+	+	+		+	+	+	+

the UK government is encouraging, on the recommendation of the UK Distributive Trades Economic Development Committee, the development of hypermarkets in in-town derelict areas.)

"Inhabitants per hypermarket", thus defined, is a meaningful indicator. Since average hypermarket size, however, is also relevant, where possible we have also calculated: "Hypermarket selling space: square metres per 1,000 inhabitants". Countries where at the sub-national level, we have been able to provide these two indicators are noted in rows 8 and 9 of Table 4.2.

Total hypermarket selling area in a territory combines the factors of number and average size - but measures only by implication the extent of consumer use. Theoretically, a more precise measure would therefore be "sales in hypermarkets as per cent of total retail sales" - but the problems of measurement in constructing such an indicator to be internationally comparative (in some countries, in constructing any such indicator) are considerable on a national level, and not possible by regions, since this latter involves disclosure by companies of sales at individual outlets.

Supermarket and hypermarket data can obviously be combined to measure provision of the self-service unit 400 square metres and over with no top limit.

Distribution Indicators

In summary, therefore, at the explorative regional level, we have attempted to construct for each country the following comparative indicators:

Group A - Supermarkets (and supermarkets and hypermarkets) exclusive of supermarkets in variety and department stores.

(1)	Inhabitants per supermarket of:	400-2,500 square metres
(2)	Inhabitants per supermarket of:	800-2,500 square metres
(3)	Inhabitants per supermarket of:	1,000-2,500 square metres
(4)	Inhabitants per self-service unit (supermarket or hypermarket) of:	400 square metres and over
(5)		800 square metres and over
(6)		1,000 square metres and over
(7)	Selling space (square metres) per 1,000 inhabitants in supermarkets of:	400-2,500 square metres
(8)		800-2,500 square metres
(9)		1,000-2,500 square metres
(10)	Selling space (square metres) per inhabitants in self-service units (supermarket or hypermarket) of:	400 square metres and over
(11)		800 square metres and over
(12)		1,000 square metres and over

Group B - Supermarkets (and supermarkets and hypermarkets) inclusive of supermarkets in variety and department stores.

(13) to (24): Dissections as above.

Group C - Hypermarkets (2,500 square metres - infinity)

(25) Inhabitants per hypermarket

(26) Hypermarket selling space (square metres) per 1,000 inhabitants.

Success to date in computing these can be judged from Table 4.2. Full analysis needs a full range of indicators, and this can be demonstrated by the almost complete reversal of rank-ordering of regions in some countries when a different criterion is applied.

Emphasis and proposed requirement. Constructing the above regional-level indicators has necessitated in some countries comprehensive research at the most basic level possible - the individual firm or retail unit - and e.g., for Great Britain, a re-run of 1971 Census of Distribution data to produce regional "4,000 square feet minimum" figures as starting-base for a later-year analysis. Standardisation of basic retailing statistics is a pre-requisite of distribution research and comparative analysis. Given agreed definitions and resultant comparative statistics, data "fine-tuned" to local conditions can be provided as supplementary information.

In this one aspect of its work, the embryonic working party will, if this is agreed, attempt to lay the basis for the production of the above listed retail statistics (with the addition of others that may be proposed), importantly b y sub-national region, as a comparative yearly series.

4.6 SOCIO-ECONOMIC, ETC., INDICATORS: THE INDEPENDENT VARIABLES

The problems here are of general marketing relevance.

Concept: Concentration of Population

Summary of Hypothesis. The degree of concentration of population and urbanisation is an accepted central concern of marketing. The retailing argument is that the mass merchandiser needs a mass market: therefore, population concentration will stimulate growth of the large retail unit. The effect may not be linear: at some point of population concentration, the civic problems of such congestion may impose restrictions on retail growth, but the working hypothesis of this research was of a linear relationship.

Measurement

(1) Population Density. The accepted measure is: "inhabitants per square kilometre of total territory". This is information for specific geographical purposes. In marketing it is a more or less meaningless statistic. In an extreme example, demographic conditions in England (916 persons per square mile) and Japan (712 persons per square mile) appear comparable, thus computed, with less congestion in Japan. The realistic picture in Japan is, of course, one of the most extreme congestion (Tokyo-Osaka) and mountainous areas of extreme emptiness.

In the less dramatic context of a European study, it is however equally meaningless to note, for example, that Switzerland has an overall population density of 150 inhabitants per square kilometre. There are vast differences between Swiss regions, with some having a negligible population, whilst the extensive Mitteland area (including the cities of Zurich, Winterthur, Basel, Biel and Bern) has a density of 325 per square kilometre, which is higher than the overall density of the populous Netherlands - and with a similar high density around Geneva. The demographer Kingsley Davies (19) may maintain regarding overall density statistics: "They constitute a part of the basic demographic picture in each country; even the deserts of Egypt have significance for that country" - but they have no marketing significance. If Libya annexed Egypt's share of the Libyan desert tomorrow, population density figures would change overnight dramatically: marketing conditions would remain precisely the same.

The arbitrariness of the calculation is obviously reduced at a regional level, but still lacks any precision and remains dependent on probably historic and probably irrelevant boundaries.

The problem is conceptualising an "ideal" alternative. "Inhabitants per square kilometre of used land" is a possibility, but the validity of the concept and how it should be measured, if accepted, are problematic. It is quite clear, however, what the "first generation" indicator should be: this is "inhabitants per square kilometre of inhabitable land". From the total area of "territory" one obviously deducts the total area of lakes, forests, mountains, fiords, and other uninhabitable areas. In Switzerland, 25 per cent of the territory is accounted "unproductive" (lakes , mountains); an additional 24 per cent is forest. On a conservative definition of "inhabitable" land, the quoted population density figure for Switzerland would be approximately doubled. The statistic would then begin to have marketing significance - this is more nearly the density at which the population lives. We have constructed indicators for almost all countries both nationally and regionally deducting from the denominator "forested areas". Norway produces statistics by county both of forested areas and also of areas above the tree-line - factors of relevance in Norway. Population density and related statistics produced deducting these areas are very different to the customary figures - and a step nearer usability.

Alternatively, on currently available data, we have constructed indicators "inhabitants per square kilometre of agricultural land". These can be seen as being very approximate indicators of "used land" on the grounds that the land area devoted to urban use is not significant in proportion to the total land of a territory of regional or national size - given that in structuring our regions for analysis we have, as discussed above, amalgamated those statistical units too small to be by themselves properly meaningful in an aggregate analysis

(that we have, for example, amalgamated the city of Vienna at least into Niederosterreich; and are not, for example, considering Basel-Stadt in isolation as a usable region).

All these approaches are only very tentative steps towards the desired measurement of "inhabitable land". Given specific research, indicators based on "inhabitable land" could, however, be constructed. Areas of water and forest are easily measurable (and currently measured) and conceptually without major problem, if "forest" is acceptable as "uninhabitable". Mountains are more problematic: specific height above sea-level is not self-evidently relevant (not, for example, in Switzerland).

Arguably the relevant factor is gradient. Aspects of "uninhabitability" additional to these might be considered relevant to a particular country or region and included to produce an accepted statistic.

There are no inherently major difficulties. EEC, for purposes of regional aid, calculate a highly complicated statistic "poor farming areas" (zones defavorisees) - calculated separately by each country within the boundaries of principal criteria which include:

- altitude higher than 600-800 metres (according to latitude) and gradients over 20 per cent for mountain areas.
- poor land, density of population less than 50 per cent of the national average and not exceeding 75 inhabitants per square kilometre for agricultural areas threatened with depopulation (20).

Within these broad criteria (and "poor land" has a complex set of alternative methods of measurement, any or all of which may be applied) each member country has submitted its own specifications for and locations of its "zones defavorisees". This agriculturally-based statistic is not of general marketing significance, but a similar formula could be constructed for more general application - and disaggregated calculations of height and gradient have already been made by EEC member countries to support recommendations for "zones defavorisees". Detailed sets of maps depicting average gradient per square kilometre have forinstance been published in 1975 by the Commission in respect of the regions of Italy, France, Belgium and Luxembourg (21). Similar work on Germany has previously been done in 1965 by Richter (22). Calculations as precise as in these studies, however, are not essential in order to produce usable delimitations of areas of "unacceptable" gradient. For other, in particular non-EEC, countries a greater degree of approximation would obviously be acceptable.

The research requirement, therefore, is to calculate, and deduct from the total territory areas of water, areas of forest, areas with an adverse combination of height and gradient, areas of uninhabitability due to climatic extremes (as, for example, in part of the north of Scandinavia. When, as regards this particular factor, not so to deduct becomes ridiculous, this is, of course, already done: no-one has seen a population density figure for Denmark that took into account the mammoth and uninhabitable former Province of Greenland which dwarfed the mother country 51 to one), areas of agreed barren land. One then has a base for a population density statistic that has marketing relevance.

(2) Urbanisation. In addition to population density, marketing (obviously retailing) is concerned with the extent of local concentration of that population; urbanisation.

The customary "urban/rural" statistical population split has litte significance in Europe - or certainly not contemporary significance. The objections are two-fold. The first is of measurement, the second of concept.

(a) Measurement

National definitions of "urban" are idiosyncratic: "urban" is a relative term. The United Nations Demographic Yearbook (UNDY) gives statistics of "percentage of populations living in urban localities". These are based on the following varying definitions:

Belgium, Austria - communes of 5,000 inhabitants or more.
France, Denmark, Germany - towns of 2,000 inhabitants +.
Netherlands - towns of 2,000 inhabitants + (mainly).
Switzerland - communes of 10,000 inhabitants +
England and Wales - "urban areas".
Finland - "urban communes".
Norway - "town municipalities".
Spain - towns of 10,000 inhabitants +.
Sweden - towns of 200 inhabitants +.

Kingsley Davis (1969) in his production of "urban" versus "rural" population figures for all countries cites the national definitions of "urban" he has respectively used. Three are quoted here simply as an example of the differences that exist. Thus:

Italy. Urban definition: communes with less than 50 per cent of the economically active population engaged in agriculture. (The smallest was estimated as having 27,800 inhabitants in 1960).

Netherlands. Urban definition: municipalities with a cluster of 5,000 inhabitants +, and municipalities with no more than 20 per cent of the economically active males engaged in agriculture.

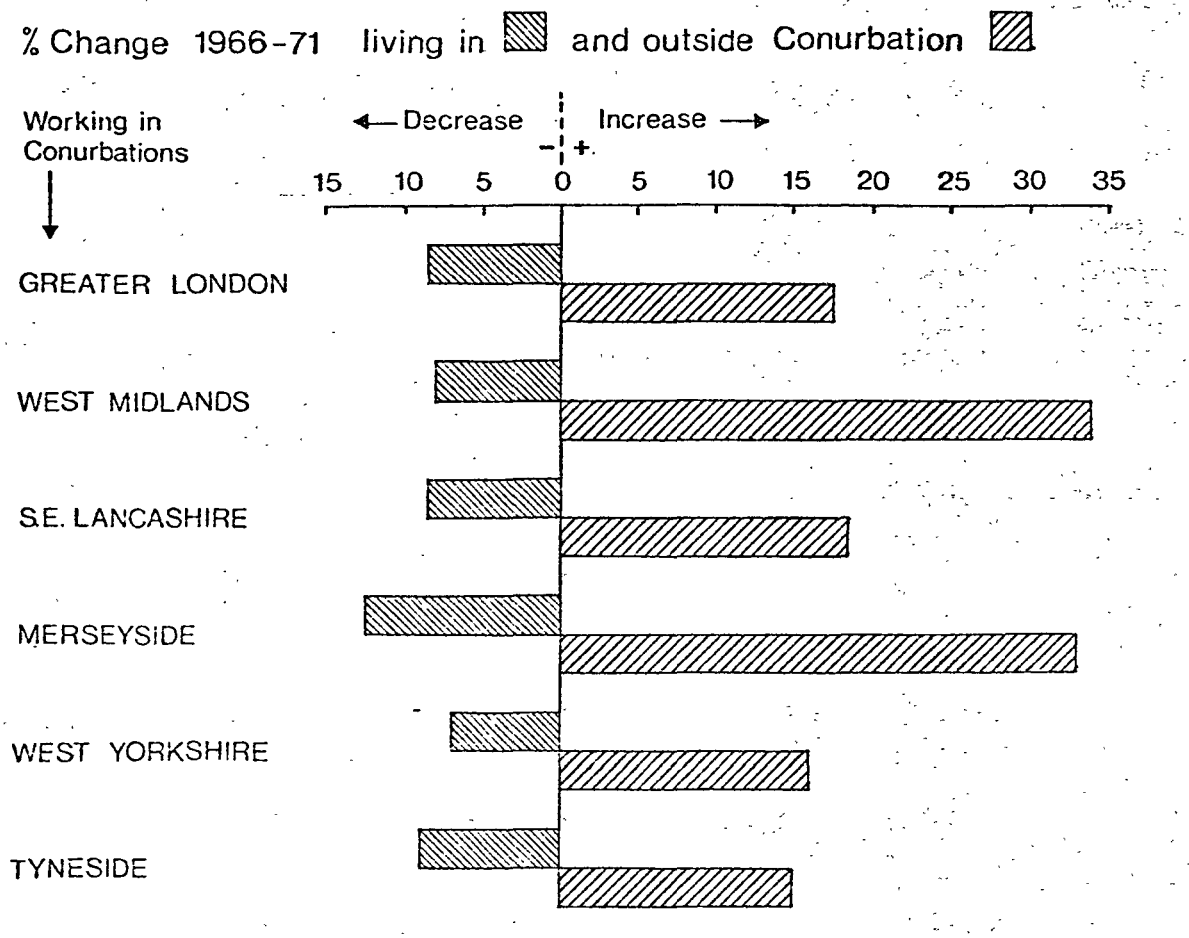
Ireland. Urban definition: cities and towns, including suburbs, of 1,500 inhabitants +.

Davis justifies well the comparisons he has made on a world wide basis using such disparate data, but, when comparing countries of approximately similar economic development such as in Europe, such statistics have limited comparative value.

(b) Concept. The attempt to measure "urban" versus "rural" habitation in mid-century Europe can be strongly criticised on conceptual grounds, in conditions of ever-expanding average commuter distance. The trend is shown in Figure 4.3 as regards the major UK conurbations, and could be replicated in most countries in Europe.

On such grounds Eversley (23) surmised in 1975 that the "rural" population of England and Wales might rise by the year 2001 to 28 per cent of total population as compared with a figure then of 23 per cent. Much of this population, however, will not be rural in the sense that its behaviour patterns are rural. The bulk of that 28 per cent will be

Figure 4.3 Where People Live in Comparison with their Workplaces: Connurbations in England.



Source: Population Trends 1976

"urban-oriented" - and conceptually this is the factor to be currently measured, certainly so in a marketing analysis. A United Nations report (24) has aid:

> "Ruralism as either life style or source of livelihood is still a substantial component of Europe's social scene but the time when it will give way almost entirely to urban-type systems appears not far distant ... Europe as a whole and all its major regions are rapidly approaching a stage of almost total urbanisation, if not in residential patterns as such, then at least in socio-economic functional terms".

The basic measurement of the factor urban-oriented - or, as the UN report phrases it, of urbanism 'not in residential patterns as such" but "in socio-economic functional terms" - is proposed in our study to be the proxy negative measurement "employment in agriculture, forestry and fishing as a percentage of total employment", which is constructable without great difficulty both at national and regional level. In some countries, as we have seen in the examples above, the lowness of the level of agricultural employment provides, in fact, the criterion for the category "urban", or part of the cirterion; and if, as Kinglsey Davis argues, the definition "urban" necessarily varies as between nations that are primarily agricultural and those that are primarily industrial, then it seems more logical to measure that level of agricultural employment directly. And such statistics are then comparative. Additionally today they more accurately indicate consumer behaviour patterns than does the attempted measurement of place of habitation. Additionally they do not give rise to the yet further objection levied agains "urban/rural" statistics, an objection that Davis never properly counters, that they force into a dichotomy what is essentially a continuum.

However, the indicator above, conceptually preferable though it is, subsumes the element of unpaid family employment. This weights in particular the "employed in agriculture" part of the calculation. This is unsatisfactory in the indication of relative life style. (The question is further discussed in the "female emancipation" context below). Additionally, therefore, we have constructed "percentage of wage earners and salaried employees employed in agriculture etc.". Obviously, however, such an indicator, useful for specific purposes, discounts self-employment. Methodologically the best all-round indicator of this factor therefore is "percentage heads of households employed in agriculture etc.". This we have been able to compile at regional level, but with some gaps in the data. All these indicators, however, we have found predictive in a way that attempted "urban/rural" measures are not. An alternative approach by calculating "percentage of GDP derived from agriculture" is also satisfactory.

The relative size of the concentrations of population remains, however, important. Therefore the following indicators of local concentration must be attempted: "percentage of total population living in towns of (indicator 1) 10,000, (2) 20,000, (3) 30,000, (4) 40,000, (5) 50,000, (6) 100,000, (7) 250,000 inhabitants or more". The precentages thus produced are only crudely indicative. The problems are:

(a) The necessary use of discrete intervals. At the higher end of the scale, where candidate towns are comparatively few, a small increase in population can project a town from, e.g., the "50,000 +" category to the "100,000 +" category, and dramatically affect the top percentage (as, for example, in Belgium, circa

1970). Using the whole range of the scale, however, comparisons can be made. But:

(b) "Towns" are defined on the basis of historic civic boundaries: these boundaries usually no longer represent the urban reality. The desirable measurement is "urban agglomeration". This can be, and is, assessed in various ways. (For example, the Larry Smith Consulting 1961-62 estimates of metropolitan areas in Europe, based mainly on catchment area studies, are remarkably predictive of Kingsley Davis' "urban agglomeration" estimates for 1970). It is possible, in respect of some countries, to produce usefully comparative figures of percentage habitation by "agglomeration" regionally and nationally. UNDY gives partial coverage of base data. Essentially one is trying to construct the following comparative indicators: "percentage of population living in urban agglomerations of (indicator 1) 100,000, (indicator 2) 250,000 inhabitants or more" or at higher or lower levels as appropriate. The need is for definitional agreement on, and measurement of, "urban agglomeration" regardless of civic boundary.

Urban concentrations can be further distinguished. As regards "green-field" retailing, for example, Smith has emphasised that: "A factor of the utmost importance in relation to the growth of out-of-town shopping facilities in France is the physical fabric of existing urban settlements. In general, French towns are compact, nucleated settlements in which urban sprawl, characteristic of inter-war Britain, is largely absent"(25).

The following proposition is perhaps crucial. There is a vast difference in, e.g., shopping behaviour and retail site location between "walled cities" (cities that come to an abrupt boundary end, characterised by flat accommodation and high density living, such as are characteristic of Southern European countries) and "house and garden" cities diffused over large areas, as for example, in the United Kingdom.

The debt for the concept as such, as far as this project was concerned, is to Mark Norton, Vice President Larry Smith Consulting, who, in discussing this topic, emphatically insisted always on the importance of this distinction. A range of indicators to express the factor "density of population in urban agglomerations" should be central to comparative marketing analysis. The calculation would be:

$$\frac{\text{Populations in urban agglomerations}}{\text{Area of urban agglomeration}}$$

to produce (e.g.), the indicator: "inhabitants per square kilometre of urban agglomerations of 100,000 inhabitants or more". This can be related statistically to percentage of total population in the agglomeration category (by regression, AID, etc.) to produce, for example, a proposition such as the following: given that 30 per cent live in agglomerations of 100,000 inhabitants, then the crucial factor is perhaps density of population in those agglomeration areas - and the subjective and unquantified opinion of Mark Norton is that it almost certainly is.

Emphasis and Proposed Requirement

Production of agreed definitions of the following base data is essential to enable the construction of commercially useful demographic indicators:

(a) area of "uninhabitable territory",

(b) number of inhabitants in defined "urban agglomerations" (not "towns"),

(c) area of each "agglomeration".

4.7 CONCEPT: CAR OWNERSHIP AND ROAD CONGESTION

Summary of hypothesis

(1) The car ownership hypothesis is uncomplicated: one-stop shopping depends on car ownership. The relationship is hypothesised as positive and linear in respect of the supermarket and hypermarket. (2) The road congestion hypothesis is that town centre congestion is a factor in out-of-town or "fringe" retail location, therefore a stimulant to e.g., hypermarket growth, and that development of the hypermarket and large off-centre supermarket unit is most likely in conditions of high in-town congestion. The proposition has unquantified support. It is not proposed that road congestion affects "self-service" adoption or the development of the smaller supermarkets.

Measurement

(1) Car ownership presents few problems. Car/road indicator 1 "cars per 1,000 inhabitants" is constructable without difficulty both nationally and regionally. The dating of the indicator requires thought. As regards hypermarketing, it takes time to build a hypermarket. A

car provision indicator dated concurrently with the hypermarket indicator might not therefore be optimal. In the regional analyses three dates for the "cars per 1,000 inhabitants" indicators were used: 1966, 1970 and 1973.

An alternative indicator "Percentage of households owning at least one car" might appear preferable. One such indicator is constructed in the national analysis for comparison pruposes. Reference, however, can be made to the British case in Table 4.3. The pattern of this table can be paralleled in all other European countries.

Table 4.3

Type of household	Ordinary	Old*
Two Adults 4+ children	61	
" " 3 children	73	
" " 2 children	77	
" " 1 child	72	
Two Adults only	66	30
One Man	41	19
All	54	

*Over 65 or 60.

SOURCE: Family Expenditure Survey Table 56.

The overall national figure of 54 per cent for households owning a car seriously understates the percentage of the population on behalf of whom car-shopping is conducted. The predominant disadvantaged groups as

regards car-ownership are the single-person households and in particular, the old, a factor which is reflected in the low patronage figures for these groups in every hypermarket study. A "cars per 1,000 inhabitants" statistic more accurately reflects the weight of shopping as related to car-ownership. For households accounting for the bulk of total retail sales, certainly the bulk of food sales, the realistic car-ownership per household figure is over 70 per cent. A "cars per 1,000 inhabitants" figure does, of course, double-count, or treble-count, households with more than one car. Only 9 per cent of households were, however, in this category in 1973 (26). Any overstatement in this respect is considerably less than the effective understatement inherent in the adoption of a "household" basis for this range of indicators. And, of course, if housewives who have themselves the exclusive use of a car are, in actual fact, more prone to shop by car than housewives in single-car households, then there is no overstatement, or minimal overstatement, in the use of a "cars per 1,000 inhabitants" indicator to quantify the concept of car-ownership as affecting retail potential.

(2) Precise and generally applicable indicators of road congestion are difficult to construct. The road congestion calculation suggested as optimal above is virtually impossible on currently available statistics. It requires (a) urban traffic volume, (b) non-urban traffic volume. Where, as in UK, indicative national figures for these factors are produced they are based on occasional sample counts and the statisticians concerned give them nil comparative value.

As proxy, we can attempt to measure the overall car/road/inhabitant relationship. The hypothesis above is lost.

At national level, comparative figures of total traffic volume are obtainable. Experimental indicators would be:

Car/Road indicator 2 (proposed):

$$\frac{\text{Total traffic volume}}{\text{Road density (kilometres of road per square kilometres of inhabitable land)}}$$

or: Car/Road indicator 3 (proposed):

$$\frac{\text{Road density (definition as above)}}{\text{Traffic per kilometre of road}}$$

These have been calculated at national level, using "total territory" in place of "inhabitable land". As such they appear useful where overall population densities are similar. Comparative use depends on the realistic definition and measurement of "inhabitable land". At regional level "traffic volume" is not obtainable.

"Motor vehicles per kilometre of road" is inferior to these sub-optimal calculations to the extent that the ratio of vehicle-usage to vehicle-ownership differs between regions. However, the quality of the road networks also differs obviously between areas. If at a point in time "motor vehicles per kilometre of road" over a mile of motorway equalled 100, that could represent traffic moving with freedom. The similar figure produced in respect of a country lane would indicate absolute road congestion. In the context of supermarket development, Gosling and Maitland describe the comparative development of motorways in Europe particularly since the war, noting that by 1974, for example, Germany had a Reichsautobahnen network of 2,500 miles, a quarter of the European total, and conclude:

> "The implications of these intensifying nets of national and regional highways for the urban structure and in particular for its retailing element were enormous. At the same time as car-ownership made the concentration points on the old routes increasingly congested, large cheap sites on the outside of the cities were made highly accessible" (27).

The statistic generally quoted in international comparisons of road provision, "motor vehicles per kilometre of road", is irrelevant as indicating this aspect. The provision of highways designed to produce traffic mobility outside the congested cities and towns is proposed in this thesis as a significant factor specifically in hypermarket development. Indicators based purely on road provision are obviously inadequate. A relevant range of indicators is constructed in the regional analysis by including in this all the "national" and "regional" roads (the trunk roads and principal roads in UK terminology) in the different regions. Using this base the following regional indicators were constructed:

> "Kilometres of road (minus minor roads) per kilometre of territory 1973".

> "Motor vehicles per kilometre of road (minus minor roads) 1973".

> "Kilometres of road (minus minor roads) per 1,000 population, 1973".

The most indicative indicator is the first of these. For comparative purposes, similar indicators were constructed on an "all roads" basis.

The limitations of the usefulness of these indicators need to be emphasised. All these indicators are affected by the fact, discussed in section 4.6, that total land area cannot necessarily indicate land in general use by the population. In Northern Scandinavia (Norway, Finland and Sweden) as a prime example, such road provision statistics are "unrepresentative" in the context of this thesis in those parts of these countries where the majority of road is only for long-haul use and traverses countryside that is not "in general use". A calculation based on "inhabitable land" would improve their statistical relevance. One based on "generally used land" would produce comparative road provision statistics that are properly usable for marketing purposes other than transport calculations.

The lack of usable measurements of "land in use" obviously affects directly the indicators of "kilometres of road per kilometre of territory". Indirectly, however, it affects the other two sets of indicators. Even in the most isolated sub-regions of a country, a minimum level of road provision is required. Where there are extensive areas of largely uninhabited land, road provision proportionate to population will be greater than normal, as also will road provision proportionate to vehicle ownership. This is illustrated in columns 1, 2, 4 and 5 of Table 4.4 in the case of the "trade regions" of Norway.

For climatic reasons Norway becomes distinctly less inhabitable and less inhabited going from south to north. Where, progressively towards the north, the land is progressively unused road provision is disproportionate to population and therefore also vehicle ownership. This is to say, as

Table 4.4 Comparative Road Provision in the Trade Regions of Norway

Norway	MVS per km Road			Kms Road per 1,000 population		
	All roads	Major roads	Hard-surfaced	All roads	Major roads	Hard-surfaced
North	7	13	112	32	16	2
Central	11	22	85	24	12	3
S.W.	13	36	72	17	6	3
S.E.	24	42	70	15	7	4

SOURCE: calculated from Trade Region data.

a statistic of the provision of roads that are used in everyday life it is overstated. The Swedish case is similar; and, though Finland is not studied in the regional analysis, the same relationship would be found there also.

In this context, the definition of "road" is itself not beyond argument. Statistical comparability is problematic. Some statistics are irreconcilable (International Road Federation versus EEC versus national). The problem is the definitional inclusivity of "road". Columns 3 and 6 of Table 4.4 indicate this. When a "hard-surfaced" criterion is applied in the measurement of the roads, the rank-ordering of the Norwegian regions is exactly reversed. Hard-surfaced roads are exceptional in Norway - particulary so, however, towards the north. This definitional problem affects in particular all three Northern Scandinavian countries, but also, to a lesser degree, many of the other

countries. In the countries studied the percentage of all roads that were hard-surfaced was as follows in 1973 (28) (the figure for France was not obtainable):

100 per cent:	Austria, Great Britain, Netherlands
90-95 per cent:	Denmark (94), Italy (93)
85 per cent:	Germany, Ireland
80 per cent:	Belgium (82), Spain (79)
50 per cent:	Sweden
Below 50 per cent:	Finland (40), Norway (20)

In all of the last three countries the percentage of hard-surfaced roads decreases in the less habitable north. It was therefore considered whether a "hard-surfaced" criterion would be a preferable one. It might, it was thought, represent road provision as related to land in use more realistically. On investigation it was not thought logical to apply such a criterion. It would seriously distort the statistics, in particular those of these three countries, in the opposite direction to the bias already noted.

Emphasis and proposed requirement

Debate on concept and optimal versus practical comparative measurement of road congestion is required.

4.8 CONCEPT: PROSPERITY

The hypothesis that the level of individual "prosperity in a nation is related to marketing advance is almost universally accepted.

In the M.S.1 study, the indicator "Gross national product per capita" was chosen by more "experts on comparative marketing" than any other indicator as having "the most direct and significant bearing on the marketing system in a given country" (29). Duncan has itemised "expansion in total personal income and in disposable income and the redistribution of income" as important forces affecting distribution (30). Cundiff has related economic advance to the rate of development of self-service (31). On the specific issure of the growth of supermarkets, both Carvat (32) and Markin (33) have listed changes in personal disposable income as a factor affecting growth despite the fact that the obverse of what is implied in that statement was what led to the original introduction of the supermarket in the USA in the form of the "cheapies" in the depression years. The paradox inherent in this is discussed in Chapter 9 in the context of the hypermarket. Gosling and Maitland (27) have related hypermarket growth to the growth in personal incomes. In this respect, in personal discussion in Paris in 1975, a Carrefour director gave high disposable income as the decisive factor in the selection of sites for overseas and internal expansion - in which respect, he stated at that time, they would quite happily have moved out of Spain. And it can be noted, as regards this policy, that in 1978 Carrefour, in fact, demolished a store in the low-income Paris suburb of Creteil.

Measurement

The factor to be measured is the "average relative prosperity of individuals". Conventionally accepted indicators are:

Prosperity indicator 1: "Gross National Product per capita" - considered by the MSI as the best indicator for marketing comparison.

Prosperity indicator 2: "Gross Domestic Product per capita" - or, since GDP per intra-national region is a virtually impossible calculation: "Gross Value Added per capita".

Prosperity indicator 3: "Gross Disposable Income of Households per capita".

Prosperity indicator 4: "Final Consumption of Households per capita".

The concern of this paper is not with any inherent incomparability in alternative methods of compiling these statistics, though these incomparabilities exist even in so-called comparative statistics. "Consumption of households", for instance, can mean consumption anywhere by households resident in the territory or it can mean consumption in the territory of households resident anywhere. Even EEC countries are calculated differently in this respect in the SOEC regional analyses; and the difference in a regional analysis can be significant. Nor is the concern with the difficulties of deriving a realistic figure of, for example, "Gross disposable income per capita" in conditions of an "underground economy" running in the UK at an estimated 7½ per cent of Gross Domestic Product (or something over £11 billion in the 1978-79 financial year), and in Italy, where significantly it is known as the "parallel economy", at nothing less than an estimated astronomical 20 per cent of GNP(34). These are distorting factors. The objection that invalidates this entire range of prosperity statistics for trans-national comparisons of any precision at all is that at present these

statistics, if used comparatively, are calculated on the basis of exchange rates (= to a large extent, "the political prices of currencies"). The real value of a nation's currency is what that currency can actually buy within national boundaries. There is invariably a difference between this real value and the value computed on an exchange-rate basis - as the plane loads in recent years (up to the strengthening of the pound) of continental shoppers bound for London testified.

This difference is in many cases far from marginal. A report by the United National/World Bank (35) has shown that the real GDP of developing countries in particular is grossly understated if calculated on the basis of exchange rates. The real GDP of Kenya, for example, (i.e., GDP expressed in terms of internal purchasing power) is three times the value shown in an exchange-rate conversion. The report further notes:

> "The unsatisfactory nature of exchange-rate conversions has become even clearer in thepast few years under the new regime of managed floating rates. Changes in exchange rates of as much as 20 per cent within the space of a year have not been unusual even among major currencies. Exchange-rate conversions thus sometimes show substantial changes in relative gross domestic products between pairs of countries when no such real change has actually occurred".

Customary spasmodic or periodic "shopping basket" comparisons are of little value in amending, even subjectively, basic prosperity statistics, in view of the arbitrary goods-and-service content of different "shopping baskets". There is little relationship between such comparisons produced by different sources - not, for example, between the surveys for 1974 conducted by the US State Department, Business Week, the Union Bank of Switzerland (mid-1973) and The Financial Times. Figures from these surveys where they can be compared are given

Table 4.5 International "Indicators" of Cost of Living: 1974

(Exclusive of Housing and Education Costs)

	Source: US State Department 1974 Total Index[1]	Food[2] A $	Food[2] B $	Food[2] C Index	Clothing[3] A $	Clothing[3] B $	Car use[4] A $	Hotel[5] A $	Hotel[5] B $	Hotel[5] C Index	Evening out[6] A $	Evening out[6] B $	Evening out[6] C Index
		Source: A. Business Week Survey 1974 B. The Financial Times Survey C. Union Bank of Switzerland - mid-1973											
Stockholm	163	100	50	110	256	221	32	38	37	90	50	183	71
Tokyo	159	130	31	99	303	474	40	40	39.5	95	70	158	95
Paris	140	95	26	83	297	280	34	60	65	116	55	188	100
Moscow	139	130	36	-	-	311	30	50	50	-	40	108	-
Brussels	133	83	39	73	283	359	27	48	50	112	45	142	112
Milan	120	115	-	78	260	-	25	30	-	120	35	-	103
Madrid	116	163	-	66	215	-	27	33	-	56	35	-	47
Sao Paulo	115	110	-	-	221	-	30	45	-	-	35	-	-
London	107	100	26	60	330	181	31	46	53	131	45	76	75
Washington	100	-	25	-	-	248	-	-	46	-	-	145	-
New York	-	80	26	78	258	293	21	50	56	130	45	179	130

(1) Washington = 100

(2) A: Weekly food bill for family of four. B: Food basket. C: Standard shopping basket.

(3) A: Coat of good business suit, shirt, tie and pair of shoes. B: As A, less tie.

(4) Ten gallons of petrol, plus parking for five days.

(5) A: Daily rate of double room in first class hotel. B: Single room with bath in Hilton type hotel. C: Double hotel room with bath and breakfast.

(6) A: Drinks and dinner for two. B: Drinks and dinner for four, theatre tickets and taxi for five miles. C: Meal in restaurant (without drinks).

in Table 4.5. The relative rankings variously produced are disturbingly different. Additionally the variously computed rankings have changed with bewildering frequency - bewildering certainly to overseas executives of home-based companies to whom the relative weight of their local cost of living supplement is invariably computed on "some formula bordering on magic that none of us understands" (36).

All the comparisons quoted above use "shopping basket" methods of calculation. An international "shopping bag" comparison, employed to measure purchasing power of the native population, that does not weight or vary the contents of the basket according to national consumption habit must be inaccurate, to a greater or less extent. From the global picture presented in Figure 4.4, it can be seen, for instance, that "average" protein intake by the inhabitants of the United States closely parallels that of Western Europe - but that the parallel does not extend to the kinds of food by means of which this amount of protein is received. Table 4.6 suggests that this type of difference is significant also internally in Europe.

The only valid method of comparing living standards as between countries must be as the EEC Commission maintains (37), by calculation of "consumer purchasing power based on the consumption pattern of each country examined ... carried out on similar lines in all the countries examined". This type of "massive investigation" was undertaken by the Community for the original Six, and extended in 1973 to include the three new members.

Figure 4.4 Protein and Caloric Intake by World Region

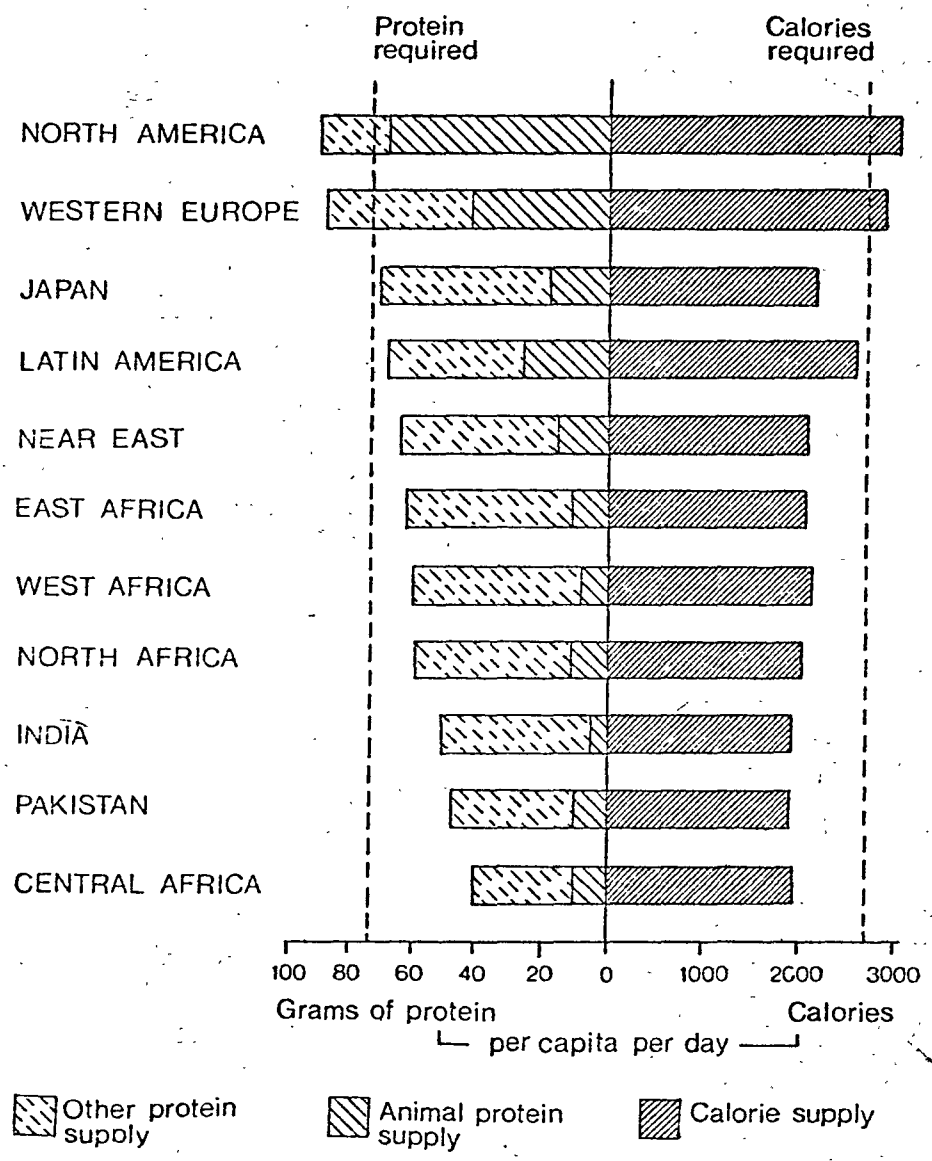


Table 4.6 Consumption of Main Foodstuffs, kilograms per head per year (1969-70)

	Grains	Rice	Meat	Fish[1]	Milk and cream	Cheese[1]	Butter	Margarine[1]	Eggs	Sugar (refined)	Potatoes	Vegetables	Fruit[2]	Wine[3]
Belgium/Luxembourg	79	1	67	12	81	8	8	13	14	39	117	87	66	12
France	78	2	85	14	97	14	8	3	14	34	96	131	88	108
Germany	66	1	73	10	78	9	7	9	16	32	102	65	112	16
Italy	127	2	48	11	65	10	2	0	11	27	45	170	109	115
Netherlands	65	2	51	10	114	8	2	19	13	46	93	81	85	1
UK	73	2	73	9	143	5	7	4	15	45	98	62	45	(4)
Norway	69	2	42	n.a	176	n.a	5	n.a	10	42	97	33	n.a	n.a
Denmark	68	1	62	n.a	121	n.a	8	n.a	11	48	79	42	n.a	n.a
Ireland	93	1	81	n.a	213	n.a	10	n.a	14	51	126	60	n.a	n.a
USA	62	4	110	5	126	7	2	4	18	45	41	92	56	n.a

([1]) 1968-1969. ([2]) Fresh fruit only. ([3]) Litres per head per year.

SOURCE: SOEC.

A major survey was carried out in Autumn 1975. Seven hundred and five goods or service items were priced. The "goods" items were priced in different types of retail outlets (department store, hypermarket, market stall etc.) and the prices weighted relative to the share of trade of each particular item in each type of outlet. Purchasing Power Parities (the ratios of the average prices of an identical item) were then calculated for each of the 705 items - and overall parities then obtained "by combining these basic item parities together using weights proportional to the corresponding household consumption expenditure in each state" (38). The end product was a set of indices to convert into real terms the ESA's "final consumption of households" - and therefore also related indicators. (CPPPs were calculated, by these means, without "rents" and health costs" for the Nine as at 1975 - and including "rents but without "health costs" for the original Six as at 1975 and 1972). They provide deflator indices with which to adjust comparative "prosperity" indicators that are calculated on a current exchange rate basis.

They are approximate. In view of the amount of work involved the price comparisons were made in capital cities only. Nevertheless, they provide a means of adjusting the relevant statistics much nearer to reality (39).

SOEC has recently provided us, for our research but not for publication, with provisional Purchasing Power Parities for GDP, for years 1970 to 1975, for the EEC Nine. The difference between national comparisons based on current exchange rate and those based on purchasing power can be seen in Table 4.7.

It can be seen that the rank-order, for example, of the 1973 leaders, Germany and Denmark, changes, and their comparative "prosperity" drastically. The relative standing of the United Kingdom is seen very differently when computed on the basis of purchasing power. The right hand column is the realistic comparison.

If sub-national EEC regions are being compared internationally, the "prosperity" statistics for each region can be adjusted by applying the national CPPP deflators. The changes thus produced in international ranking of regions can be dramatic - but this obviously takes no account of regional differences in cost of living internally in each nation, such as are recognised at a rudimentary level in capital city cost-of-living allowances.

Parallel to the EEC programme, work on broadly similar lines has been and is being carried out by the United Nations & World Bank International Comparison Project (ICP). Phase I of this project produced purchasing power comparisons for ten countries. Three Western European countries were included: Germany, France and Italy (40). Phase II of the project enlarged the sample to sixteen; and the European representation was increased by the addition of Belgium and the Netherlands. The bench-mark date was 1973, and extrapolations of the results were made up to

Table 4.7 Gross Domestic Product Comparisons: EEC Exchange Rate versus Purchasing Power 1973

	GDP at Purchasers' Value per capita 1973					
	In 100 US $ (1)	Rank	Amended for Purchasing Power (2)	Rank	GDP per capita in UK as % of GDP per capita in the other countries	
					BY $	By purchasing power (3)
Germany	56	1	37	2	55	78
Denmark	54	2	45	1	57	64
France	48	3	34	3	65	85
Belgium	47	4	33	4	66	88
Netherlands	44	5	33	4	70	88
UK	31	6	29	6	-	-
Italy	25	7	22	7	124	132
Ireland	21	8	19	8	148	153

(1) United Nations Statistical Yearbook.

(2) This calculation via the dollar using SOEC PPPs is approximately valid.

(3) Calculated as in Column 2.

1975 (35). Phase III, estimated to be completed in 1979 but upon which work was still in progress at the time of writing this paper, includes a comparative analysis of more than thirty countries, with a 1975 reference date. All nine EEC members are included (basically, it seems using EEC 1975 data) and also Austria and Spain. Thus, in particular if the ICP programme is continued into Phase IV and beyond, we have the means to obtain quantified purchasing power deflators for GDP and other "prosperity" statistics for eleven Western European countries. These will be on an annual basis, since the ICP intends to carry out the benchmark studies every five years and to extrapolate to intervening years. Among our Western European universe, this leaves Norway, Sweden, Finland, Switzerland and Portugal excluded from this type of comparison. However, the ICP researchers declared one of their objectives to be that of finding a way to make approximate comparisons for the countries "that cannot be accorded the full ICP treatment".

In 1980 they published tables of "real gross domestic product" for 119 countries of the world, including all Western European countries, for the years 1950 and 1960 through to 1977 (41). These were based on a detailed examination of the 1970 price structures of sixteen of the countries previously studied in depth. "Real gross domestic product" was found to vary in a systematic way with nominal GDP. Based on these quantified relationships, figures for RGDP ("real GDP") were calculated for the 103 countries in which no fieldwork or detailed study had been carried out. They are approximate. However, "alternative entries developed from simple exchange rate conversions will be subject to a much wider degree of inaccuracy". At least approximate adjustment to "prosperity" statistics is therefore now possible right across a European analysis currently up to the year 1977.

In the work for this thesis, the ICP calculations were received too late to be able to be used as amending relevant "prosperity" indicators. The main indicators in this series are based on exchange rate conversions. However, in each case alternative indicators calculated in terms of purchasing power have been constructed in respect of the eight EEC countries and of the regions of these countries, using the EEC purchasing power deflators. These are an input to the correlation analysis.

Aggregation

A secondary, and considerably minor, objection to aggregate "prosperity" statistics is that "GDP (etc.) per capita" is a mean not a median. Such Lorenz curves and Gini coefficients of income distribution as have been produced for Western European countries (as for example, for selected countries, by the United Nations 1967, Klein 1973, Stark 1977) show enough, although not major, differences to prevent us offering "comparability of error" as justification for considering such statistics properly comparative. But the difficulties in conceptualising and measuring income inequality are notorious. The OECD Working Party on Social Indicators had originally agreed in principle on an indicator "Gini coefficient of the distribution of disposable income and wealth" (42), but subsequently decided it was essential to produce in parallel a range of alternatives to the Gini coefficient, since these alternative calculations could result in different conclusions (43). Stark (1977 (44) recommends that the Gini coefficients he has himself produced are not used quantitatively. Gini and similar coefficients,if ever systematically provided, will be marketing indicators - not useful, however, to amend aggregate statistics. They will be supplementary information.

Emphasis and Proposed Requirement

A Marketing Indicators Working Party would, as priority, affirm the critical importance of the production, both by nation and region, of the type of exchange-rate deflators methodologically pioneered by SOEC and the United Nations/World Bank ICP Programme.

4.9 CONCEPT: FEMALE EMANCIPATION

The phenomenon of female emancipation is intuitively monitored by almost every marketing practitioner.

In the United Kingdom a hundred years ago the average female grew up, worked for a few years, married at 22, had twelve pregnancies, produced six children, reared six children, died at 42 (45). Working-class women particularly, "sacrificed themselves for the sake of their husbands and children" in a short life of "monotony, loneliness, discouragement and sordid hard work". Today a woman of 42 has brought up her "two and a half children" and has already set out on a new life of work, with thirty years of life ahead of her. Children may not even seriously interrupt a working life. In Sweden in 1976, 62 per cent of women with children under seven years old went out to work. The parallel statistic seven years before this was only 38 per cent. This progression is such that, in the UK in 1977, four out of 10 adults thought a marriage where the husband looks after the children and the wife goes out to work could be very happy; and only two out of 10 have anything against it. Three years previously the latter ratio was one in three (46). Under the continuing impact of birth control, higher living standards, more and more labour-saving and food preserving

devices, improved education, the consequent advance in legal, political, social and job-opportunity rights, the change in role and status of women continues to be revolutionary. "This is a new situation in the entire history of mankind" (47), and is recognised as such almost universally, and certainly by marketing - except statistically.

Measurement

(1) The Working Wife. It is generally accepted that the emergent phenomenon of the "working" housewife affects the form of marketing development. In our specific context it is an important factor motivating self-service and one-stop shopping. Comparative measurement at national level can be tentatively approached, but the measurement at regional level, other than partially, can only be in an elementary form.

Two "ideal" indicators were postulated. These were: (1) "Housewives in paid employment as a percentage of all housewives of working age"; (2) (sub-aspect indicator) "housewives who are in paid employment and who have children under (e.g.,) 15 years of age as a percentage of all housewives who have children under (e.g.,) 15 years of age".

Indicator (1) was proposed as the short-term indicator aim. Indicator (2) was obviously a long-term ambition; no comparative indicator can be currently constructed even approaching such a measurement. "First generation" indicators were then sought most nearly approximating to the ideal in the short term of the optimal indicator (1).

"Married woman" is a working synonym for "housewife". Any statistics, however, in respect of married women are sparse in Europe. The more readily available data are "females" data. This is the usual basis

for measurement, and the following indicators can be constructed, certainly at national level and, in most cases, at regional level.

"Working wife" indicators 1-4: (1) female labour force as a percentage of total labour force; (2) females in civilian employment (avoiding the comparability problem of measuring unemployment) as a percentage of all persons in civilian employment; (3) ... as a percentage of all females aged 15 and over; (4) ... as a percentage of all females aged 15-64. These indicators become progressively more sensitive 1-4. The usual measurement is indicator (1).

The emphasis on paid employment in the "ideal" indicator, particularly important in respect of countries with a high agricultural workforce, is not accounted for in the indicators above. The "females" of particular interest to marketing are those who work outside their homes for money (references are abundant: she is the "trendsetter in the market place" - McCall 1977 (48)) with all that that implies in terms of shopping-time allocation, priorities, status, outlook, personal discretionary income. In a marketing context an indicator that subsumes this population into an "all females" population is insensitive. OECD, EEC and most national statistics include in the "labour force" definition unpaid family workers who work at least e.g., (to quote the EEC case) 15 hours a week, and the inclusivity of this definition critically affects in particular the ratio of female to male agricultural workers, and thus all related workforce calculations.

At national level, it is possible, with difficulty and sometimes approximating, to construct usably-comparative indicators in which

the basis of measurement is "paid employment", i.e., indicators in the above categories based on a labour force excluding unpaid family workers.

At sub-national level, these calculations are not currently possible, although SOEC do dissect, by sex and region, unpaid "family aids" in the critical agricultural sector - so that for EEC countries in Community Survey years the regional indicators can be adjusted to this extent.

Other approaches, however, are possible, regionally and nationally. One might, for instance, regard the agricultural sector as being not indicative, and therefore construct indicators based on employment in industry and services only. Alternatively one might consider only full-time employment. Such indicators are calculable at least for specific years for the majority of countries.

The conceptual validity of these alternatives can be argued. However, all the above are gross approximations to the desired measurement. At national level only is it possible to attempt the following comparative indicators: "married women in labour force as a percentage (1) of all persons in labour force; (2) of all married women."

The final indicator is nearest the "ideal", even though it subsumes unpaid workers (we are considering here only what is practicable in the foreseeable future). Even at national level, it is data hardly won, with certain national inputs to the indicator possibly suspect. At regional level statistics of the female married workforce are available for few countries. Where they are produced as regularly as, for example, in Sweden and Denmark, they appear significantly relevant.

Juvenile Dependency

One can, of course, compile indicators of probability to work as affecting women - i.e., birth rate and juvenile dependency indicators. Such statistics are indicative of female orientation in a broad sense, and as such are additionally descriptive and not alternative to female-activity indicators. Therefore, if the year of study is 1979: dependency indicators (1) and (2): "births per 1,000 inhabitants (1) 1972 (= 7 years prior); (2) 1979". Alternatively, dependency indicator (3): "population aged 0-7 (or 0-14 etc.) as a percentage of females of working age (15-64)" can be constructed.

Alternatively again, one can approximate to this measurement by constructing the indicator: "average size of household".

Female Education

In general marketing theory this factor is important. In a retailing context it has been generally observed that the more educated the consumer, the more this creates a demand "for wider choice with less emphasis being placed on advice or 'hard-sell'" (49). This is to spell out advantages of self-service and the supermarket and hypermarket to the housewife. And, not necessarily paradoxically, it has been noted that the more educated the consumer the more she is aware of relative price advantage. The "ideal" indicator to illustrate this is "terminal level of female education", plus sub-aspect indicators to disaggregate this by age category.

Considerable work has been done to produce approximately comparable categories of levels of education internationally: the UNESCO International Standard Classification of Education (ISCED) programme (50).

EEC has published comparative education statistics, including terminal level percentages, by sex and age group as at 1973 based on ISCED for the original Six (51). One has problems in assessing the relative status of e.g., teacher training - but, in the context of our study, the ranking of these terminal levels appears significantly predictive. At this level, however, (= six observations only per variable) this offers only tentative support for an hypothesis. EEC survey sample sizes, however, were large, up to 100,000 households in the larger countries. The responses are, therefore, available for disaggregation by region (or are already thus disaggregated but unpublished, as, for example, in France) and a resultant analysis could then much more strongly support or not an hypothesis of, for example, the relationship between supermarket growth and female education level and, in other contexts, other marketing hypotheses.

UNESCO data, in the main unpublished, are for incomparable years.

Convenience - Durable Ownership

Within the general context of this as a factor in "female emancipation", two possible indicators are directly related in trade and general marketing theory to specific aspects of marketing development: convenience-durable indicators (1) and (2): "percentage of households owning (1) a refrigerator; (2) a home deep freezer".

As related to the large supermarket and the hypermarket, "the growth in ownership of domestic regrigerators and freezers ... enables the consumer to match the new pattern of larger and more distant outlets with less frequent shopping trips" (29). This has affected the

frequency not only of shopping for perishables and frozen foods but the frequency of shopping for canned and non-perishable items also (52). A substantial level of home deep-freezer ownership has been argued as being a prerequisite of any considerable hypermarket development.

National, and in many cases regional, household penetration figures for refrigerators are available from varying sources: these can generally speaking be reconciled. This is not true of home deep freezer statistics, mainly through the incomparability of international (also intra-national) definitions (for example, AGB: "separate door + minimum 1.5 cubic feet deep freeze space". Other definitions - different statistics.) The trade places greater reliance on its own commissioned surveys than on official statistics; but when all the varying penetration estimates are juxtaposed (and a sample only is given in Table 4.8), it can be seen that there is little reliable monitoring, and certainly not comparative monitoring even at national level, of what in many marketing contexts is a highly significant and (at least for a food retailer or a grower or a food-processor) predictive durable.

Female Emancipation: Summary Emphasis and Proposed Requirement

Statistical recording of the female emancipation "revolution" lags far behind marketing practice: the reverse is optimal. We have considered basic indicators. Additional, and more refined indicators can and should obviously be proposed: "Percentage pay equality" is among the long-term possibilities. This is not currently calculable to be comparative and representative. The first and basic requirement is, it is suggested, for the primary statistic: "activity rates (optimally defined) of married women". It is also suggested that all indicators

Table 4.8 Percentage of Households Owning a Home Deep Freezer: Survey Comparisons 1974-1976

Year	Source	Austria	Belgium	Denmark	France	Germany	Netherlands	UK
1974	EEC	-	25	45	12	39	25	16
1975	Birds Eye	42	27	71[1]	15	37	32[1]	25
	AGB	-	-	-	-	-	-	13
1976	EEC	-	42	53	20	50	36	22
	Euro-Panel	33	25	-	16	36	21	-
	Birds Eye	48	41	74	35	41	43	32
	AGB	-	-	-	-	-	-	20
	Ministry of Agriculture	-	-	-	-	-	-	26.5

(1) Including fridge-freezer.
AGB = Audits of Great Britain Limited.

discussed above are possible in the short term, given a slightly higher degree of priority.

4.10 CONCEPT: SHORTAGE OF LABOUR AND COST OF LABOUR

Hypothesis. This is that the retailer is impelled towards self-service operation, thence to a larger scale self-service operation, by the "push" factor of escalating labour costs.

Measurement

Conceptually, two approaches seemed possible: (1) a direct measure of labour costs; (2) a measure of unemployment. (1) is methodologically complex and perhaps not possible comparatively, therefore not discussed in this paper. (2) is based on an assumption of supply and demand in labour affecting the price of labour. Though this can be disputed as a general current hypothesis it arguably remains valid when applied to retail labour, with its high female, high part-time content. It is more oblique than (1) but superficially more measurable. National unemployment statistics however are notoriously incomparable unless based on standardised surveys. For Sweden, Austria, Finland, Spain and the EEC countries, it is possible to obtain statistics, if not for identical years, based on sample surveys not necessarily standardised, which are not necessarily the basis of the "official" series. International comparisons based on EEC surveys can be made with confidence at national level. As regards a regional analysis, all statistics based on national surveys become less reliable the more they are disaggregated. This is particularly so with unemployment statistics. The Statistical Office of the European Communities warns, in respect of

its unemployment figures, that "regional division of the data produces an extremely small sample permitting only an overall analysis of unemployment. This can only be guaranteed reliable for whole countries or very large regions" (53). In the United States, where the proportionate allocation of over $17 billion a year in grants to counties and cities depends directly on unemployment figures, President Carter established a National Commission on Employment and Unemployment Statistics to discover the extent of the reliability of these figures at the crucial regional and local level. Sar Levitan, the labour economist appointed to head this commission, expressed the preliminary opinion that the national random survey method is fine for measuring the scale of unemployment nationally, but comes "close to being straight random numbers" at the local level owing to the smallness of the sample at this level (54). The large regional groupings (noted in column 4 Table 4.1) that we have preferred to analyse, apart from being, it is hoped, more socio-economically homogeneous, are more meaningful in this respect also than those customarily employed but, except in the case of the UK, considerably smaller "basic administrative units" which are the basis of regional statistics, including regional unemployment statistics, as produced by governments.

Single year comparisons are not meaningful. Therefore, if the year of study is 1978, the following indicator can be attempted: Labour indicator (1): "Average annual unemployment rates e.g., 1974-1978" (or longer time-span).

Emphasis. Constance Sorrentino of OECD wrote in 1976: "in view of the different needs of the countries and the differences in their facilities for producing statistics, it has never been seriously proposed that all countries should adopt the same system of measuring unemployment" (55). Nevertheless, Sorrentino's paper itself goes a long way towards clearing the ground for exactly that proposal as regards Western Europe. The requirement is obviously not specific to marketing.

In a regional analysis of this critical variable large regional groupings are a pre-requisite.

4.11 CONCEPT: INDUSTRIALISATION

The "Prosperity" model alone is insufficient to explain the economy of a country, as affecting distribution. Such factors of the economy as railway provision, electrification, manufacturing capacity, road transport provision and computerisation are insufficiently subsumed in the concept "prosperity". Additional indicators were thought to be required that could represent the "level of industrialisation".

To most observers of comparative marketing it is held as axiomatic that the level of industrialisation of a country has an effect on the development of its marketing institutions; and this will not be argued here. It is proposed that a rural and non-industrialised economy is the less likely to foster a developed system of distribution as that is understood in Chapter 3. As regards our specific indicators of retailing advance, indicators of the progressive developments of self-service, the debt owed to many aspects of the basic industrial-

isation of the economy has been suggested: directly relevant is obviously the packaging industry, and the related paper and board, tinplate, plastics, glass, cellulose film and aluminium industries; increasingly important are the computer hardware and computer software industries.

The concept is broad and measurement is correspondingly difficult.

(1) Measurement by energy and steel consumption. A "proxy" measure calculable at national (and with some difficulty at regional) level is industrialisation indicator (1): "Energy consumption (kilograms of coal equivalent - or other) per capita". This, however, is quite obviously affected by level of car-ownership and by the amount of space heating that climatic conditions demand, and is accordingly a fallible indicator of "industrialisation". It is possible to construct a more precise indicator, industrialisation indicator (2): "industrial energy consumption (kilograms of coal equivalent - or other) per capita". At least for EEC countries this indicator is possible down to regional level.

It has been argued, however, that certain countries, such as Denmark and Sweden, import large amounts of crude and semi-finished steel and are, therefore, in actuality importing large amounts of energy which are not included in these data on energy consumption. A secondary indicator of "industrialisation" can therefore logically be considered: industrialisation indicator (3), "Apparent steel consumption (kilograms) per capita". The data for this indicator are readily available at national level, but cannot currently be disaggregated by sub-national region.

The "energy" and "steel" indicators are argued as being complementary, and we have found that, if both sets of data are indexed and then combined in a joint index, the resultant indicator so produced, i.e., an energy/steel index (which is our industrialisation indicator (4), appears more indicative of our concept of "industrialisation" than either dimension considered separately.

A statistic more accessible at regional level is: industrialisation indicator (5), "Industrial electricity consumption (kilowatts per hour) per capita". This can be argued as being valid.

(2) Measurement by relevant employment. Measurement of degree of "industrialisation" in terms of percentage employment in industry is obviously also possible, and both nationallly and regionally industrialisation indicator (6): "Percentage of labour force employed in industry" can be compiled without great difficulty. On the argument that in later stages of industrialisation the emphasis shifts to services employment, industrialisation indicator (7): "Percentage of labour force employed in Services" should logically also be compiled.

(3) Measurement by productivity. A third approach is to assume that logically greater "industrialisation" results in higher productivity. At national and regional level the following indicator can be constructed: industrialisation indicator (8), "Gross value added per occupied person". In the particular context of our research, this indicator emerges as more predictive than "Gross value added per capita" or similar "prosperity" model indicators.

Any attempt to expand the concept of industrialisation and industrial sophistication to include also the concept of "marketing sophistication" is fraught with problems of conceptual validity and definition, and the problems of comparative measurement are probably insurmountable. The difficulties of making international comparisons of advertising expenditures, for example, are notorious (56). We have experimented with an indicator "Advertising expenditure (dollars) per capita 1970" (i.e., an indicator dated before the period of general floating exchange rates) but have not found it satisfactory. For one reason, an adjacent year would have produced a different ranking.

Emphasis. Precise specification of the concept "industrialisation" and how it should be measured is difficult. In this accordingly problematic area representation of this factor will, it is suggested, need multiple indicators, whatever the hypothesis and whatever the dependent marketing variable.

At the crucial regional level, the "employment" and "productivity" indicators noted above can be compiled for most European countries. The "energy" indicators are constructable for many countries for selected years but with some difficulty in calculation as regards the conversion to a common base of the different units of energy.

At national level all the above indicators can be constructed using available data.

4.12 CONCEPT: RETAIL INTEGRATION

Hypothesis. The hypothesis is that the growth of systematised retailing is related to the growth of the large retail organisation, but without specification of the direction of cause and effect.

Measurement

We adopted the following indicators: retail indicators (1) and (2): "Integrated retail trade as a percentage (1) of total retail trade; (2) of total retail food trade" (one has,however, the not negligible problem of the comparability of the term "food trade")

In addition we used in our analysis retail integration indicators (3) and (4): "Non-associated independent retailers' share (3) of total retail trade; (4) of total retail food trade".

These last indicators (with the relationship with retail development hypothesised as negative) are the more sensitive and preferable, taking into account as they do the strength in certain European countries of the voluntary chains and retailer buying groups. We constructed these indicators at national level only.

Proposed requirement. The need is for yearly, comparable, national and regional statistics.

4.13 THE HYPOTHESIS OF A NATURAL TRADING PROGRESSION FROM SUPERMARKET TO HYPERMARKET

This final hypothesis has relevance to the hypermarketing variables only. It is proposed that the level of hypermarket development is directly related to existing and prior levels of supermarket and self-service development.

It is argued that there is a natural tendancy for self-service operations to expand to supermarket size and for supermarket operations to expand to hypermarket size, if the concentration is on low price. With gross margins progressively cut, progressively more customers are needed to maintain gross profit = a larger catchment area is needed = the need for a large store in an off centre location where ample car parking is possible, to cater for customers travelling over distance and where land costs are lower. The logic leads also to the sale of foods and non food merchandise, in order:

1. to provide maximum incentive for the customer to travel over distance;
2. to capitalise on the high customer flow once this has been created;
3. to benefit from the higher gross profit margins on non food, especially on non-comparison semi-durables.

The ultimate of this progression is a free standing superstore, the "hypermarket".

When thus predicting hypermarket provision by this measure, the supermarket variables become the independent variables.

4.14 GENERAL CONCLUSION: FUTURE RESEARCH REQUIREMENT

Available indicators serving marketing are inadequate. There is an urgent need for the recognition of a Marketing Indicators Working Party. Optimally, such a working party would sub-divide into working parties per marketing sector - and optimally each sub-committee would:

1) consider what marketing variables are currently most indicative of marketing development in that sector; propose optimal indicators of those marketing aspects; propose "proxy" indicators if optimal indicators are currently not constructable;

2) consider environmental, etc., factors hypothesised as affecting these specific marketing aspects; propose "ideal" indicators that, if available, would quantify these factors; publish these if they were able to be compiled;

3) collate, or encourage the collation of, existing but scattered data to construct new indicators not previously compiled but now required; publish; press for national and sub-national data to be thus structured and published by statistical offices in the future, additionally to the structuring of the basic data by statistical offices in other formats;

4) work in the long term to create specific marketing indicators, national and sub-national (sub-national, by agreed optimally homogeneous region) that are internationally comparative.

Then the interaction of marketing and the marketing environment could be studied with more relevance.

Details of the formation of a marketing indicators working party orientated towards the production of statistics relevant to retail distribution are given in Appendix 3.

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"Even when returns are made, the tax authorities 'assess' the taxpayer on a much higher figure of income than that returned. Eventually after much haggling, a bargain is struck. So taxpayers usually start off by estimating their income on the low side and the tax collectors similarly start off on the high side. Both figures are published, and Italians enjoy comparing them, and noting that some well-known millionaires claim to have incomes no higher than an office boy. On the other hand, as the late Signor Luigi Einaudi once said when he was governor of the Bank of Italy, 'The entire national income would not be enough to cover all the taxes that would be due if the tax collectors' initial assessments were real and enforced".

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CHAPTER 5

DATA COLLECTION AND INDICATOR CONSTRUCTION

The major task in this project has been that of data collection and the consequent construction of, in many cases, previously unattempted comparative indicators. This is particularly so at sub-national regional level, both in respect of the dependent (distribution) variables and the indpendent (socioeconomic etc.) variables. The difficulties have been considerable. As regards the distribution indicators, however, I believe we now possess the best data existant of supermarket and hypermarket provision calculated on a sub-national regional basis and comparative across Europe. (I believe we possess the only such data collection.) These statistics are calculated as at 1st January, 1973. They lay, however, the foundation for a comparative yearly series. Similarly as regards the socioeconomic and demographic indicators constructed at regional level: these have intrinsic value and have not before been comparatively produced at this level.

The Distribution Indicators

Distribution indicators were constructed by the following means:

At national level by using the national totals for 1 January, 1974 respectively compiled by the International Association of Department Stores (IADS), Paris (unpublished) and by the International Self-Service Association (ISSO), Cologne, and by reconciling these respective totals and amending such totals as necessary in the light of our regional analysis. Distribution indicators thus constructed are listed in Appendix 1.

At regional level supermarket and hypermarket indicators were constructed in respect of each country by the following means and using the following "supermarket " definitions. (The note on Germany refers also to the national analysis.) The total range of distribution indicators attempted is given in the summary of regional indicators in Appendix 2. for clarity the information below is presented in note form.

AUSTRIA

Basic supermarket data was obtained through the offices of Dr.Erich Ketzler, Osterreichisches Institut Fur Verpackungswesen (O.I.V.), Vienna; Hypermarket data from A.C. Nielsen Company Ges. M.B.H. (Vienna) and O.I.V. (Vienna).

Supermarket definition: Self-service. $400m^2$ minimum (no maximum) size. Proportion of turnover of groceries (including perishables) more than 70%.

Indicators constructed: Inhabitants per supermarket of size (1) 400 - $2500m^2$ (2) 1000 - $2500m^2$. Inhabitants per self-service unit of size (1) $400m^2$ and over (2) $1000m^2$ and over. Inhabitants per hypermarket.

BELGIUM

All data obtained through the Comite Belge De La Distribution (Brussels) and Libre Service Actualities (Paris)

Supermarket definition:

Self-service. $400m^2$ minimum. Full food range including "fresh meat". Alternative calculations have also been made without the "fresh meat" requirement.

Indicators constructed. All indicators + alternatives for all 24 supermarket indicators minus the "fresh meat" criterion. The latter series is not used in the main analysis, since the first mentioned series is the more internationally comparable.

DENMARK

Raw material for supermarket and hypermarket data were obtained from Per Press (Copenhagen) and Dansk Butikregister I/S (Vedbaek).

Supermarket definition. Self-service with full range of provisions including fresh meat. From this category we have deducted those units of under $400m^2$ selling space.

Indicators constructed: All indicators.

FRANCE

All data obtained from the Institut Francais Du Libre Service (IFLS), Paris.

Supermarket definition: Self-service, selling full range of food including butchery. Minimum sales area $400m^2$.

Indicators constructed: All Indicators except the series that excludes supermarkets in variety and department stores (Indicators 1-12).

GERMANY

Supermarket data were obtained through the Institut Fur Selbstbedienung (I.S.B.), Cologne. The national data for supermarkets in variety and

department stores were amended in the light of conflicting data from I.A.D.S. (Paris) after correspondence with both bodies and adjustment by both parties of their original figures; the resultant 1973 national figure was then apportioned regionally by Lander according to 1977 percentage possession (ISB percentages). Hypermarket data were obtained from Informationszentrum Nieue Handelsformen (I.N.H.), Bad Worishofen, but by Nielsen region only. These agglomerations of Lander were considered to subsume populations too large to be included in the analysis.

Supermarket definition: Self-service. 400m^2 minimum sales area. Predominantly a food store.

Indicators constructed: Inhabitants per supermarket 400m^2 and over (both inclusive and exclusive of supermarkets in variety and department stores).

IRELAND

Supermarket and hypermarket data. Two special runs of 1971 Census of Distribution data were made by the Central Statistics Office, Dublin, to produce supermarket data dissected by selling area classes (square foot and metric bases) per county. In the process of updating these figures to 1973, these were found to be unexplained discrepancies with information supplied direct by retail companies. Final statistics were compiled based entirely on the direct responses of retail firms.

Supermarket definition: Self-service. 4000 sq.ft. minimum selling area. It was considered it would not improve comparability to employ a 400m^2 (=4306 sq.ft.) minimum criterion, since statements of size made by retail

companies are approximate. No "assortment" specification was included in the criterion, but, since limited-range discounters are uncommon in Ireland (as also in U.K.), the resultant statistics are considered approximately comparative with those of other nations.

Indicators constructed: All indicators.

ITALY

All data obtained through the Instituto Nazionale Della Distribuzione (I.N.D.I.S.), Rome, and Ministero Dell'Industria Del Commercio E Dell Artigianato, Rome.

Supermarket definition: As France.

Indicators constructed; All indicators.

NETHERLANDS

Data obtained by commissioned computer run made by Eug. J.M. Trautwein, Arnheim.

Supermarket definition: Self-service. Full food range. The $400m^2$ - $2500m^2$ criterion was applied specifically for this analysis.

Indicators constructed: Inhabitants per (1) supermarket $400m^2$ - $2500m^2$ (2) Self-service unit $400m^2$ and over. (Both inclusive of supermarkets in variety and department stores.) Inhabitants per hypermarket.

NORWAY

Data obtained through Norges Markedsdata As, Oslo.

Supermarket definition: Self-service. 400m^2 minimum (this analysis only). Turnover in excess of 3 million crowns.

Indicators constructed: As Netherlands.

SWEDEN

Supermarket data obtained via Supermarket, I.C.A. - Forlaget AB, Vasteras and Butiksregister A/B, Eriksbergagatan. 1973 listings so obtained were based on a minimum turnover criterion (4 million Swedish crowns) not a floor-space criterion, which was only introduced in 1975. We have included in our indicator, therefore, those stores included in the 1973 listings which also appear as satisfying the 400m^2 criterion in the 1975 listing. The assumption of this is that no stores of 400m^2 and over were closed between 1973 and 1975. The supermarket indicators are understated to the extent that this is not correct. Hypermarket data were obtained from A.C. Nielsen Company AB, Skarholmen.

Supermarket definition: Self-service. Complete grocery assortment. 400m^2 minimum sales area (this analysis only).

Indicators constructed: As Netherlands + hypermarket selling area per 1000 inhabitants.

SWITZERLAND

The establishment of supermarket numbers based on a $400m^2$ minimum criterion by canton in Switzerland has not proved possible in the time available - despite assistance received from the Forschungsinstitut Fur Absatz Und Handel, A.C. Nielsen SA, Advico AG, Litton Business Systems and retail firms and cooperatives in Switzerland. The basis has been laid, however, for a future analysis. Hypermarket data by canton were obtained via Advico Advertising Agency, Zurich, supplemented by information from the Federation of Migros Cooperatives, Zurich, in respect of their particular stores.

Indicators Constructed: Inhabitants per hypermarket. Hypermarket selling area per 1000 inhabitants.

GREAT BRITAIN

Supermarket indicators were constructed by means of a commissioned run of the 1971 Census of Distribution data to produce numbers by Standard Regions of self-service grocery stores of 4000 sq.ft. or more selling space - also the sales areas, by region, of such stores. These listings were updated to January 1973 by the addition of new openings up to 1973 as compiled by A.C. Nielsen Company, Oxford, and also as notified by retail multiple firms. The indicators are accurate to the extent that closures of units over 4000 sq. ft. during 1972 are matched by any unrecorded openings. Our list is considered to be usably correct. Hypermarket data were obtained from The Unit for Retail Planning and Information (URPI), Reading, and the C.W.S., Manchester.

Supermarket definition: As Ireland.

Indicators constructed: Inhabitants per (1) supermarket 4000 - 25,000 sq.ft. (2) self-service unit 4000 sq.ft. and over.

M^2 selling area per 1000 inhabitants (categories as above). The above calculations are exclusive of supermarkets in variety and department stores. Since, however, the increase in supermarket numbers by adding those in variety and department stores in only 2 per cent nationally, the same figures also serve as usable "inclusive" indicators.

Inhabitants per hypermarket. Hypermarket sales area per 1000 inhabitants.

NORTHERN IRELAND

Supermarket and hypermarket indicators were compiled by direct contact with individual retail firms.

Supermarket definition: As Ireland and G.B.

Indicators constructed: As G.B.; but indicators including supermarkets in variety and department stores are specifically and separately calculated.

The Socioeconomic/Demographic Indicators

At national level these have been compiled from the publications of, and direct response from, recognised authorities in each dimension (UN, OECD, the Statistical Office of the European Communities, International Road Federation etc.).

At regional level, although comparative material has been produced by the Statistical Office of the European Communities (SOEC) in respect of the sub-national regions of the major EEC countries, this had had to be supplemented by search within the nation; and very extensive correspondence with the various statistical departments of the non-EEC countries and of the less-researched EEC countries has been necessary in order to produce the requisite new data in the previously noted socioeconomic/ demographic dimensions and to make these comparative. The result is a prototype series of marketing indicators at the explorative regional level.

National indicators thus constructed are given in the indicator list of Appendix 1. Additionally to theindicators on this list, two further national indicators have been calculated but not correlated: these are the Car/Road Indicators 2 and 3 as discussed in Chapter 4.

Regional indicators constructed for this project (all constructed at both minor region and major region level) are given in the indicator list of Appendix 2.

CHAPTER 6

DATA ANALYSIS: CORRELATION AND REGRESSION

6.1 At national level the analysis is based on data for fourteen countries - Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and United Kingdom. At regional level, the analysis is based on the major regions of these countries with Finland and Spain excluded.

In the regional analysis, comparative indicators were first constructed for the sub-national minor regions of these twelve countries (= 187 observations per completed variable). The data for these minor regions were then aggregated to correspond to the hypothesised "homogeneous" major regions. This resulted in 68 observations per completed variable. In many cases, however, there are gaps in the data. In the case of some variables there are considerable gaps.

The steps in the analysis of the data were:

1) Rank-ordering of all variables according to the ranking of each dependent variable. This was useful in the interpretation of subsequent analysis.
2) Correlation of all variables.
3) Regression of key variables in the regional analysis.
4) AID analysis of main regional variables.

Prior to examining the results of these analyses, there is one main objection to any such analytical approach using socio-economic etc. data as independent variables that needs to be evaluated. The objection applies to the hypermarket analysis only. It is that hypermarket development is controlled by Government regulation and therefore cannot be related to socio-economic factors.

6.2 THE HYPERMARKET : THE FACTOR OF PLANNING APPROVAL

Much has been said and written to the effect that the main determinant of hypermarket development in Europe is the ease or otherwise of obtaining planning approval. In the course of this study a great deal of material has been collected on the different planning regulations affecting hypermarket development in respective European countries. It is possible to quantify very roughly the overall impact of these regulations, as was done for this study by Dr Jefferys* and two other international authorities who wish to be anonymous. Jefferys quantification of this factor is shown in Table 6.1. The anonymous responses are remarkably similar.

No attempt, however, was, on reflection, made to weight the model in any way according to these or other quantifications. It is argued that the logic of so doing is circular. Norton and Stahel of Larry Smith Consulting have listed similarities in conditions in Europe and the U.S.A. that affect out of town development and asked why out of town development has been so slow in Western Europe, and

* Director General of the International Association of Department Stores (IADS) Paris, and Chairman of the Distributive Trades Economic Development Committee Common Market Working Party.

Table 6.1 Effect of Government (National or Local)

Influence on the Ease of Opening Hypermarkets

Grading : 0 = Complete Banning of all such outlets

to

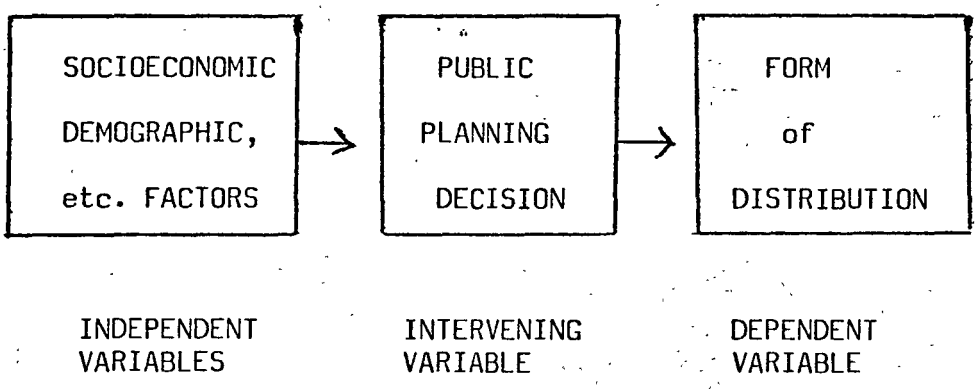
10 = No control whatsoever

Country	Before 1973	After 1973
Austria	5	4
Belgium	9	1
Denmark	6	5
Finland	6	3
France	9	3
Germany	9	5
Ireland	4	4
Italy	3	2
Netherlands	5	4
Norway	4	4
Spain	8	8
Sweden	6	4
Switzerland	5	3
United Kingdom	3	5

Estimate by J B Jefferys, International Association of Department Stores, Paris.

they say that probably the most important retarding element has been "The strict control exercised by Government Authorities at all levels of the development process" (1). Many other commentators, for example Tanburn (2), go further and treat the factor of planning control as, in

effect, an unquantified independent variable. But this is only arguable on a basis that Governmental and Local Authority planning decisions are arbitrary and irrational acts! Assuming this is not the case, then socio-economic and demographic factors affect the planning decision and the planning decision affects the distribution decision.



If the planning authority is completely disinterested and supremely efficient and omniscient, then it can be argued that the essence of its action is simply the interpretation of the retailing forms that conflicting socio-economic, demographic etc. factors on balance demand. In this case, if one could quantify all the original independent variables, one could study their action on the dependent variable and ignore the intermediate "prismatic" effect of the public planning decision.

However, planning authorities are not completely disinterested (vide Le Loi Royer), nor obviously are they supremely efficient and omniscient. Their effect is to distort or delay or possibly accelerate the natural action that various independent socio-economic variables have on the dependent variable (distribution), if conditions were those of absolute

lack of "friction" or "interference" in the system.

Conflicting socio-economic forces create a need for central planning. The central planning body thus created attempts to interpret these same socio-economic factors. It remains an instrument of the public concern that created it - at least in the long run and if only out of political expediency.

This part of the study assumes a premise that: voters vote, and consumers vote with their feet, and in the long run they get what they want - in other words, that the primary socio-economic variables are relatable directly to the dependent variables. This is a simplification but a useful one.

6.3 ANALYSIS BY CORRELATION

The results of the correlation analysis of national data are given in Appendix 1, those of the regional data in Appendix 2.

The correlation coefficients shown there cannot in many cases be compared directly, since the number of paired observations vary according to the variables correlated. (The number of cases per variable varies, and the data-gaps in one indicator may or may not correspond with the data-gaps in the correlated partner). For this reason significancelevels are given against each correlation coefficient.

At the national level, non-linear correlations were obtained. The cases where these transformations improve the statistical fit are noted in the commentary.

The self-service analysis, the hypermarket analysis and the supermarket analysis are dealt with separately. The conclusions are further discussed in chapters 8 and 9.

6.3.1 The Analysis of Self-Service Provision

A subsidiary part of the research was to examine influences on self-service development as such. This was studied at national level only. The year for analysis was 1962, chosen for the reasons outlined in section 4.5.1, that after this date this indicator becomes insensitive. Operative influences are suggested in the correlation matrix of Appendix 1. Detailed reference to this matrix is not made in this context. Obviously only those environmental variables dated circa 1960 should be taken into account. The highest correlation of the relevant indicator (1SS62) is with NATOT62 ("percentage of total retail trade held by non-associated retailers 1962"). The relationship is positive; The r value is 0.69122, significant at the .01 level: The more that retailing is organised, whether through legal or through voluntary association, the more is this conducive to the development of self-service.

Significant relationships are also found to exist with, in particular

indicator GNPPC61 ("GNP per capita 1961") and the related indicator DI60 ("Disposable income per capita 1960") and also the indicators ENERGY 61 ("Energy consumption per capita 1961") and FE%WE61 ("Female wage and salary earners as a percentage of all wage and salary earners 1961").

It can be argued, therefore, that self-service as such develops most rapidly in industrialised countries with a high level of individual prosperity where the incidence of female employment is high - provided that in these countries there exists a significant level of legal or voluntary integration of the retail system.

6.3.2 The Hypermarket Analysis

(1) Alternative bases for hypermarket measurement

It can be seen in the correlation matrices of Appendices 1 and 2 that the alternative methods of measuring hypermarket development, the first based on numbers of hypermarkets regardless of size and the second based on total hypermarket selling space, are statistically very different. At the national level, the correlation (in Appendix 1) between "Inhabitants per hypermarket 1974" (IHY74) and "Hypermarkets selling space per 1000 inhabitants 1974" (SHY74) is only barely significant ($r = 0.47922$). At the level of the major sub-national region. The parallel correlation (in Appendix 2) between IHY and SHY is significant at the .001 significance level but accounts for only 30 per cent of the variance in respective data ($r = 0.55598$). It matters

therefore, whether we are concerned in "predicting" relative numbers of hypermarkets or whether we take account also of their relative average size. Progressively as the spread of hypermarketing advances the size measurement will be the more significant.

(2) The Concentration of Population Model

(a) Measurement by population density

The variously attempted measurements of population density are not significantly correlated with the indicators of hypermarket development, either at national or regional level. As argued in section 4.6 however, measurement of this factor is unsatisfactory to date and needs specific research. In addition what is being described here is the global relationship only. The relevant findings of the AID analysis that is more sensitive in this respect are given in Chapter 7.

(b) Measurement by degree of urbanisation.

The proxy indicators to measure the reality of the urban/rural split, the indicators of "Percentage of labour force employed in agriculture, forestry and fishing" (AGRIC%68, AGRIC%70 and AGRIC%73) are in general significantly negatively related in the regional analysis with hypermarket incidence. The 1968 measurement is the best predictor. The respective correlation coefficients are as follows, the level of significance being indicated in brackets:

	IHY Inhabitants per hypermarket 1973	SHY Hypermarket selling area per 1000 inhabitants 1973
AGRIC % 68 (n = 45)	0.63(.001)	- 0.56 (.001)
AGRIC % 70 (n = 68)	0.47(.001)	- 0.22 (-)
AGRIC % 73 (n = 52)	0.27(.001)	- 0.14 (-)

It can be seen that the r values progressively diminish as a more contemporary date is applied. In the case of the more sensitive hypermarket indicator, that based on sales area (SHY), they cease in the more concurrent years to be significant. Hypermarket establishment decisions are made several years in advance of opening. Environmental variables dated some years prior to the hypermarket variables will tend to be the better predictors. This phenomenon is to be noted also in respect of other environmental variables.

The proposed preferable indicator "Percentage of wage earners and salaried employees employed in agriculture etc" (WAGRIC 70 and WAGRIC 73) which avoids the "unpaid family workers" problem, but which was able to be constructed at national level only, is very highly correlated indeed with the hypermarket variables, accounting for 88 per cent of the variance in IHY 74; but one emphasises that this is based on only fourteen observations. At the more sensitive regional level, however, the indicator "Percentage of heads of households employed in agriculture etc" (AGRICHOH) also eliminates the unpaid family worker. This also is highly correlated with the hypermarket variables with r values of 0.69 and 0.60 significant at the .001 and .01 significance levels respectively. These therefore are the predictive variables to be developed for future analysis.

The alternative measurement of this factor by "Percentage of gross domestic product derived from agriculture etc" is not so predictive. In those instances where this indicator, in both the national and regional analyses, is related significantly to hypermarket development, the r values and levels of significance are considerably lower.

Surprisingly there is in general no significant relationship with large local concentrations of population, whether measured in towns or agglomerations - and there is no high relationship with degree of urban habitation even taking the smallest urban unit as base. The exception is in the correlation of "Percentage of inhabitants living in urban agglomerations of at least 100,000 inhabitants" with "inhabitants per hypermarket" in the regional analysis. The r value is low and is significant only at the 0.1 level. But the indication here is that the higher the urban concentration at the 100,000 inhabitant level the less this is conducive to hypermarket growth. The AID analysis in Chapter 7 investigates this more sensitively.

(3) The car-ownership and road congestion model

(a) Car ownership: It is generally taken as axiomatic and is part of the "hypermarket" criterion that the hypermarket caters for a car-owning public. And at national level the car-ownership and hypermarket indicators are in each case significantly correlated - not, however, at very high levels of correlation or significance.

At regional level, the phenomenon that we have already noted in the case

of agricultural employment for a prior indicator to be the best predictor is evident here also. Thus (figures in brackets denote significance levels):

		IHY Inhabitants per hypermarket 1973	SHY Hypermarket selling area per 1000 inhabitants 1973
CARS 66	(n = 63)	0.52(.001)	0.32(.05)
CARS 70	(n = 68)	0.31(.02)	0.32(.02)
CARS 73	(n = 68)	0.17(-)	0.22(-)

The concurrent indicators are, in fact, not even significantly related. Taking, however, the 1966 indicator as the predictive variable, car-ownership is still not shown as the dominant influence on hypermarket development that it is popularly supposed to be: indicators of other environmental factors have higher coefficients.

(b) Road congestion Both nationally and regionally the generally used indicator of road congestion, the number of "motor vehicles per-kilometre of road "is not significantly related to hypermarket develop-ment - nor is the measurement "kilometres of road per 1000 inhabitants" in the regional analysis.

The variable that is significantly related is "kilometres of road per square kilometre of total territory" in the regional analysis. This has been measured for all roads (ROSQKMPL) and for major roads only (RDSQKMMI). The relationships are as follows (figures in brackets denote significance levels):

		IHY	SHY
		Inhabitants per hypermarket 1973	Hypermarket selling area per 1000 inhabitants 1973
RDSQKMMI	(n = 61)	-0.31(.02)	0.47(.001)
RDSQKMPL	(n = 66)	-0.47(.001)	0.14(-)

Where the size of the store is not taken into account the degree of provision of roads as such is significantly related to hypermarket development. Taking into account, however, relative hypermarket size (as in SHY) then the provision of major roads, as distinct from minor roads, is the important factor. This was our hypothesis. The "all roads" indicator is not significantly related to SHY. The viability of the large hypermarket depends on the provision of major roads - not so, necessarily, the smaller hypermarket, the "superstore".

(4) The prosperity model

In the national analysis all the "prosperity" indicators unadjusted for purchasing power are significantly related to the hypermarket variables - that is to say, to IHY 74, SHY 71 and SHY 74.

At regional level the relationships of the hypermarket variables with the "prosperity" variables GVAHAB ("Gross Value added, dollar equivalents, per inhabitant 1970") CONSEXP ("Private consumption expenditure, dollar equivalents, per capita 1970") and DISPINC ("Gross disposable income of households, dollar equivalents, per capita 1970") are shown below (figures in brackets denote significance levels). The indicator PCFOOD ("Percentage of private consumption spent on food,

drink and tobacco 1973") is included also as a "prosperity" indicator, on an assumption that the higher the individual's income the smaller will be the proportion of income spent on food, this in extension of Engel's economic law. It has a more particular relevance, however, in the context of this thesis, in that the smaller the proportion of income spent on food the less, it was argued, will the purchasing of food be an important "ceremony" to the busy housewife, and the more she will accept impersonal methods of food distribution. It was argued therefore as indicating something more precisely applicable than simply differences in levels of disposable income.

		IHY	SHY
		Inhabitants per hypermarket 1973	Hypermarket selling area per 100 inhabitants 1973
PCFOOD	(n = 21)	-.55(0.1)	.98(.001)
GVAHAB	(n = 68)	-.36(.01)	.37(.01)
CONSEXP	(n = 46)	-.50(.001)	.59(.001)
DISPINC	(n = 68)	-.29(.05)	.42(.01)
GVACPPP	(n = 52)	-.49(.001)	.29(0.1)
CONSCPPP	(n = 46)	-.50(.001)	.42(.01)
DINCCPPP	(n = 52)	-.29(.05)	.36(.02)

The highest related indicator is PCFOOD. In its relation with SHY it has, in fact, a correlation coefficient of 0.98. But the direction of influence is positive, and not negative as was hypothesised. It is emphasised that this astonishingly high and unexpected relationship is based on only 21 observations. Nevertheless it is significant at the

.001 level. One can suggest that the "drink and tobacco" element has weighted the findings. This is an indicator to be properly developed for further investigation.

Of the less tentative indicators, the indicator of private consumption expenditure (CONSEXP) is the best predictor, but again this is based on a lesser number of observations, in this case 46. Where we have the full range of observations, disposable income (DISPINC) is the best predictor of the preferred variable SHY.

The only properly justifiable indicators of "prosperity" are those adjusted for purchasing power. In the regional analysis these are the counterpart indicators GVACPPP, CONSCPPP and DINCCPPP. Similar indicators are constructed in the national analysis. From the matrix above it can be seen that at regional level the prediction of hypermarket development by these indicators is somewhat better in the case of IHY and worse in the case of SHY than with the unadjusted indicators. In general the adjusted indicators have fewer observations, being in respect of EEC regions only. Additionally, in the regional analysis the "prosperity" statistics of all of the regions of a particular country are weighted by the same purchasing power adjustment ratio, since we have CPPP deflator indices at national level only. Even so the CPPP - adjusted indicators are all correlated significantly with the hypermarket variables.

(5) The "Female Emancipation" model

(a) The working wife. At the national level, the eighteen different indicators attempted are shown in Appendix 1. They are those whose codes begin with the letters FE (=females) or MA (= married women) plus the XFAM70 indicator (= "females in civilian employment as % of all persons in civilian employment - excluding unpaid family workers 1970"). There is no significant correlation of any of these indicators with the two hypermarket indicators based on selling space. As regards the hypermarket variable IHY74, the two highest correlated indicators are among the methodologically preferable ones. They are XFAM70 and FE%WE61 (= "female wage and salary earners as % of all wage and salary earners 1961"). The latter indicator, calculated as at 1970 but not shown in the matrix, is also highly predictive. Both these types of indicators are designed to exclude the problematic unpaid family workers in the agricultural sector. The "married women" indicators are not significant. We noted in chapter 4, however, that these indicators were suspect as to accuracy. The national data of the 1969 sample surveys of housewives working full-time and those working full-time or part-time (WIFEFT69 and WIFEALL) are significantly related to IHY74.

At the regional level, the methodologically preferable indicator is again the highest correlated (with both the "Inhabitants per hypermarket" and the "Selling space" indicators) of those indicators for which we have a full range of 68 observations. This is FECV1564. ("Females in civilian employment as percentage of all females aged 15-64, 1973")

Alternative approaches to measuring this factor regionally by calculating females employed in (a) industry (b) services (c) industry and services - as percentage of all persons employed in these sectors (indicators FEMSIND, FEMSERV, FEINDSER) - show "services employment" as being most significant.

(b) Juvenile dependency. In the national analysis, the Birth Rate indicators are in general significantly related to the selling space indicators of hypermarket development (SHY71 and SHY74). In the regional analysis, however, the levels of correlation are low.

Measuring, in the national analysis only, juvenile dependency by direct 'Juvenile dependency' indicators (JDEP60 and JDEP70) no significant correlations are obtained.

An alternative method of measuring dependency, however, is to measure the average number of persons per household (HHOLDS in the regional analysis). Here the relationships with hypermarket development are significant.

(c) Female education. An attempt was made to measure this difficult factor at national level only. EDUC1869 ("% females educated up to at least age 18 - 1969 sample") is not significantly correlated with any of the three hypermarket variables. EDUCEEC (five observations only) is included simply to have the observations included in the data deck.

(d) Convenience - durable ownership Refrigerator ownership nationally (FRIG73 and FRIG69) is not significant when related to the hypermarket variables. Regionally a significant correlation is obtained with SHY.

Home Deep Freezer ownership is not significant.

Nationally two indicators were constructed of percentage vacuum cleaner ownership (VAC73 and VAC69), on an hypothesis that ownership of this appliance to some extent measured" emancipation from household drudgery". The first of these is correlated at the .001 significance level with IHY74, and a reciprocal transformation of the base data increases the r value to 0.947 in this case. However, we are unable to construct these indicators on a regional level for further analysis.

Too much weight should not be given to the precise correlation coefficient, based as it is on only 14 cases. The function of correlation at the national level is to provide indications and suggestions.

(6) The Labour Model

To measure the hypothesised "push" factor of escalating labour costs progressively propelling the retailer towards self-service operation and the progressively less labour-intensive methods of supermarket and hypermarket operation, the sole indicators we are able to construct are those of unemployment. At the national level (but not shown in

Appendix 1) the relationship with hypermarket development is not significant. At the obviously more sensitive regional level, and taking a long time-span for the measure of average annual unemployment (1965-1973) since yearly percentages fluctuate in many cases dramatically, the correlation with the hypermarket variables is significant at .001 and .01 levels, thus supporting the hypothesis, In correlation with IHY the r value (n = 52) is 0.75708 and is higher than that of any other predictive variable.

(7) The industrialisation model

The general concept is that a given level of industrialisation and industrial sophistication is necessary for hypermarket development, in fact for any form of systematised distribution.

(a) Measurement by energy and steel consumption At the national level we measured this by "Energy consumption per capita" 1971 and 1973, although this is obviously affected by level of car ownership and is accordingly a fallible indicator of "industrialisation". We have accordingly constructed an additional indicator: "Apparent steel consumption per capita" (average annual figures for the period 1971-1973). In general these are significantly correlated with the hypermarket variables. We have indexed both the "energy" and "steel" data and combined the resultant figures in a joint energy/steel index which becomes a new indicator ESINDEX. This too is significantly related to hypermarket provision.

In the regional analysis we attempted to refine these indicators and constructed: "Industrial energy consumption per capita" and "Industrial electricity consumption per capita" (INDENERG and INDELECT). These are significantly related to hypermarket provision.

(b) Measurement by employment At the regional level we calculated "percentage employed in industry" for 1970 and 1973 - and, on the argument that in later stages of industrialisation the emphasis shifts to service employment, also "percentage employed in services" 1970 and 1973. Though some of the correlations of these four indicators with the dependent variables are significant, the r values are not high.

(c) Measurement by productivity A third possible approach is to assume that greater "industrialisation" results in higher productivity. At national level the indicators VAWORK 70 and VAWORK 73 ("Value added per worker, dollars" 1970 and 1973) are significantly related to the three hypermarket indicators. The same indicators adjusted for purchasing power, VAWCPP 70 and VAWCPP 73, are not. It is argued that the latter is the true representation.

At the more sensitive regional level, however, both GVAOCCUP ("Gross value added, dollar equivalents, per occupied person 1970") and the similar indicator adjusted for purchasing power, GVAWCPPP are significantly related at high levels of significance to the dependent variables as follows (figures in brackets denote significance levels):

		IHY	SHY
		Inhabitants per hypermarket 1973	Hypermarket selling area per 1000 inhabitants 1973
GVAOCCUP	(n = 49)	-.56(.001)	.66(.001)
GVAWCPPP	(n = 49)	-.53(.001)	.54(.001)

The variance explained is higher than with the "GVA per capita" or similar calculations in the "prosperity" model.

(8) The retail integration model

This was able to be examined at national level only. There is support for an hypothesis that hypermarket growth is linked to levels of "organised" retailing. As was predicted the factor of "association" whether in a legal entity or by voluntary co-operation, is shown as being somewhat more significant than the extent of control of distribution by "legal entities" considered alone.

(9) The retail infrastructure model

It has been suggested that the hypermarket develops by a process of natural trading progression from a base of existing supermarket provision.

There is strong support for this hypothesis. At national level (Appendix 1), "Inhabitants per hypermarket 1974" (IHY74) is correlated almost perfectly with the two indicators of supermarket development exclusive of hypermarkets (ISM74X and ISM74V) with

correlation coefficients of 0.949 and 0.976. At regional level the selling space indicator of hypermarket development (SHY) is highly correlated with the selling space indicators of supermarket development.

Thus: Correlation coefficients

Supermarket provision	Hypermarket provision (SHY)
SSM425X (400 - 2500m^2)	0.66635
SSM825X (800 - 2500m^2)	0.87195
SSM1025X(1000 - 2500m^2)	0.89182

- so that, for example, 80% of the variance in hypermarket development thus measured is accounted for by the level of development of the large supermarket (of from 1000 to 2500 m^2 selling space) - and it accords with the hypothesis that the correlation coefficients increase progressively as the minimum selling-space cut-off point in the supermarket criterion is increased.

It can be argued, therefore, that probably the most potent factor in hypermarket development is the pressure for change exerted by existing self-service and supermarket operators and their public. Since there is little governmental interference in supermarket development, in general, therefore, countries and regions have their rightful place in the hypermarketing world in relation to the decisive factor of existing supermarket provision. Variations in the supposed strictness of planning control for hypermarkets have not affected this significantly.

6.3.3 The Supermarket Analysis

(1) Alternative bases for measurement

An examination of the regional correlation co-efficients in Appendix 2 shows the great difference that changing the basis of measurement from numbers of stores to total selling space of such stores makes to the analysis. The effect of grading supermarkets into size categories is also demonstrated.

(2) The concentration of population model

(a) Measurement by population density None of our three attempted measures of population density is correlated significantly with supermarket provision measured in terms of numbers of supermarkets - i.e. the various "inhabitants per supermarket" and "inhabitants per self-service unit" measures. There is in general, however, significant correlation, in the regional analysis, of these measures when the supermarket variable is exposed in terms of selling area, theoretically the preferable measurement. Of the three population density variables, "Population density of agricultural land" is slightly the best predictor. This accords with the argument of chapter 4. It is methodologically the preferable predictor.

(b) Measurement by degree of urbanisation. In general the comments made in respect of the hypermarket variable regarding these indicators apply also to almost all the supermarket variables. The proxy

indicators "percentage employed in agriculture" are predictive, with the 1968 indicator having most explanatory value. At the national level, "percentage wage and salary earners employed in agriculture" (WAGRIC) is again very highly correlated, and its regional level substitute "percentage heads of households employed in agriculture" (AGRICHOH) is also significant across the range of indicators. "Percentage GDP derived from agriculture" is a useful alternative.

As with the hypermarket, large concentrations of population, however measured, are not shown as significant. As regards the smaller urban units, where we have a sufficient number of regional supermarket observations to justify correlation (i.e. with the ISM425V and the ISM4UPV indicators) the percentage of variance explained increases as the size of urban unit gets smaller. On this evidence large concentrations of population are not essential to supermarket development.

(3) The car ownership and road congestion model

(a) Car ownership At national level the "cars" indicators are significantly related to the supermarket variables. In the regional analysis, only car-ownership 1966 is significantly correlated with all the supermarket variables, and this is in general the best predicator. Where, however, we have the most substantial number of supermarket observations (indicators ISM425V and ISM4UPV) all the "car" indicators are correlated with those variables at the .001 significance level.

(b) Road congestion. At national level, the usually accepted indicator of road congestion "Motor vehicles per kilometre of road" is not significant. The two similar regional indicators are significant in some instances but not in correlation with the main supermarket variables ISM425V and ISM4UPV. This applies also to the four regional indicators of road provision. In this respect, however, the correlation tabulations of the hypothesised significant indicators among these are of interest. RDSQKMMI ("Kilometres of road, minus local roads, per square kilometre of land 1973") and RDSQKMPL ("Kilometres of road, all roads, per square kilometre of land 1973") are not, except in one instance, significantly correlated with any of the supermarket variables expressed in numbers of supermarkets (the variables beginning ISM). When, however, average size and the size categories are taken into account, the picture is as follows (figures in brackets denote significance levels):

	Sales area provision in supermarkets (excluding those in variety and department stores) of					
	400-2500m^2	800-2500m^2	1000-2500m^2	400m^2 & over	800m^2 & over	1000m^2 & over
RDSQKMMI	.02(-)	.5 (.05)	.54(.02)	.33(.01)	.59(.01)	.6 (.01)
RDSQKMPL	.67(.001)	.69(.001)	.73(.001)	.66(.001)	.71(.001)	.7 (.01)
	Sales area provision in supermarkets (including those in variety and department stores) of					
	400-2500m^2	800-2500m^2	1000-2500m^2	400m^2 & over	800m^2 & over	1000m^2 & over
RDSQKMMI	.21(-)	.2 (-)	.18(-)	.46(.01)	.51(.01)	.52(.01)
RDSQKMPL	.46(.01)	.64(.001)	.61(.001)	.43(.01)	.71(.001)	.7 (.01)

Road provision is significantly important where the larger supermarkets are concerned - since there is in general a high degree of correlation with the supermarket indicators expressed in terms of selling space, but not with the supermarkets indicators simply denoting the numbers of supermarkets. The degree of correlation increases progressively as a higher sales area criterion is applied in almost every case: the larger the supermarket the more is adequate road provision important. The indicator of "major road" provision, ROSQKMMI, that we have hypothesised as influentially significant specifically in hypermarket development, becomes progressively more significant up the size categories when hypermarket selling space is taken into account in addition to supermarket space (the indicators containing the letters UP), and, as we have seen, in extension of this it emerges as the dominant partner of the two indicators in the specific "hypermarket" analysis. Road provision is progressively an important factor as the average size of store increases: it is not an important factor for the smaller supermarkets.

(4) The prosperity model

At both national and regional level the "prosperity" indicators (of GNP, GDP, GVA, Disposable Income, Consumption Expenditure) are in almost every instance significantly related to the whole range of supermarket variables, and in the case of the ISM425V and ISM4UPV variables, mostly at the .001 significance level. The corresponding indicators adjusted for purchasing power are also significantly related, and in respect of the two main regional supermarket variables again mostly

at the .001 significance level.

As regards the sensitive "selling space" indicators in the regional analysis, "Disposable income" and "consumption expenditure" are significantly related at the .001 level to all six indicators of the varying supermarket size categories that take into account supermarkets in variety and department stores. The level of significance is in general less in respect of the "space provision" indicators that solely denote free-standing supermarkets. This can be taken as indicating the importance of variety and department store supermarketing in the more prosperous countries.

(5) The "Female Emancipation" model

(1) The working wife Comments made above in respect of the hypermarket are also applicable in general to the supermarket. Nationally XFAM70 is the best predictor, FE156570 the next best. In the regional analysis the latter indicator is the best "workwife" predictor generally of supermarket development. FEMSERV is also usefully predictive - however, with twenty one observations only.

(2) Juvenile dependency Directly calculated dependency (national level only) is not significant. The Birth Rate indicators are generally predictive - and, both nationally and regionally, the earlier-dated indicators (1960 indicators in the national analysis, 1966 in the regional) are in almost every case the preferable predictors. These indicate probable average number of young children

(under age 14 and under age 7 respectively) and are on this evidence a better guide than current birth rate. The indicator "Average number of persons per household" (HHOLDS in the regional analysis) is generally significant, the significance levels being progressively higher accordingly as the supermarket variables have more observations.

(3) Female education EDUC1869 is significant with all but one of the national supermarket indicators.

(4) Convenience - durable ownership Refrigerator ownership 1978 and HDF ownership 1974 are significantly related to all the national supermarket indicators. In the regional analysis, non-coinciding gaps in the data mean that for most indicators we have no observations to correlate. The potential importance of the refrigerator indicator, however, is suggested in those instances where correlation is possible. It is not significant in its relationship to general supermarket provision. Considering only the large supermarkets, however, (those of at least $800m^2$ and $1000m^2$ respectively) it is found that the relationship with refrigerator ownership here is very high - with coefficients of 0.92, 0.90, 0.94 and 0.93 when correlated with ISM825V, ISM1025V, ISM8UPV, and ISM10UPV respectively. Admittedly the number of observations in each of these matrix cells is only 9 (the eight regions of France and Northern Ireland) - but it does suggest a logical connection and indicates the possible direction of further research if more extensive data can be obtained.

At national level, vacuum cleaner ownership is generally predictive.

6. The labour model

Although in the national analysis the correlation of unemployment with the supermarket variables is not significant, in the more sensitive regional analysis this factor assumes great importance showing in general high levels of correlation. Taking the case of our most substantial supermarket variables, the single factor of level of unemployment explains 74% of the variance in ISM425V ($r = 0.86033$) and 73% of the variance in ISM4UPV ($r = 0.85705$). This is based on 52 observations.

7. The Industrialisation model

(1) Measurement by energy and steel consumption Nationally, the three types of indicators (energy, steel and the energy/steel index) are all correlated significantly with the supermarket indicators. Reciprocal transformation increases the extent of explanation provided by the "energy" variables: the r value of the correlation of ENERGY71 with ISM74X, for example, is increased by reciprocal transformation from the 0.808 shown in Appendix 1 to 0.951. These figures need to be treated with caution: they are based on only 14 observations.

Our more precise indicators at regional level - those of industrial energy and industrial electricity consumption - are significantly related to most supermarket variables, not however at this high level

obviously not, since N in these cases = 47 and 51 respectively.

(2) Measurement by employment The regional level indicators of percentage employment in industry and in services are related to the supermarket variables as noted in Appendix 2. In the case of the supermarket variable containing most observations, ISM4UPV, the relationship is in each case significant at the .001 significance level.

(3) Measurement by productivity "GVA per occupied person" is significant with all supermarket variables.

8. The retail integration model

Comments made in respect of the hypermarket apply to the supermarket indicators also.

6.4 REGRESSION ANALYSIS OF REGIONAL DATA

The regional data were subjected to forward stepwise multiple regression. Variables from each hypothesised dimension were selected for consideration given that each contained a requisite number of observations. The number of usable observations in the regression analysis was reduced in order to permit the inclusion of "unemployment" as a variable. This also permitted the inclusion of CARS66 - an indicator preferred to CARS70 or CARS73. The constituents of the resultant formulae are given in Table 6.2. These have been computed only for those dependent variables

TABLE 6.2 REGIONAL ANALYSIS: REGRESSION

VARIABLES SIGNIFICANT @ 95% LEVEL

( ) = STANDARD ERROR OF B

Variables explained overleaf.

DEPENDENT VARIABLE	N	REGRESSION COEFFICIENTS (B) FOR INDEPENDENT VARIABLES CONSTANT	POPAGRIC	AGRIC %70	CARS 66	DISPINC	FECV 1564	UNEMPLOY	% VARIATION EXPLAINED
IHY	43	917.12				-1.93 (0.69)	-90.05 (42.92)	1124.8 (200.7)	60.62
SHY	38	32.12		-3.83 (4.07)		0.07 (0.04)		-31.19 (13.99)	28.54
ISM425X	25	9364	-0.74 (0.7)	56.24 (29.73)	-18.32 (6.93)			412.7 (100.2)	80.36
ISM425V	43	-233						247.9 (22.94)	74.02
ISM4UPX	34	4326		69.35 (23.2)	-14.70 (5.72)			350.2 (90.2)	74.21
ISM4OPV	52	-240						232.0 (19.7)	73.45
SSM425X	25	-534	9.72 (0.05)	-3.64 (1.5)		0.25 (0.02)	3.62 (0.89)	-8.2 (3.6)	89.14
SSM425V	33	-632	0.54 (0.12)			0.36 (0.05)		-21.5 (8.62)	69.07
SSM4UPX	25	154	0.26 (0.07)			0.16 (0.07)			44.29
SSM4UPV	33	-5.11				0.23 (0.06)		-33.6 (16.32)	54.14
ISM825V	28	6432		92.5 (30.4)	-19.6 (7.7)				41.34
ISM8UPV	28			92.5 (30.4)	-19.9 (7.7)				42.16
SSM825V	23	-136	7.23 (0.07)			0.15 (0.03)			62.12
SSM8UPV	23	76.2				0.16 (0.07)		-43.7 (18.9)	51.39
ISM1025V	23	-1171						887.7 (168.4)	56.51
ISM10UPV	23	-1209						881.8 (168.5)	56.6
SSM1025V	23	-44.2	0.17 (0.04)			0.37 (0.07)	3.7 (1.6)	-13.2 (5.92)	81.74
SSM10UPV	23	87.3				0.14 (0.06)		-41.1 (18.3)	47.36

TABLE 6.2 continued: Explanation of variable codes

IHY - Inhabitants per hypermarket.

SHY - Hypermarket selling area per 1000 inhabitants

ISM425X - Inhabitants per supermarket of 400 - 2500m^2 exclusive of supermarkets in variety and department stores.

ISM425V - (ISM825V, ISM1025V) Inhabitants per supermarket of of 400-2500m^2 (800-2500m^2, 10,00-2500m^2) inclusive of supermarkets in variety and department stores.

ISM4UPX - Inhabitants per self-service unit 400m^2 and over, excluding supermarkets in variety and department stores.

ISM4UPV - (ISM8UPV, ISM10UPV) - Inhabitants per self-service unit 400m^2 (800m^2, 10,00m^2)and over, including supermarkets in variety and department stores.

SSM425X - selling area per 1000 inhabitants in supermarkets of 400-2,500m^2, excluding supermarkets in variety and department stores.

SSM425V - (SSM825V, SSM1025V) - selling area per 1000 inhabitants in supermarkets of 400 - 2,500m^2 (800 - 2,500m^2, 10,00 - 2,500m^2) including supermarkets in variety and department stores.

SSM4UPX - Selling area per 1000 inhabitants in self-service units of 400m^2 and over, excluding supermarkets in variety and department stores.

SSM4UPV - (SSM8UPV, SSM10UPV) - selling area per 1000 inhabitants in self-service units of 400m^2 (800m^2, 10,00m^2) and over, including supermarkets in variety and department stores.

POPAGRIC - Inhabitants per km^2 agricultural land.

AGRIC % 70 % labour force employed in agriculture.

CARS 66 - Cars per 1000 inhabitants, 1966.

DISPINC - Disposable income (dollars) per inhabitant.

FECV1564 - Females in civilian employment as % of all females aged 15-64.

UNEMPLOY - Unemployed as % total labour force.

for which the minimum number of observations exceeded twenty.

6.4.1 Hypermarket analysis

It can be seen from Table 6.2 that we can predict by regression the relative numbers of hypermarkets (IHY) with a great deal more accuracy than we can predict the relative total hypermarket selling space (SHY). 71.5 per cent of the variation in SHY remains unexplained, as compared with only 40 per cent in IHY. Partly for this reason alternative methods of analysing SHY were sought. (See AID analysis, under).

Surprisingly, since it is contrary to most hypermarket hypotheses, the "CARS" indicator is not by regression analysis shown as significant. Hypermarkets as such preferentially develop, according to this analysis, in regions characterised by high disposable income and a significant level of "working" females, where retail labour is short, as denoted by labour shortage in general, as signalised by low unemployment rates. The larger hypermarkets, but not necessarily the small, characteristically develop in non-agricultural regions, as measured by "percentage of labour force employed in agriculture etc 1970" (AGRIC % 70). This is predictive of SHY that takes into account store sizes, while not predictive here of hypermarkets expressed in terms of numbers only.

The analysis in Table 6.2 is based on socio-economic and demographic variables only. We have suggested, however, that probably the main determinant of hypermarket provision is the degree of existing and prior supermarket provision. Accordingly additional regression runs

were made incorporating ISM4UPV (Inhabitants per self-service unit of $400m^2$ and over, including supermarkets in variety and department stores. 1.1.1973") as an additional independent variable. This particular indicator was chosen since it contains the largest number of observations. Although this indicator includes hypermarket units, it is based on numbers of units and not selling space and the proportion of hypermarket units in any region is very small compared to the total number of all units over $400m^2$ and does not appreciably affect this indicator as being a measure of supermarket development: the correlation of ISM4UPV with ISM425V (which is exclusive of hypermarkets) is 0.99992.

By incorporating ISM4UPV, the variance explained in IHY is increased from 60.62 per cent to 62.68 per cent. It is not significant, however, as helping to explain SHY in this analysis.

6.4.2 Supermarket (plus self-service unit) analysis

Significant variables and degree of explanation of variation are noted in Table 6.2. There is in general a high level of prediction of the supermarket proper - the supermarket exclusive of units over $2500m^2$. In these cases, in general the percentage explanation of variation is greater where the dependent variable is expressed in terms of selling space (SSM425X, SSM425V, SSM825V, SSM1025V). Methodologically also these are the preferable dependent indicators.

The dominatingly significant variable is UNEMPLOY ("Unemployment as percentage of total labour force. Annual average 1965-1973"). It is significant in all but four of the sixteen regression equations predicting supermarket development. In the case of the combination of dependent and independent variables for which we have the most observations, the ISM425V and ISM4UPV regressions, it is the sole significant (negative) predictor and by itself explains 74 per cent and 73 per cent respectively of the variation. We have hypothesised the "push" factors of the shortage of labour and cost of labour as important factors propelling the retail operator to self-service and thence to larger self-service operation. The emerged importance of the proxy measurement of this factor supports this as a prime determinant.

The level of disposable income (DISPINC) is a significant component in all the eight regressions on the supermarket dependent variables that measure the precise "supermarket selling space per 100 inhabitants", the dependent variables beginning SSM. These are inherently the sensitive regressions.

Studying Table 6.2, however, it can be seen that the ability of the regression routine to predict is not good in the case of the prediction of the self-service unit expressed in terms of selling space and inclusive of hypermarkets (SSM4UPX, SSM4UPV, SSM8UPV, SSM10UPV). Here the proportion of total selling space held by hypermarkets is substantial.

Taking the extreme cases, the regression formula predicting SSM10UPV (which is inclusive of hypermarkets) is explanatory of only 47% of variation, as compared with the 83% explanation of the variation in SSM1025V (which is exclusive of hypermarkets); and similarly the explanation of SSM4UPX is only 45% as compared with the 92% explanation of SSM425X. The relative inability, which has been noted above, of linear regression to predict hypermarket selling space is reflected to this extent in the "supermarket" analysis also. An alternative method of predicting this factor was employed. This is examined in chapter 7.

References Chapter 6

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(2) TANBURN J People, Shops and the 70s Lintas Special Projects 1970

CHAPTER 7

AID ANALYSIS

7.1 Correlation and regression can throw light only on the statistical generalisations that can be made taking into account the whole span of the dependent data. An examination of the raw data, however, suggests that one combination of socioeconomic factors may be an important determinant in some regions while a different combination of factors may be important in others. As the final stage of the analysis therefore, the regional data were subjected to Automatic Interaction Detector (AID) analysis. This method of analysis has the ability to show what factors or combinations of factors which do not necessarily affect all regions nevertheless affect a certain number of those regions.

For the AID programme the independent data are grouped. The programme then considers the means of each of these combinations of predictor variables, and divides the sample through a series ofbinary splits into mutually exclusive subgroups, so that the means of the groups thus formed account for more of the total sum of squares than the means of any other combination of predictor variables.

In order to increase the number of input variables above the number for which we had the full total of 68 observations (and in particular, in order to include "unemployment" as input) estimates were made of missing regional data in the following indicators:

UNEMPLOY (% unemployment) previously 52 observations

MVSROADM (motor vehicles per km major road)previosly 66 observations

RDSQKMM (major roads per km^2) previously 66 observations

RDSPOPM (major roads per 1000 population) previously 66 observations

CARS 66 (car ownership 1966) previously 63 observations

The estimates were made by taking the relevant national figures for each country for the years in question and weighting the regions within each nation around this national mean in the light of unquantified information as to the proportionate incidence inter-regionally of, for example, unemployment or motor vehicles per km road. The resultant estimates are considered usably accurate.

Before considering the results of the analysis, it is necessary to evaluate the distinctive use to which AID is put in this particular research, and to relate this to its context of the controversial aspects inherent in the use of AID as such.

7.2 AID ANALYSIS USING AGGREGATE DATA

7.2.1 It is not believed that AID analysis has previously been used to deal with this type of aggregate data. Previous use has almost entirely been concentrated on the group behaviour of individuals. In the marketing field, AID has been used to investigate, for example, brand purchasing behaviour (1), the duration of the purchase decision process (2), time spent reading popular Sunday papers (3), consumer expenditures on durable goods (4), patronage of a national grocery chain (5). A partial exception is the Gallup Poll model for retail site location, in which the data input is aggregate in respect of specific catchment areas only (6,7,8). The Gallup Poll use of AID is different to its use in

this research. This is referred to below. In a wider context, Sonquist lists, in a "partial bibliography of research reports and citations referring to AID or MCA", a total of 37 applications (9). None of these uses aggregate data.

There are problems in the use and interpretation of AID as such. These problems are different in degree and the expectations are different in this present research using international aggregate data.

7.2.2 The Question of Sample Size

There is a considerable difference between what is expected of the AID analysis and its interpretation in this present study and the expectations and interpretation where a sample of individuals constitutes the cases.

Inputting data that are a sample of a vastly larger population, it is essential that the sample size be adequate to be able to sustain successive splits of these data - so that the progressively diminishing sample sizes are still large enough to be meaningful as representing the total population. Sonquist, Baker and Morgan (10) warn that a thousand cases or more are necessary, "otherwise the power of the search processes must be restricted drastically or these processes will carry one into a never-never land of idiosyncratic results". Doyle (11) argues that, if the search technique is to be validated, that number should be doubled.

The aggregate data used in this present research, however, are not a sample in this sense. They are obviously a sample to the extent that they are not in respect of every region of Western Europe. Spain,

Portugal, Finland and Luxembourg are not studied at regional level in this research. Of the countries studied, The Netherlands, Austria, Germany and Switzerland are excluded from the first AID hypermarket analysis; Netherlands, Austria and Germany from the second; Switzerland from the supermarket analysis. However, it is not claimed that the AID analyses represent the position throughout Europe. It is claimed that they represent the situation as at 1973 in the countries whose regions are thus analysed. The universe in the first AID "hypermarket" analysis is the totality of the 47 regions of Italy, Denmark, Ireland, Belgium, France, Norway, Sweden and the U.K. In the second AID "hypermarket" analysis, the universe is these regions plus the five regions of Switzerland. In the "supermarket" analysis the universe is the regions of all the twelve countries studied except Switzerland.

The identity of each region at each stage of a particular AID analysis can be ascertained. It is useful and important to do this. The identity of any one individual in a sample of individuals representative of a large population is of no importance at all. And we know no more, and care no more, about him than what is contained in the data.

A full analysis will take into account the possible effects of any marginal splits (these are considered below) and the degree of decisiveness of the splits. If this is done, and, at the end of each analysis, we are still able to discern a coherent pattern in the data, then we are justified in saying that "These are the relationships between this particular distribution development and the environmental factors as these existed in 1973 in the regions of these particular eight or nine

or eleven (as the case may be) countries of Europe, to the extent of their being hypothesised and within the limits of measurement.

This is valuable information in itself. It is not essential to generalise the findings to the regions of Europe not included in the AID analysis. In dealing with a sample of responses from individual persons the same quite obviously is not true. They are meaningless unless they reflect the responses of a vastly wider universe. Gordon Simmons Research Ltd. (5), for example, used AID analysis on behalf of a national supermarket chain in the attempt to predict the porportion of a customer's grocery budget that would be spent at the stores of that chain, in respect of different categories of customers. Of the 13 predictor variables, ten were of "store image". The total of customers of that retail chain is counted in millions. An analysis based on the Gordon Simmons' sample of 1023 shoppers is valueless unless the behaviour of these 1023 people can validly represent the behaviour of that universe.

The parallel case using aggregate data would be this: An independent shopkeeper on an isolated island of 80 inhabitants has therefore a maximum of 80 customers who shop at his store. He might question these customers to try to find out what distinguishes those who patronise him very seldom from those who give him all their custom. If he finds that the ten or even five customers who use his shop the least all have the same characteristics, that is important information to him in its own right. It is irrelevant for him to generalise these findings to "shop customers" in general. He <u>has</u> no other potential customers. The analogy with the type of aggregate data research in this project is to this extent exact.

If he is only able to question 60 of the 80 inhabitants, his research findings, if valid, apply unarguably to 60 of his 80 potential customers. If he had been able to question the remaining twenty customers, or even ten of these, this obviously might have weighted his conclusions in one direction or another (with such a universe it almost certainly would); but it would not be a great leap into the hypothetical if he took the customer profiles revealed by his research to be probably typical of his customers.

The total number of regions used as inputs to the general regional analysis is 68. If "marketing regions" had been constructed for those countries not in fact included in the regional research programme, these could have been expected to have provided, on the basis of their populations, an additional eleven regions (Portugal, 3; Spain, 5; Finland, 3; Luxembourg could not have been included, since hypermarkets and supermarkets are banned there by law). The total universe of Western European "marketing regions" is therefore approximately 79. The AID analyses use as cases respectively 47, 52 and 63 of these regions. At the lowest level of data input, the number of cases represents over half the maximum Western European universe; at the best it constitutes over three quarters. It is a matter of regret, in particular, that the German regions, if the data were to be properly compared with those of other regions, were not able to be included in the hypermarket research. The inclusion of the eleven German regions might have weighted, or even presumably altered, the findings. Nevertheless, to the extent that the research findings are valid, they are applicable to the regions of most countries of Western Europe. And, in drawing conclusions from this research, this project does generalise these findings and takes them as probably typical of the situation generally in Europe.

Obviously where the sub-group number of regions becomes very small (three, for example, in the most extreme instance), any generalisation, even in the conditions noted, becomes very dangerous indeed. It still remains valid, however, to state that in these regions, which are named, the following conditions existed. This observation is of interest. Doyle (11), in criticism of Heald and Gallup Poll, says that "few statisticians would be prepared to generalise on samples of three or four!". In international aggregate data analysis, if the universe is taken as being the countries included in the particular analysis, there is no question of a sample and there need be no question of generalisation. And, if the universe is taken as being Western Europe, one can say: "This supports (or does not support, or modifies) the hypothesis. It follows the logic of the preceeding splits. It may, of course, only apply to these three regions" - although, as regards the proviso, it needs to be said that, in this research, a sub-group of ten cases represents one eighth of the maximum Western European universe.

A small number of total cases presents, of course, a statistical problem. The AID programme is based on our examination of the means of possible sub-groups. The larger the number of cases the more reliable is the mean. Sonquist, Baker and Morgan (10) note that the least squares criterion being used is very sensitive to extreme cases, and that "cases in sub-groups can appear extreme even if they don't in the full sample". This is obviously true. Nevertheless, if a sub-group of , to take the most extreme example, six cases contains one very extreme case, the sub-group will split one and five, not three and three. And, in fact Sonquist and his co-researchers take the former type of split as a warning that a sub-group contains one or two extreme cases. The AID analysis trees

in this research contain few examples of this type of extreme and unbalanced splitting.

The inclusion in the analysis of five or six of the currently missing regions might, of course, affect the terminal relationships considerably, even though the effect on the preliminary splits might be slight. If we are generalising to all the regions of Western Europe, any generalisations derived solely from some of the terminal boxes of the tree need to be offered very tentatively indeed, and identified by region. That basic principle is obviously correct.

7.2.3 The Question of Intercorrelated Predictors and Predictors of Amost Equal Importance

Many of the predictors of the AID analyses are intercorrelated. Some are designedly so. "Gross value added per inhabitant" is obviously very highly correlated indeed with "gross disposable income of households per inhabitant". Both, however, are used in this research as marginally different indicators of individual prosperity. The reason that both are included is simply to ascertain which of the two might be marginally preferable in any subsequent analyses. The three "cars" indicators and the two "female employment" indicators are in this category. The indicators within these sets are treated in the main as synonymous when it comes to interpreting the data.

Between indicators expressing different concepts, however, the question is different. Some of these are intercorrelated. The AID programme might split on one that is perhaps only marginally more explanatory. In this case, the correlates of this predictor are subsequently less likely to be chosen. Therefore, as Doyle and Fenwick have emphasised, "exclusion does not necessarily imply insignificance". (3)

A correlation matrix for the predictor varaibles is given in Table 7.1. Where there is no overall intercorrelation, however, this is not to say that intercorrelation may not occur between predictors in a split sub-group.

Additonally, there may be no intercorrelation, but nevertheless two or more predictors may be similar in importance as judged by the Between Sums of Squares/Total Sums of Squares (BSS/TSS) ratio. If, in respect of a particular split, the difference in Between Sums of Squares between competing predictors is marginal, the the choice of a predictor label to explain that split is marginal - and, particularly if the predictors concerned are <u>not</u> highly correlated, we have no assurance that the tree subsequent to the split is stable; "clearly another set of data might have produced different results", (10). If, in particular, the first split in the programme is made on the basis of a marginal difference in BSS as between two predictors then "had the programme split by the second variable, the subsequent tree diagram might have been totally different" (1). What is not, or rarely, emphasised is that a possible alternative tree that is radically different <u>in respect of the cases that are assigned to the different sub-groups</u>, as opposed to the diagnostic labels assigned to the boxes, is more likely to occur when two predictors that are almost equal in their power to discriminate are not themselves intercorrelated.

Table 7.1 Correlation matrix of the predictor variables in the AID analyses

Variable description	Variable Code	ISM4UVP	POPAGRIC	POPDENS
Supermarket provision	ISM4UPV	1.000		
Population density agricultural land	POPAGRIC	-0.075	1.000	
Population density	POPDENS	-0.089	0.950	1.000
% in agriculture	AGRIC 70	-0.641	-0.188	-0.323
% in towns > 250,000 inhabitants	TOWNS 250	-0.102	0.510	0.534
% in towns > 1000 inhabitants	TOWNS 100	-0.095	0.510	0.560
Car-ownership 1973	CARS 73	-0.463	-0.071	-0.079
Car-ownership 1970	CARS 70	-0.517	-0.056	-0.063
Car-ownership 1966	CARS 66	-0.566	-0.038	-0.019
Motor vehicles per km major road	MVSROADM	-0.106	-0.977	0.971
Major roads per km^2	RDSQKMM	-0.002	-0.042	0.000
Major roads per 1000 population	RDSPOPM	-0.077	-0.139	-0.302
Gross value added p.c.	GVAHAB	-0.533	0.132	0.151
Disposable income p.c.	DISPINC	-0.441	0.095	0.083
% unemployment	UNEMPLOY	-0.857	-0.127	-0.160
Females aged 15-64 working	FECV1564	-0.526	0.129	0.131
Females % labour force	FELF	-0.474	0.212	0.195
Birthrate 1973	BIRTHS 73	-0.361	-0.260	-0.293
Household size	HHOLDS	-0.489	-0.377	-0.406

	AGRIC 70	TOWNS 250	TOWNS 100	CARS 73	CARS 70	CARS 66
AGRIC 70	1.000					
TOWNS 250	-0.312	1.000				
TOWNS 100	-0.392	0.902	1.000			
CARS 73	-0.317	0.071	0.062	1.000		
CARS 70	-0.395	0.114	0.095	0.464	1.000	
CARS 66	-.057	0.150	0.151	0.823	-0.417	1.000
MVSROADM	-0.299	0.574	0.587	-0.094	-0.133	-0.192
RDSQKMM	0.062	-0.157	-0.173	-0.094	-0.133	-0.192
RDSPOPM	0.342	-0.318	-0.426	0.174	0.206	0.150
GVAHAB	-0.548	0.291	0.264	0.561	0.662	0.715
DISPINC	-0.417	0.197	0.161	0.477	0.556	0.581
UNEMPLOY	0.650	-0.113	-0.110	-0.604	0.626	-0.617
FECV1564	-0.502	0.254	0.209	0.489	0.630	0.794
FELF	-0.441	0.296	0.251	0.405	0.528	0.668
BIRTHS 73	0.400	-0.089	-0.161	-0.537	-0.504	-0.418
HHOLDS	0.577	-0.401	-0.398	-0.590	-0.644	-0.685

	MVSROADM	RDSQKMM	PDSPOPM	GVAHAB	DISPINC	UNEMPLOY
MVSROADM	1.000					
RDSQKMM	-0.154	1.000				
RDSPOPM	-0.258	0.029	1.000			
GVAHAB	0.123	-0.085	0.162	1.000		
DISPINC	0.043	0.039	0.241	0.907	1.000	
UNEMPLOY	-0.157	-0.142	-0.076	-0.628	-0.471	1.000
FECV1564	0.190	-0.378	0.036	0.710	0.539	-0.578
FELF	0.262	-0.481	0.038	0.657	0.459	-0.535
BIRTHS 73	-0.338	0.127	0.161	-0.440	-0.317	0.513
HHOLDS	-0.452	0.242	0.052	-0.732	-0.580	0.623

	FECV1564	FELF	BIRTHS 73	HHOLDS
FECV1564	1.000			
FELF	0.911	1.000		
BIRTHS 73	-0.338	-0.372	1.000	
HHOLDS	-0.638	-0.649	0.704	1.000

Nevertheless, the programme print out of all BSS/TSS ratios enables us to identify at each split the precise extent to which a selected predictor is more discriminating than its nearest competitors. This is essential information if one wishes to make any judgment as to the probable stability of the tree, or interpret the tree. The relevant figures are given below in respect of each analysis. The problem of marginal difference in BSS is discussed in much of the literature, but it is not believed that any previous published description of any AID analysis has detailed these differences by quoting the BSS/TSS ratios of possible candidate predictors at each split (or even at the critical initial splits). One would suggest, however, that, without this, it is impossible to interpret meaningfully any AID analysis.

7.2.4 The Question of Measurement Errors

As the number of cases per sub-group is progressively decreased by the programme, so the liability to distortion caused by measurement errors becomes more pronounced. Sonquist (9) and Doyle and Fenwick (3) emphasise the factor of measurement error distortion. The principle focus of the regional research has been on comparability and valid and accurate measurement. As one consequence, a considerably larger number of possible cases has been sacrificed. All data were originally compiled in respect of a total of 233 minor regions in the countries studied. On examination, however, it was found that in many of these minor regions hypermarket locations, for example, were peripheral: relating these to environmental data that excluded the environmental data of the bordering region or regions would be to distort the relationships. In consequence the minor regions were aggregated into "marketing regions" - reducing measurement errors to a minimum at the expense of data quantity. It is argued that

it is the insistance on the predominant importance of accurate measurement in this trade-off that has produced coherent research results.

7.2.5 The Question of the Limitation of Dichotomising the Data

The programme relies on dichotomous splits; but a three or four-way split might have reduced the unexplained variance more than a two-way split. "This problem is partially resolved in that the program can split the same variable at the next iteration" (1). This is what happens in certain of the analyses of this research, producing in these instances in effect trichotomous splits. Nevertheless, the initial choice of variable was on the basis of a two-way split. Had a three-way split been possible to the programmes at this first stage, an alternative variable might have been selected in preference. This we cannot know.

7.2.6 The Question of Objectives

What can be exprected of an AID analysis has generated controversy. Basically the process is "descriptive", though that term has no precise meaning. The original Gallup Poll researchers, noting that AID "tends to be rather more descriptive than analytical" (6), nevertheless drew very precise and quantified conclusions from their AID model for retail site location - as did Heald when representing these data (7,8). Regardless of the suspect direction of influence in the Gallup model (12) the main objection to it that has been raised is that it is used as the basis for the specification of precise statistical relationships. The Gallup researchers started with no precise hypotheses (although the act of including an indicator implies an hypothesis). Variables chosen for inclusion in the AID programme were the six most significant as produced by the regression of 53 factors. Doyle has challenged the statistical

validity of this method of selection and also the procedure sequence. He is categorical that the use of AID is in suggesting the form of the relationships as a preliminary to regression analysis (11) - and he notes elsewhere that there are virtually no published AID applications in which AID is in fact so used (3). If not used as a preliminary to regression then alternatively, Doyle and Fenwick suggest, AID is used correctly if treated as "a simple descriptive device" (3).

"Descriptive" and "analytical", however, are relative terms. It is not arguable that AID is not more descriptive than it is analytical in the formal sense: unrepresented variables may be significant; net effects are not obtained; splits may be made on the basis of marginal difference in discrimination as between predictors. Nevertheless, if these factors are taken into account (and, in the case of the last factor, the degree of difference published), then the AID process has a very considerable and very valid power to support, clarify or modify an hypothesis.

Staelin states that the AID researcher, working with a sample, has "inductively searched for new hypotheses" (2). Where the cases constitute the universe he has done more than this. AID analysis can tell the truth. Certainly where the sample is also the universe it does tell the truth as in that instance. It can never tell the whole truth. There are alternative relationships that remain unexplored. This does not detract from the more exact description provided by AID of those relationships it has the ability to investigate.

This is exemplified below. This is what is expected of it in this research.

7.3 THE AID ANALYSES

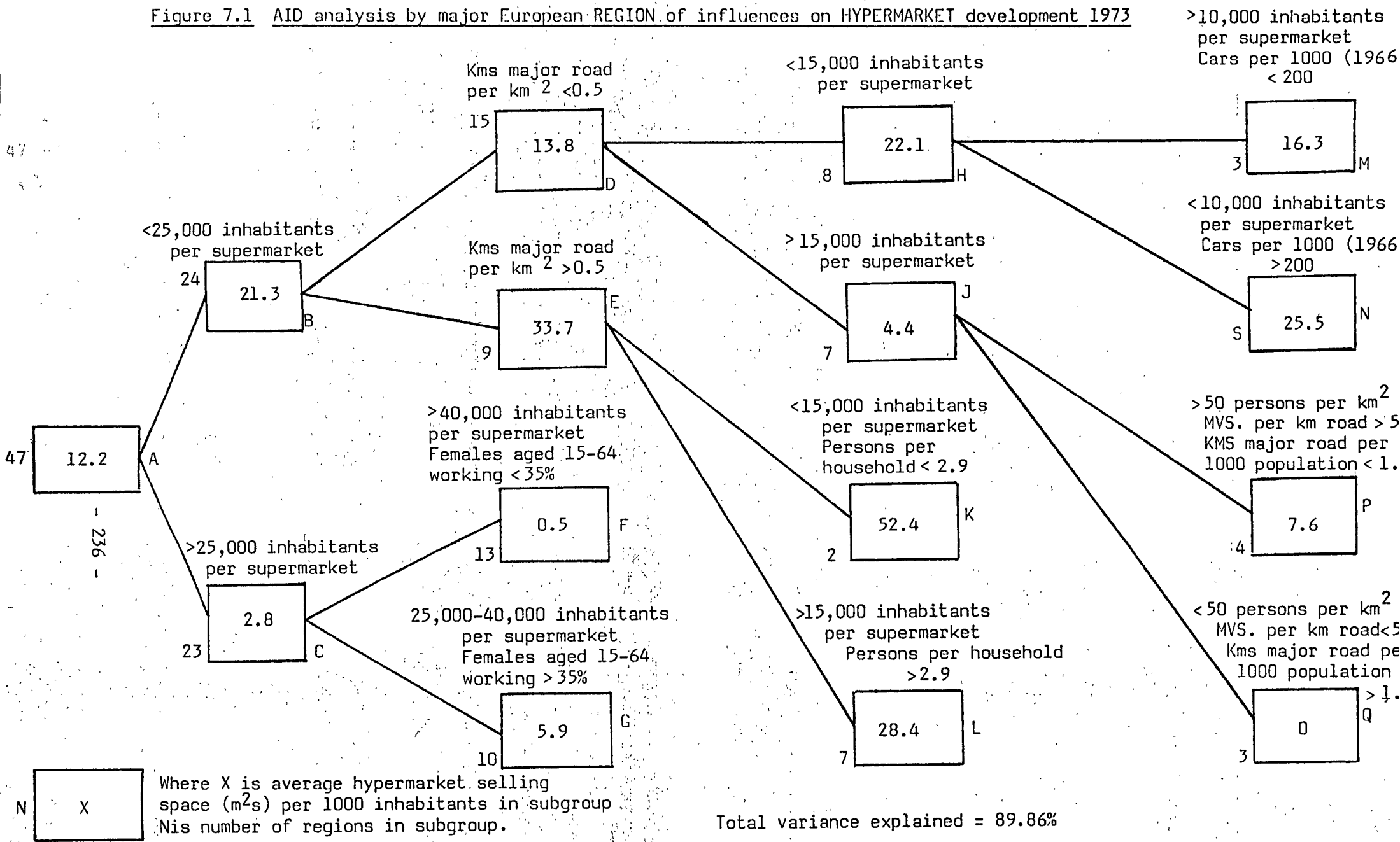
7.3.1 AID Analysis : The Hypermarket - Analysis 1

The dependent variable chosen for analysis is SHY ("Hypermarket selling area per 1000 inhabitants 1973"). This was preferred as the unit of analysis for two reasons; (1) It is methodologically preferable to IHY, (2) It was predicted with much less accuracy than IHY by the regression procedure. On the argument that correlation has indicated the level of existing supermarket provision as being a major predictor of hypermarket provision, the supermarket indicator ISM4UPV was included in the first hypermarket AID run as an independent variable. The results of this AID analysis are shown in Figure 7.1.

It can be seen that the primary and crucial split is in fact made on the basis of existing supermarket provision: those regions that possess few supermarkets (less than one for every 25,000 inhabitants - subgroup C) have an average total hypermarket selling space of $2.8m^2$ per 1000 inhabitants; those regions that have more than one supermarket per 25,000 inhabitants (subgroup B) have an average total hypermarket selling space of $21.3m^2$ per 1000 inhabitants. This split is of particular interest in that it divides the sample into equal halves - and this split alone explains 41% of the total variation in hypermarket provision.

Sub-group C (low supermarket provision/low hypermarket provision) in turn sub-divides on the same criterion, this time at a yet lower level of supermarket provision, in conjunction with an alternative criterion that is equally discriminating - that of the female activity ratio for females of working age 1973. Where existing supermarket provision is very low

Figure 7.1 AID analysis by major European REGION of influences on HYPERMARKET development 1973



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Where X is average hypermarket selling space (m^2s) per 1000 inhabitants in subgroup
Nis number of regions in subgroup.

Total variance explained = 89.86%

(less than one supermarket for every 40,000 inhabitants) in these regions the percentage of working females is also low, and hypermarkets are, in consequence it may be argued of these two factors, virtually non-existant (an average of $0.5m^2$ per 1000 inhabitants). In regions where supermarkets are more developed and the female activity ratio thus measured is over 35 percent, the similar average is $5.9m^2$ of hypermarket selling space per 1000 inhabitants. The split is again into almost equal halves, again decisive.

Group B (above average supermarket provision and in general above average hypermarket provision) can be further subdivided into those regions with a major road network less dense than the European average (Group D) and those with a road network density above the average (Group E) - 0.5 kms road per km^2 of territory being approximately the European average. Hypermarkets are more prevalent in the latter regions, in the ratio of 2.5 to 1.

Where the major road network is dense (Group E) and also where it is not (Group D), regions in both these secondary sub-groups can be further distinguished, yet again on the basis of the supermarket infrastructure but now at a higher level of provision: the split in both instances is at 15,000 inhabitants per supermarket. The split of sub-group D is again categorical. Conditions are more conducive to hypermarket development by a ratio of five to one where supermarket provision is high in such circumstances. Group H (many supermarkets) consists of the three regions of Denmark plus the five regions of Sweden. Of the two countries Sweden has the higher level of hypermarket provision. The splitting of this group in Group M (the three Danish regions) and Group N (the five

Swedish regions) indicates that the reason for this difference is a yet further difference in existing supermarket levels combined with a difference in car-ownership levels.

Where, at the tertiary level of the analysis, supermarket provision is not high (Group J), the combined factors of road provision, road usage and population density are crucial. Where the population is small compared to the provision of major roads (indicative of a sparsely populated country and lack of road congestion - the opposite in effect of the conditions described in Box E), then in 1973 hypermarkets did not develop at all. The regions thus isolated are three of the four Norwegian regions.

Concentrating on the optimal path, however, we have already noted that Group E is further sub-categorised by the programme on the basis of the extent of supermarket provision. The regions involved, however, split identically on the basis of one of the indicators of juvenile dependency - the number of persons per household. The sequence of conditions most favourable to hypermarket development terminates thus in cell K, the final decisive factors being a high level of supermarket provision and the small size of the average household unit, arguable therefore the factor of the "emancipated" housewife consumer with fewer family ties. The two major regions thus highlighted are Belgian regions - The Walloon region and Brabant.

In summary, without an infrastructure of supermarket development, hypermarkets will not develop on any appreciable scale. Where this infrastructure exists, then the emergence of hypermarketing on a

considerable scale is higher where the density of major road networks is high. Where this is so and the number of children in the average family is small and supermarkets are highly developed, conditions are most conducive of all to hypermarket growth. In regions of low road density, however, considerable hypermarket development is possible where the supermarket infrastructure is very highly developed and car ownership is high.

The predominant and pervasive importance to hypermarket development of the existing supermarket infrastructure is dealt with further in Chapter 8.

Ther terminal location of regions is as follows, (Subgroup reference letters refer to subgroups in Figure 7.1):

Subgroup F.	The eleven Italian regions, Ireland excluding the Eastern Planning Region, North Trade Region (Norway).
Subgroup G.	Centre-Est (France) all the United Kingsom Standard Regions excluding West Midlands and Northern Ireland.
Subgroup K.	The Walloon Region, Brabant (Belgium).
Subgroup L.	The Flemish Region (Belgium), Bassin Parisien, Nord, Est, Ouest, Sud-Ouest, Meditarranee (France).
Subgroup M.	The three Danish Regions.
Subgroup N.	The five Swedish Regions.
Subgroup P.	Region Parisienne (France), West Midlands, Northern Ireland (UK), the Eastern Planning Region of Ireland.
Subgroup Q.	East Trade Region, Central Trade Region, West Trade Region (Norway).

The ignored importance of examining the BSS/TSS ratios of possible candidate predictors at each split has been emphasised in section 7.2.3 above. This information in respect of this analysis is given in Table 7.2. It is seen that there are no examples of highly marginal splitting.

Table 7.2. AID Analysis : The Hypermarket I.
BSS/TSS Ratios of Candidate Predictors at Each Split.

Sub-group being split	BSS/TSS ratios of candidate predictors		
	Predictor/s selected	Predictor/s 2	Predictor/s 3
A	0.41286 Inhabitants per SM	0.33477 Roads per km^2	0.27816 Disposable Income
B	0.42728 Roads per km^2	0.26963 Towns of 100,000	
D	0.68617 Inhabitants per SM	0.67003 Cars 1970 Cars 1973	0.63753 GVA per inhabitant Females working Household size
E	0.70119 Inhabitants per SM	0.63952 Disposable Income	
C	0.33562 Inhabitants per SM Females working	0.32961 Females in labour force	0.28894 Unemployment
H	0.54280 Inhabitants per SM Cars 1966 Cars 1970	0.36078 Population density Roads per km^2	
J	0.40043 Population density Roads per population MVS per km road	0.38811 Roads per km^2 % in agriculture	

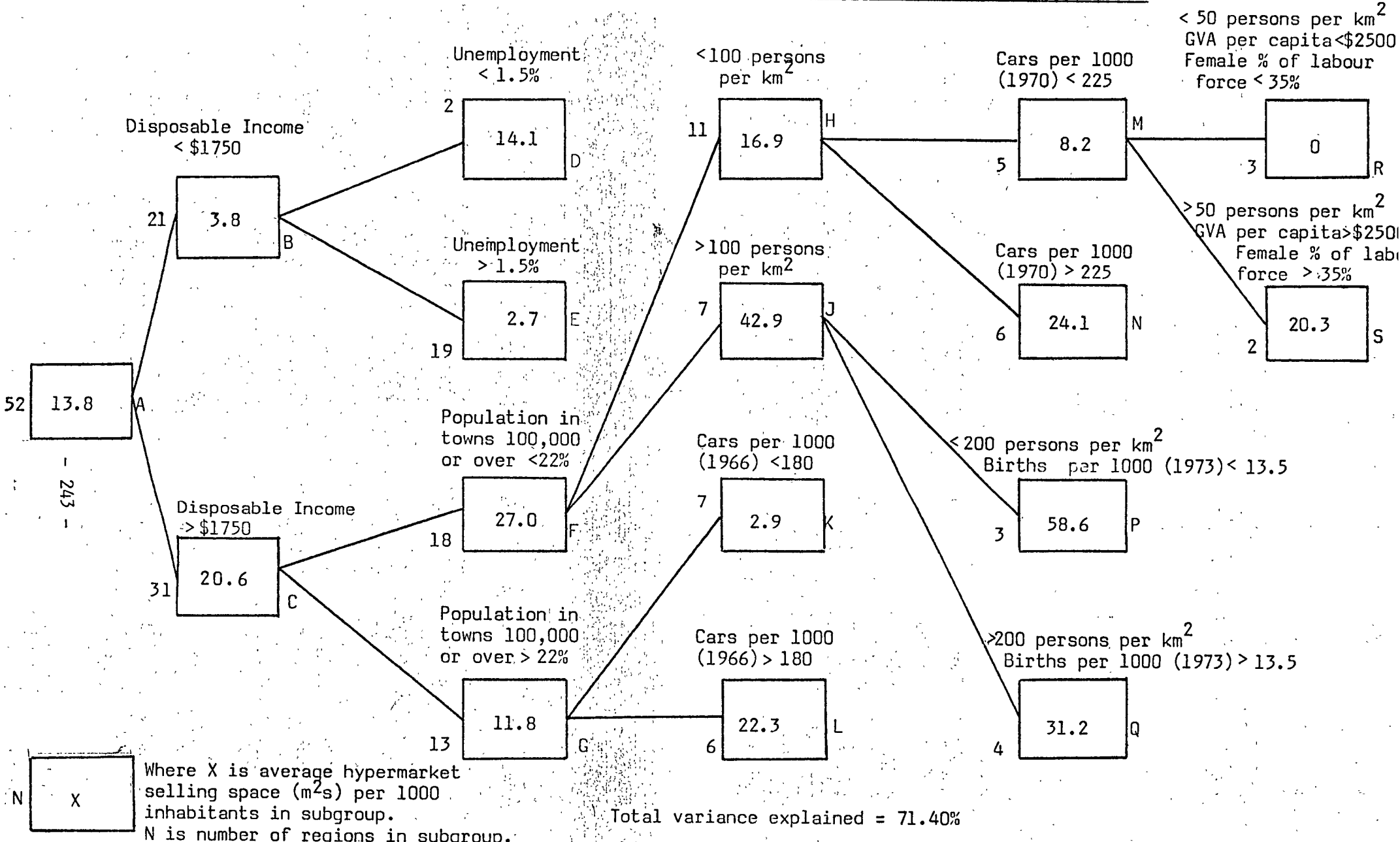
7.3.2 AID Analysis : the Hypermarket - Alternative Analysis

In an alternative approach to the analysis of hypermarket development, the factor of supermarket provision can be regarded as an intervening variable. If supermarket development is in turn a product of socioeconomic forces, it can be argued that one should try to relate these socioeconomic influences directly to hypermarket development ignoring the intervening factor of supermarket development. Accordingly an alternative AID analysis was made of influences on SHY, this time not including the factor of supermarket provision as independent variable. The results of this analysis are shown in Figure 7.2. The number of observations is increased to 52, since Switzerland, for which we have no regional supermarket data, can now be included.

As seen in Figure 7.2, the first and decisive split is by the factor of individual "prosperity" as measured by "Disposable income per capita 1970". Where this was low, below $1750 (Group B), the level of hypermarket development is low, except in those regions of very low unemployment rate from 1965 to 1973 - below 1.5% (Group D). Over the two regions in this Group hypermarket development was approximately the European average.

For the 31 regions with a higher level of "prosperity" (Group C), the subsequent splits are of the greatest interest. Hypermarket development is less likely to occur where there is an above average degree of urban concentration (Group G) - though this deterrent effect is less where high urbanisation is combined with very high historic car ownership (Group L).

Figure 7.2 AID analysis by major European REGION of influences on Hypermarket development 1973



Where, above this given level of "prosperity", concentration of population into towns of 100,000 inhabitants and over is below average (Group F) but where overall population density is not low (Group S), then these are the conditions most favouring hypermarket growth - particularly so if this is allied to the "female emancipation" factor of a low birth rate (Group P). Boxes P and Q suggest there may also be a maximum density for the ambient population itself, as affecting the rate of hypermarket growth. The split between Group P and Group Q only marginally avoids incorporating all the three "high-hypermarket" regions of Belgium into Group P, since the Walloon region is only marginally excluded by the criteria break-points.

Where large urban concentrations are uncommon and where overall population density is particularly low (Group H), hypermarkets can still develop on a substantial scale if car-ownership is particularly high (Group N). If, however, given these circumstances, car ownership is not high, and population density and female employment are low, and individual prosperity is not notably high, then hypermarket development was unlikely to occur at all (Group R) in 1973. The three regions without hypermarkets in Group R are Central Norway, North Norway and the Graubunden/Ticino region of Switzerland. Where, given the preceding factors, car-ownership is not high, this is off-set, however, as affecting hypermarket development by a high female employment rate and high individual prosperity (Group S).

Terminal location of regions is as follows (subgroup reference letters refer to subgroups in Figure 7.2):

Subgroup D. Ouest (France), South East (UK)

Subgroup E. Nordest, Centro, Sicilia, Sardegna, Abruzzi-Molise, Campania, Sud (Italy), the two regions of Ireland, ten of the U.K. Standard Regions (not S.E.).

Subgroup K. Lombardia, Nord-Ouest, Lazio, Emilia-Romagna (Italy), Greater Copenhagen (Denmark), East Trade Region, West Trade Region (Norway).

Subgroup L. Region Parisienne, Mediterranee (France), West Sweden, South East Sweden, Greater Stockholm (Sweden).

Subgroup N. East of the Great Belt (Denmark), Bassin Parisien, Sud-Ouest, Centre-Est (France) North Sweden, mid-Sweden.

Subgroup P. Brabant, the Flemish region (Belgium), Bern/Basle (Switzerland).

Subgroup Q. Walloon region (Belgium), Nord (France), Zurich/Luzern, St. Gallen (Switzerland).

Subgroup R. Central Trade Region, Northern Trade Region (Norway), Graubunden/Ticino (Switzerland).

Subgroup S. West of the Great Belt, (Denmark), Est (France)

Table 7.3 AID Analysis : The Hypermarket 2.
BSS/TSS Ratios of Candidate Predictors at Each Split.

Sub-group being split	BSS/TSS ratios of candidate predictors		
	Predictor/s selected	Predictor/s 2	Predictor/s 3
A	0.20851 Disposable Income	0.19472 Towns 100,000	0.16791 Roads per km^2
C	0.13712 Towns of 100,000	0.12860 Roads per km^2	0.11036 Cars 70
F	0.30925 Population density	0.22348 % in Agriculture	0.21289 MUS per km road
J	0.25121 Births 1973	0.19104 Household size	
G	0.79027 Cars 1966	0.63086 Females working	0.50095 Disposable Income
H	0.51414 Cars 1970 Cars 1973	0.51147 Females working	
B	0.31362 Unemployment	0.28957 Roads per 1,000 population	0.22237 Female % labour force
M	0.94151 Female % labour force GVA per inhabitant Population density	0.41845 Cars 1970 Cars 1973 Unemployment	

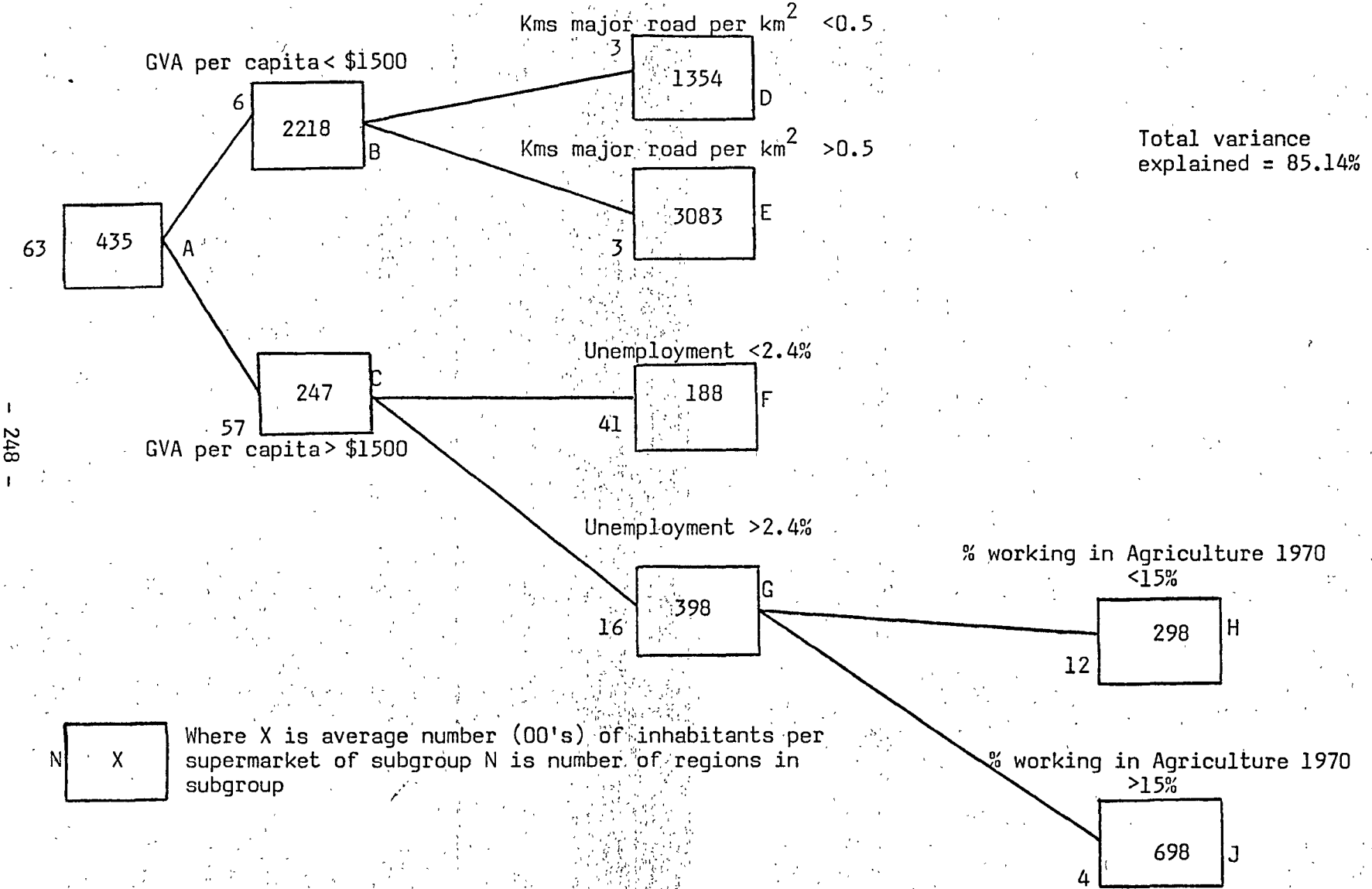
The BSS/TSS ratios of possible candidate predictors are given in Table 7.3. It can be seen that only in the case of the sub-division of Group H can the programme split be considered marginal. An examination of the regions involved shows that a split by the rejected criterion would have made little difference to the subsequent analysis in this instance.

7.3.3 AID Analysis : The Supermarket

The supermarket data were subjected to AID analysis (1) as an exercise complete in itself (2) to help explain the supermarket variable when this is included as an independent variable in the Hypermarket analysis. The dependent variable chosen for analysis is ISM4UVP ("Inhabitants per self-service unit of 400m^2 and over, including supermarkets in variety and department stores, 1.1.1973"), since here we have the largest number of observations. Although this indicator includes hypermarket units, it is effectively, as we have seen an indicator of supermarket provision.

The results of the analysis are shown in Figure 3. It can be seen that the decisive split is one based on average individual prosperity as measured by the indicator "Gross Value Added per inhabitant 1970". This split separates from the remaining regions the six regions where the GVA per inhabitant expressed in dollar equivalents was less than $1500. The six regions so segmented are the Italian Community Regions of Sicilia, Sardenga, Abruzzi-Molise, Campania and Sud with in addition Ireland excluding the Eastern Planning Region. Over all the 63 major regions analysed, the average number of inhabitants per supermarket was 43,500 in 1973. Distinguishing regions into "prosperity" groups as above produces a dramatic differentiation. The average for Subgroup B

Figure 7.3 Aid analysis by major European REGION of influence on Supermarket development 1973



(low "prosperity") is 221,800 inhabitants per supermarket. The average for Subgroup C (high "prosperity") is 24,700 inhabitants per supermarket.

The six regions (Group B) of the first split, those with low "prosperity" and very low supermarket development, are further distinguished by the analysis on the basis of the density of their road networks. Those with low road density in terms of major road provision (Group D) have a greater degree of supermarket development than where the road network is more developed (Group E). It is difficult to interpret this and the small numbers of regions involved make it perhaps not meaningful.

The majority of regions (57 regions) have a "GVA per inhanitant" rating of over $1500. These can then themselves be split into those regions where the average annual unemployment percentage 1965-1973 was under 2.4% and those in which it was above this figure. Where unemployment is low (Group F) the average number of inhabitants per supermarket is 18,800; where it is higher (Group G) the average is 39,800. Although "unemployment" can obviously be considered a prosperity measure, we have hypothesised shortage of labour and the resultant increasing cost of labour as important "push" factors propelling the retailer to self-service and supermarket development. The preferential split on "unemployment" supports this hypothesis.

Where unemployment is relatively high, by 1965-1973 standards, the effect on supermarket development is less in areas of low agricultural employment (Group H) than in areas of high agricultural employment (Group J).

In summary, there is a minimum "prosperity" cut-off below which supermarkets will not develop on any appreciable scale. In 1973 this minimum was $1500 of gross value added per inhabitant (1970). Above this minimum cut-off point the decisive factor is level of unemployment. Where unemployment is high, however, the retrograde effect on supermarket development is less in urban-oriented than in agriculturally oriented areas.

The terminal location of regions is as follows (subgroup reference letters to subgroups in Figure 3):

Subgroup D. Sicilia, Sardegna (Italy), Ireland excluding Eastern Planning Region.

Subgroup E. Abruzzi=Molise, Campania, Sud (Italy).

Subgroup F. Greater Copenhagen East of the Great Belt, West of the Great Belt (Denmark), Flemish Region, Brabant (Belgium), the 8 Zeat of France, the 9 Lander of Germany, East Trade Region, West Trade Region, Central Trade Region (Norway), Mid-Sweden, West Nederland, Zuidwest-Nederland, Zuid-Nederland, Oost-Nederland, East Austria, West Austria, Yorkshire and Humberside, East Midlands, East Anglia, S.E., S.W., (U.K.).

Subgroup H. Lombardia, Nord-Ouest, Lazio (Italy), Eastern Planning Region of Ireland, Walloon Region (Belgium), North Sweden, North, Northwest, Wales, Scotland, Northern Ireland (U.K.) Noord-Nederland.

Subgroup J. Nord-Est, Centro, Emilia-Romagna (Italy), North Trade Region (Norway).

The BSS/TSS ratios of candidate predictors are given in Table 7.4. There are no examples of marginal splitting.

Table 7.4 AID Analysis : The Supermarket
BSS/TSS Ratios of Candidate Predictors at Each Split

Sub-group being split	BSS/TSS ratios of candidate predictors		
	Predictor/s selected	Predictor/s 2	Predictor/s 3
A	0.67616 GVA per inhabitant	0.63929 Unemployment	0.61451 Cars 1970
B	0.52349 Roads per km^2	0.39231 Population per agricultural land	0.37649 Population density Towns of 250,000 Unemployment
C	0.32962 Unemployment	0.28562 GVA per inhabitant	0.23258 Females working
G	0.56626 % in Agriculture	0.41579 Females working	

A more detailed evaluation of the major findings of the AID and correlation analyses is contained in Chapter 8.

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CHAPTER 8

FINDINGS THAT CONTRADICT GENERALLY ACCEPTED HYPOTHESES

8.1 Many of the research findings in this project support, refine or amplify currently generally accepted hypotheses. Particular points in this respect are discussed or listed in Chapter 9. Two important factors however, emerge as dominant in this research, as crucial in determining hypermarket incidence - the causative factor of the existing level of supermarket incidence, and the factor of optimum population concentration. In both these cases the findings of this research contradict widely accepted theories. These therefore are discussed in this chapter.

8.2 THE DECISIVE FACTOR IN HYPERMARKET DEVELOPMENT OF THE INFLUENCE OF EXISTING SUPERMARKET PROVISION

The hypothesis of hypermarket development as the logical extension of supermarket development (section 4.12) is firmly supported by the correlation analysis (section 3.2(9)). It is also supported decisively in the first AID analysis (Figure 7.1). The total of 47 regions is divided in the first split into two numerically equal halves. The regions with low supermarket provision have extremely low hypermarket provision. Those regions with a substantial supermarket infrastructure are those in which hypermarkets have developed on a very considerable scale - not in every instance, but quite positively in general across these regions. The subsequent tree splits four times on the basis of existing supermarket provision as the preferential variable. This therefore is consistently the prime decisive influence.

This finding is contrary to much conjectural writing, particularly in the U.K. The contrary hypothesis, which when proposed has not previously been disputed, is this: hypermarkets are most likely to develop in those areas where the existing retail structure for food is uncompetitive and prices are high; these conditions obtain where supermarkets are not strongly developed.

We have seen from the Thorpe Studies in Caerphilly and Yorkshire that the conclusions that can be drawn from the brief glimpses into the relationship between hypermarket location and previous ambient retail structure provided by catchment area studies are specific to the particular locations chosen for study and contradictory. The catchment area studies of Thorpe and McGoldrick produced contradictory evidence on this question (Chapter 2, section 2.4.6):Hypermarkets developed in South Wales from a base of existing supermarket provision; in Yorkshire they developed in a retail environment characterised by small shops. Such observations emphasise the fact that the incidental statistics in respect of particular locations provided by micro-studies are a frail base from which to generalise. Subsequently, however, Thorpe, using aggregate data, correlated superstore provision by county in Britain in 1977, as measured by sales area, with supermarket provision by county in 1961 (1), in order to confirm the following hypothesis:

> Superstore and hypermarket innovation accords with McNair's "Wheel of Retailing" theory: innovators gain entry to the market on the basis of an offered price advantage. This is the prime attraction of hypermarkets. "Theoretically such new outlets could be expected to develop where they would experience maximum comparative advantage. This would be in areas where prices were highest and where the least modern shopping facilities existed. In British terms such areas can be considered to be those where supermarket development proceeded least rapidly".

The relationship of superstore provision in 1977 with supermarket provision in 1961, as graphed by Thorpe, is shown in Figure 8.1. Thorpe comments that his hypothesis is thus supported:

> "Excluding three exceptional areas: Monmouth, Northamptonshire and Hertfordshire - all lying at least two standard deviations from the regression equation for the remaining 24 counties - statistically 34% of the variation between counties in the amount of superstore floorspace in 1977 per head of population can be shown to be related to the number of supermarkets per million people trading in each county in 1961. The slope of the equation corresponds to the hypothesis with superstore floorspace being inversely related to the number of supermarkets. The exceptional areas all include either new towns or major town expansion schemes. Hampshire is the next most exceptional county. In 1961 it was characterised by a large number of supermarkets following the post-war reconstruction of Southampton and Portsmouth. In 1977 it had been colonised by Carrefour, Woolco, Asda and an International Stores superstore."

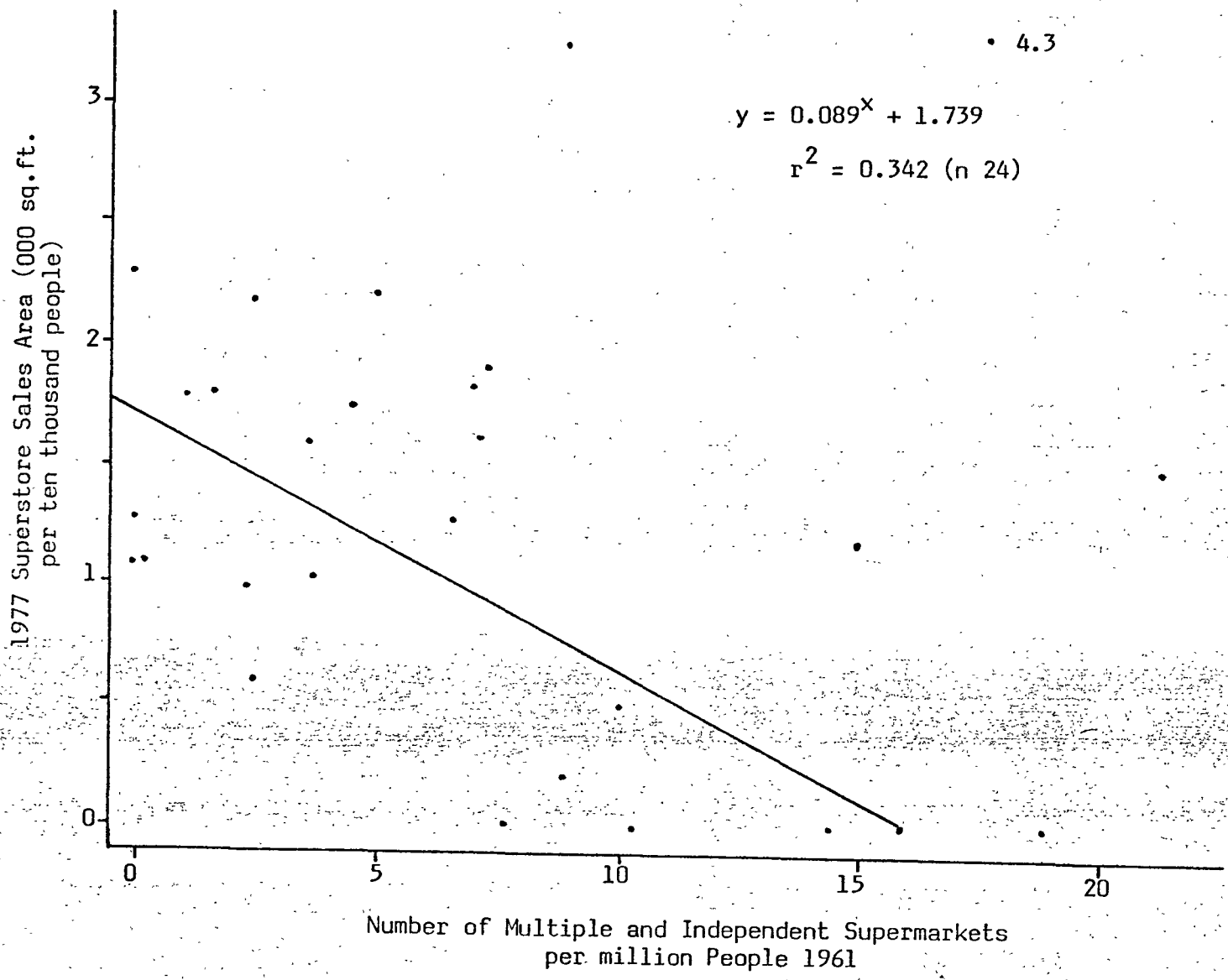
One would make three comments on this conclusion:

(1) to relate superstore provision in 1977 with supermarket provision 16 years before is to employ too long a time span in a study of cause and effect. The 1961 date is, of course, used because Census of Distribution data are available for that year. However, at the end of 1970 there were only 24 superstores in Great Britain, and supermarket data derived from the 1971 Census of Distribution would have been usable for Thorpe's purposes and perhaps have provided a more relevant base for the supermarket variable. However, the choice between the two dates is arguable. Neither is optimal;

(2) many counties other than the "exceptional" counties noted, have new towns or major town expansion schemes;

(3) Thorpe does list other influential factors in British superstore location: the fact that the innovators, in particular Asda,

Figure 8.1 Correlation of Superstore Sales Area 1977 with Supermarket Provision 1961, by County in Great Britain: Thorpe's Analysis



happened to be based in the north; and the fact that "planning permissions have been easier to obtain in some areas rather than others".

This last is arguably the crucial factor in explaining the pattern of Thorpe's data. The main reason given by planning authorities as grounds for the refusal of superstore planning applications is the effect the proposal is likely to have on existing shopping centres (2). Therefore, approval for any new retail development is less likely to be given where existing retail outlets are considered already to meet the customers' needs. In particular, as regards superstore applications, this means where High Street supermarkets are already established and successful and are maintaining the vitality of the High Street - and, not unimportantly, paying High Street rates. For local authorities have large sums of money invested in the High Streets (in the case of Birmingham, a direct and indirect investment producing a capital debt, it was said, of £300 million in 1970 (3)). They are reluctant to have the value of such investment eroded - and a major determinant of High Street viability is a strong supermarket presence. Superstores in Britain are not located by management decision at places that maximise their trading advantages, as Thorpe's hypothesis maintains. They are located, at least in effect, by the planning authorties. It is common knowledge that superstore operators submit many simultaneous superstore applications in various parts of the country in the hope of getting at least one approved. This at least maintained during most of the 1970's. An attempt was made in this research, in the light of this, to classify U.K. regions according to the number of superstore applications submitted - approved or rejected. It was thought this would indicate

those areas that were seen by participant retail managements to be the most suitable for hypermarket operation - in other words, the areas where hypermarkets and superstores would actually develop in the total absence of any planning constraint. Even this approach was abandoned. It was considered invalid by Asda executives. These pointed out that there were very many areas in the country in which they would most certainly like to operate, in respect of which they did not even submit applications - exploratory discussions with the planning authorities having convinced them it would be a simple waste of time and money to do so.

Thorpe's hypothesis, even if valid, cannot be substantiated if confined to one area of rigorous planning control - and the U.K., together with Italy, had the tightest planning control in Europe up to 1973 (as emphasised in Table 6.1). If valid, however, Thorpe's hypothesis should be able to be supported by an analysis of the relationship between hypermarket and supermarket development in much of the rest of Western Europe, in particular in Belgium, France, Germany and Spain where, up to 1973, planning control was virtually non-existant (Table 6.1). The comparative strictness of planning control is a function of environmental factors; and the data on hypermarket and supermarket relationships only become valid if generalised across Europe as a whole. Thorpe's hypothesis is not substantiated generally in Europe - not by the high positive correlation of concurrent supermarket and hypermarket indicators noted in this project, nor by the AID analysis. On the contrary, the opposite hypothesis is supported - that hypermarkets develop as a logical trading progression in regions that have a strong base of supermarketing.

The hypothesis that areas where supermarkets are weak are the areas most susceptible to hypermarket development is not a new one and predates Thorpe, though Thorpe may be the first to attempt to validate it using aggregate data. It has long been implicit in British "marketing mythology". It derives originally from the attempted explanation of why hypermarketing should have originated in France (in general terms, if not in precise fact: the first European hypermarket was the Super Bazar of the Grand Bazar d'Anvers opened in Bussels in 1962), and then developed rapidly there. In the early 1970's there was considerable speculation that the different retail structure in Britain might prevent the successful exportation of the concept to this country. The basis of the argument is (or rather was: it has now been abandoned): British grocery trade is dominated by an efficient system of supermarkets which keep prices low. Hypermarkets therefore would not be able to offer a substantial price advantage. It was argued that the situation was and is entirely different to the situation in France, since France had no supermarket infrastructure. In 1971 for instance, during the enquiry at Eastleigh into Carrefour's application to build the first U.K. hypermarket, much of the debate was concerned with whether or not the French hypermarkets had, in fact, produced any really sustained general price reduction. The Financial Times commented: "But, given the very different retail structure in Britain, this is not the issue. The issue is whether the hypermarkets can do better than existing supermarket competition".(4)

The anonymous quotation that "retailing in France moved from the corner shop direct to the hypermarket, then started filling in the supermarket gaps "has become a U.K. marketing cliche." Smith maintains it: "France would appear to have missed a whole evolutionary stage in retailing, namely the multiples and the supermarkets".(5)

The proposal of under provision of supermarkets in France in the mid-1960's and the consequent progression direct to hypermarketing is supported by Smith by the statistic that there were only 754 supermarkets in France in 1966. At the end of 1966, however, Britain, with a population larger than France, possessed 753 supermarkets (6). It may or may not be that supermarkets in Britain were more efficient and effective in price reduction than the supermarkets in France. Whether they were or not, they were not more thick on the ground; and the proposal of a logical progression from supermarketing to hypermarketing stimulated by trading economics and customer acclimatisation, is not contradicted by a comparison of the U.K. and France. In addition, it needs to be said that by 1974 supermarkets were still more numerous proportionate to population in France than in Britain - by which time France possessed in addition, not in lieu, proportionately more hypermarkets than Britain by a factor of four and more hypermarket selling space by a factor of six. And, ignoring this vast additional hypermarket provision, in 1974 the average size of the supermarket - as such in France was still marginally larger than that of the U.K. supermarket - with 3.05 square metres of selling space provision per 100 inhabitants compared with the U.K. figure of 2.95 square metres. Yet I do not think it has ever been suggested that Britain "missed a whole evolutionary stage in retailing".

Van Musschenbroek maintained in 1972 in The Financial Times:

> "In a country like France the hypermarket represents a sudden awakening in the field of distribution after decades of almost total inactivity ... (and, even as late as 1972) total self-service stores still represent less than 40 per cent of the total food-grocery business in France, against 70 per cent in the U.K." (7).

Unfortunately Van Musschenbroek is quoting a "percentage of food sales" figure for France and a "percentage of grocery sales" figure for the U.K. In March 1972 self-service store sales as percent of all food sales in Great Britain were 43 per cent (8) self-service shares of total grocery trade were quoted by Nielsen in 1974 to be respectively: France 83.6 per cent; Great Britain 75.4 per cent (9).

It is true that Britain did possess in the mid-1960's more of the smaller self-service food shops (those below 400m^2) than did France; though less proportionate to population than Switzerland, Sweden, Norway, Netherlands, Germany, Finland, Denmark and Austria. The overall picture in certain of these countries as at the end of 1967 is given in Table 8.1. Total provision for Great Britain is slightly understated, since the statistic in the "400 m^2 +" category is the previous year's figure.

Ignoring the size of store, at the end of 1967 Britain had, proportionate to population, more self-service food shops as such than France by a ratio of 1.3 to 1. Considering only those stores over 100 square metres (which is a quarter of the size required to qualify as a "supermarket" as defined generally in Europe), provision in Great Britain again exceeds provision in France by the same ratio of 1.3 to 1. The difference is marginal - certainly marginal when compared to the six to one difference between Sweden and Great Britain in the provision of such units. Where it is possible to dissect at an upper size level (at 400 square metres and over) provision in France is higher than in Britain. It is therefore logical to suppose that if comparative statistics were available of self-service units of over 200 square metres (which approximates to the minimum requirement of 2000 square feet that formed the base of

Table 8.1 Self-Service Food Store Provision by Size Categories. Europe. 31.12.1967

	Inhabitants Per S.S. Food Store	- 99m^2		100 - 399m^2		400 m^2 +		Total nos (=100%)	100 m^2 +		Inhabitants Per S.S. Food Store 100 m^2 +
		Nos.	% of total	Nos.	% of total	Nos.	% of total		Nos.	% of total	
Austria	1,463	3147	73.2	1,114	25.9	39	0.9	4,302	1,153	26.8	6,323
Belgium	5,615	720	38.0	950	51.0	210	11.0	1,880	1,160	62.0	8,190
France	3,885	10,701	68.9	3,947	25.4	895	5.7	15,503	4,842	31.1	10,343
G.B.	2,957	9,472	59.2	5,776	36.1	752(1)	4.7	16,000	6,528	40.8	8,425
Italy	24,113	109	14.7	358	48.4	274	36.9	741	632	85.3	85,348
Netherlands	1,804	4,831	66.0	2,241	30.6	248	3.4	7,320	2,489	34.0	5,087
Sweden	925	3,107	35.9	4,915	56.7	741	8.4	8,823	5,656	65.1	1,391

(1) Figure for previous year.

SOURCE: Calculated on data from International Self-Service Organisation, Cologne (10).

the British definition of "supermarket" at that time) provision in Britain would have been greater than in France by a ratio of less than 1.3 to 1. The British definition of 2000 square feet was peculiar to that country. Elsewhere in Europe it was not considered that economics of scale could exist or a full assortment be provided at that size. The lasting consequences in respect of the British conception of the relative status of British supermarketing of the different and idiosyncratic definition of "supermarket" that has historically been applied in Britain are considered below. Whichever definition is applied, however, at and before the birth of the hypermarket in Europe, supermarket development in France was comparable to supermarket development in Britain.

The myth, for myth it is, that France in the mid-1960's had no supermarket infrastructure and that in Britain supermarkets were more developed than elsewhere in Europe derives perhaps in part from the association of "supermarket" with "national grocery chain store" that is instinctive in Britain. In Britain the two are, in effect, largely synonymous. In the rest of Europe they are not. France, for example, has only one truly national multiple grocery group, Casino.

An important part of the reason, however, is statistical. For most years, the use of the traditional U.K. definition based on a "2000 square feet minimum" requirement more than doubles the number of U.K. "Supermarkets" as compared with a calculation based on the International Self Service Organisation (ISSO) definition that demands a "400 square metre minimum". The latter is the definition applied in most of Europe, including France. In 1974, for example, using the British definition,

there were 5840 supermarkets in Great Britain. Using the I.S.S.O. definition, there were 2469 (11). The ratio of the difference would be considerably greater in respect of earlier years. Though the differences in definition are now officially abolished, it was as late as 1974 that the Institute of Grocery Distribution officially adopted the higher "4000 square feet minimum" criterion base. As a result generalised comment in Britain has always tended to over-estimate the number of U.K. supermarkets. Additionally, in France the variety chain stores opened supermarket departments that corresponded to the I.S.S.O. criterion with great rapidity as soon as the supermarket concept showed itself to be viable. Any statistics listing "free-standing supermarkets", such as those produced by NEDO (12), need, where these refer to France, currently to be increased by around 20 per cent and the figures for the mid-sixties by over 35 per cent, if they are to reflect the reality of provision. In consequence of these factors, and certainly in the 1960's, even within the trade, it was widely and wrongly assumed that Britain led not only France but also all of Europe in supermarket provision. This assumption was wrong whatever the criterion. There is no statement to the contrary that can be supported by valid statistics.

Nevertheless, the contrary and quite erroneous hypothesis has been and still is repeated by almost every U.K. commentator. The belief that throughout the sixties Britain had supermarket supremacy and leadership in Europe is historic in Britain and is now ingrained. John Sainsbury, Chairman of J. Sainsbury Ltd., and possibly therefore not impartial on the question, is explicit:

> "There can be little doubt that (outside America) Britain led the way during the early 1960's. The move from counter service to self-service; from small supermarkets to larger and larger supermarkets ..... All this took place while in Europe there remained an unchanged multi-layer traditional grocery structure,with little or nothing to reflect changing consumer needs", and then came the advent of the hypermarket and "quite suddenly Europe has become a retailing Mecca for Britons wishing to catch up on what is new in distribution methods". (13).

Mathias carries the proposal of British retailing leadership to an extreme - in a newspaper column appropriately entitled (presumably not by Professor Mathias) "Rule Britannia - Even in the EEC":

> ".... the older French department stores and the new out-of-town hypermarkets apart, every other trend in improving the efficiency of the distribution system has been led in Europe from Britain in the speed of innovation and the extent of its diffusion : the multiples, self-service, supermarkets, mail order trades, even the more recent basic cash and carry warehouses and discount stores. The line of innovation has run from North America to Britain to continental Europe".(14)

This statement is challengeable on every aspect except that of the multiples and mail order. Self-service as such was certainly pioneered chronologically in Europe by the British cooperative societies, though in their particular case with no great success; but the fact that Britain had been overtaken by many countries by the 1960's in the "extent of diffusion" of self-service and supermarkets can be seen by reference to Tables 8.1 and 8.2., and the fact pre-dates the tables. Comparative supermarket provision in the 1960's is shown in Table 8.2. As regards supermarketing, if it is possible to trace a single "line of innovation", the evidence of the principal continental supermarket innovators suggests this ran via Bernard Trujillo of the "MMM Club" of Dayton, Ohio, direct to continental Europe.

This assumption of British supermarket supremacy has extended the application of the hypothesis that in international terms the areas of high hypermarket development are the areas of previous low supermarket development beyond a simple British-French comparison. It is offered as the principal explanation of the differential rates of hypermarket development throughout all Europe.

> "What has happened in France, Belgium and Germany is that the hypermarket and regional shopping centre development is in front of the U.K. situation, these countries to some extent having missed out the 'supermarket' rationalisation stage": Lowe, 1974 (15).
>
> "On any basis, the most developed contries in Europe (as regards hypermarkets)are France and West Germany. Their growth was largely the result of the sluggish acceptance of supermarkets in these countries": Donovan, 1973 (16).

The factual basis of the hypothesis, explicit or implicit in these statements, is incorrect. The comparative levels of supermarket development in Europe in the early and mid-1960's (in the case of those countries where it is possible to apply, or approximately apply, for these earlier years the International Self Service Organisation criterion) are given in Table 8.2.

The following concusions are unavoidable on this evidence:

(1) Britain in the 1960's did not lead supermarket development: on the contrary she was lagging behind most of the rest of Europe.

(2) An hypothesis that hypermarkets develop in the absence of a viable supermarket infrastructure cannot be supported using national data.

Table 8.2 Comparative Levels of Supermarket Development in Europe 1962 and 1965

Comparative Levels of Hypermarket Development in Europe 1974

	Supermarket Provision						Hypermarkets	
	1962			1965			1974	
	SMS	Inhabitants per SM (000's)	Rank	SMS	Inhabitants per SM (000's)	Rank	Rank	Hyper Space m^2 per 100 inhabitants
Sweden				290(1)	27	1	3	3.1
Switzerland	59	95	1	130(2)	45	2	5	2.0
Germany	350	162	2	1000	59	3	2	4.5
Belgium	44	210	3	151	63	4	1	4.8
Netherlands	44	268	4	159	77	5	7	0.7
France	121	388	5	470	104	6	4	2.9
G.B.	130	400	6	498	106	7	8	0.4
Austria				25(2)	290	8	6	1.9
Italy	36	1373	8	140(2)	371	9	9	0.1
Spain	30(2)	1028	7	70(2)	458	10	9	0.1

(1) The figures for Sweden as published in Sweden up to 1975 are derived according to the Swedish definition of a supermarket: a self-service store with annual sales of at least 3 million SK . When 3 million Sk . are converted to sterling and related to selling space by applying the then current U.K. ratio of £1.50 average turnover per week

per square foot selling space, the resultant size is considerably less than 400 m^2. I.S.S.O. size dissection data and I.A.D.S. supermarket data enable us to estimate the differences for specific years - thus:

Swedish Supermarkets:

	A Swedish definition	B 400 m^2 +	C B as % of A
1973	1807	1000	55%
1971	1417	788	56%
1969	1063	848	80%
1968	917	741	80%

The ratio is higher in the late 1960's than in the 1970's dates (perhaps due to inflation affecting the monetary base in the Swedish criterion). In 1965 there were 447 stores that met the Swedish criterion. On the evidence above, it is assumed that at least 65% of these were over 400 m^2. The application of this percentage produces a figure of 290 supermarkets. This estimate is obviously a conservative one.

(2) Estimated from the data for nearby years.

SOURCE: I.S.S.O. Cologne; I.A.D.S., Paris; National Studies.

(3) There is support, however, for the contrary hypothesis - that in general and in European conditions hypermarkets have developed as the logical progression of super-marketing method.

Three of the four countries ranked highest in terms of supermarket development before and at the time of the advent of the hypermarket are also three of the four countries ranked highest in terms of subsequent hypermarket development. Three of the four countries ranked lowest on the basis of previous supermarket provision are also three of the four countries ranked lowest when measured by subsequent hypermarket provision.

In this context, reference can be made back to Thorpe's analysis (of 1961 supermarket provision in the counties of Britain as related to subsequent superstore provision). It was said that his analysis is invalidated by the fact that market opportunities as perceived by the superstore operators were not the prime determinants of superstore location. The effective decision makers were the planning authorities; and planning approval for a superstore was not easily given where existing retail facilities were considered adequate or strong. This made the negative relationship that Thorpe found in his data almost inevitable.

We can refer again to Table 8.2. The three countries in which, up to 1973, planning control was virtually non-existant were Belgium, France and Germany (as emphasised in Table 6.1). The environment that Thorpe's hypothesis assumes to exist (but which did not exist in the

country he studied) existed therefore in these three countries during this period. In 1965 Germany and Belgium had high and almost identical levels of supermarket development - an average level approximately 1.7 times that of France. In 1974 Germany and Belgium had almost identical levels of hypermarket development and these were the highest in Europe. They were approximately 1.6 times the level in France. The rate of hypermarket development as between these three countries is almost exactly proportionate to their previous levels of supermarket development. Where the free market forces that are assumed in Thorpe's hypothesis exist, his hypothesis is supported precisely : hypermarkets will develop proportionate to the prior level of supermarket development.

Using national data, this relationship cannot be so precisely supported in respect of other countries where environmental factors (other, that is to say, than the environmental factors taken into account in the profit-maximising analysis of the hypermarket operator) had, it can be argued, a more significant impact on retail location. Variations in these environmental factors affected the degree of strictness of planning control in most countries. And environmental differences within these countries affected the extent to which the available controls were enforced in the various regions of these countries. National observations are generally insensitive as units of analysis. They cannot record this type of variation. The regional analysis developed in this research can. This supports, and supports most strongly, the hypothesis of this section - both in the high levels of correlation and categorically in the AID analysis.

This research evidence, it can of course be argued, is not conclusive : the hypermarket indicators and the supermarket indicators are concurrent. If the hypothesis is one of a logical progression from the supermarket to the hypermarket, then logically for methodological validity the supermarket variables should be dated to precede the hypermarket variables. It was neither practicable nor desirable for this to be done, however. In the first place, the construction of such supermarket indicators is hardly within the bounds ofpossibility. The construction at regional level, for almost all the regions of Western Europe, of 1973 indicators of supermarket provision, such that these were accurate and comparable, was a major undertaking. To construct a similar set of indicators dated back to the mid-sixties would be impossible, it is thought. Nor, however, and more importantly, would this be desirable. The argument is as follows.

At national level, the rate of progression of supermarketing for those countries included in the analysis for which comparable mid-sixties data are obtainable is given in Table 8.3. In most of these countries there was a 4.5 to fivefold increase in supermarkets between 1965 and 1974. Supermarkets in Denmark, as measured by the Danish definition of "supermarket" also increased, it might be noted, by a factor of five. The deviant country is Austria. It might be said, therefore, that, with the exception of Austria, the 1974 date is nearly as useful as a mid-sixties date in indicating relative mid-sixties supermarket provision. This would be to ignore, however, the fundamental reason for adopting a regional basis for the analysis. In Italy taken as a whole, for example, supermarkets increased by a factor of five, but this rate of increase varied widely between Italian regions. The purpose of using

TABLE 8.3 Supermarkets in Europe: 1965 and 1974

	1965		1974		Times increase in S.M. provision A/B
	Supermarkets Nos.	A Inhabitants per Supermarket (000's)	Supermarkets Nos.	B Inhabitants per Supermarket (000's)	
Austria	25	290	280	27	10.7
Belgium	151	63	801	12	5.2
France	470	104	2520	21	5.0
Germany	1000	59	4590	13	4.5
G.B.	498	106	2400	23	4.6
Italy	140	371	755	73	5.0
Netherlands	159	77	900	15	5.0
Sweden	290	27	1150	6	4.5
Denmark	91(1)		445(1)		

(1) as measured by the Danish definition of "Supermarket".

SOURCE: Calculated from I.S.S.O. I.A.D.S. and country data.

regional data is to produce a more sensitive and valid analysis than national data are able to provide.

Table 8.3 is not included in order to justify a concurrent "supermarket" indicator on the grounds of comparable rates of supermarket growth. It has been noted that the Austrian case disrupts the general pattern of this tale. Between 1965 and 1974 there was a tenfold increase in supermarkets in Austria. This was twice the rate of increase in other countries. A 1970's indicator cannot therefore represent relative mid-sixties supermarket strength in the case of Austria. It can also be noted, by reference to Table 8.2, that in the mid-sixties Austria was badly provided with supermarkets and yet in 1973 had a substantial hypermarket development. It might seem therefore that the Austrian case not only condemns the use of a 1970's supermarket indicator but also refutes this particular and important hypothesis of this thesis. Neither, however, is the case.

The situation in Austria both supports the hypothesis and indicates the difficulties of using a "supermarket" indicator dated simultaneously for all regions and countries at some prior pre-hypermarket year thought optimal for the deduction of cause and effect. Austria developed supermarkets late : the first five were opened in Austria in 1962. In 1965 there were an estimated 25. Between 1965 and 1971, however, there was a six-fold increase in supermarkets; and, by 1971, 150 supermarkets had been opened. The number of inhabitants per supermarket was then 48,000. This is in advance of the supermarket density in the countries that first developed hypermarkets at the time that hypermarkets began in those countries. (in which respect, this

Austrian supermarket density in 1971 can be compared with the supermarket densities of Germany, Belgium and France in 1965 noted in Tables 8.2 and 8.3). It was in that year, 1971, that the first hypermarket opened in Austria. Austria developed supermarkets late, and in consequence, it may be argued, the hypermarket developed there proportionately later still. In the case of Austria a mid-sixties date for the supermarket indicator would not have been optimal.

The optimal "supermarket" indicator to support this particular hypothesis would be an indicator set in the case of each region one year prior to any significant hypermarket divelopment in that region. Even if one ignores the difficulties of defining "significant" in this context, the raw data do not in most cases exist for such an indicator. In a regional analysis, "supermarket" indicators that are concurrent with the hypermarket indicators are the most relevant indicators that the analyst is in practice able to construct. These are the indicators used in this research.

The total evidence at national level supports the hypothesis that hypermarkets develop in those areas where supermarkets already exist and are established, that in these circumstances the logic of trading economics then propels the supermarketer towards the larger unit and a wider stock assortment - that is to say, towards the hypermarket. The evidence of the more sensitive regional-level analyses strongly supports the national evidence. It confirms that in 1973 high (or low) hypermarket provision co-existed with conditions of high (or low) supermarket provision generally throughout the sub-national regions of Europe. The opposite conditions would have been the case if the contrary hypothesis that has to date been accepted in Britain were correct. It is not correct.

8.3 THE FACTOR OF CONCENTRATION OF POPULATION

8.3.1 As shown in the AID analysis in Figure 7.2, a high level of individual prosperity and disposable income is a pre-requisite of hypermarket development. Concentrating on those 31 regions where hypermarkets and superstores had developed on a substantial scale in 1973, the subsequent AID splits show that the crucial distinguishing factors thereafter are factors of population concentration. Tracing the "optimum hypermarket path" through Box F to Box J, it can be seen (comparing Boxes F and G) that those regions in which many of the population tended to be concentrated in large towns were not regions in which hypermarkets rapidly developed. In fact, hypermarket development in such regions was below the European average, even when this average is calculated including the low-income regions having minimal hypermarket development. On the contrary, hypermarket development has been more pronounced, by a ratio of more than two to one, in those regions characterised by a lack of urban agglomeration. This is contrary to many, and in fact to most, generalised hypotheses on the prerequisites of hypermarket growth. Regions in which geographic-demographic conditions are most conducive to hypermarket development are those in which town sizes are not large, but in which, nevertheless, the total population of the region is fairly dense (over 100 persons per square kilometre). In other words, urban mass as such is a deterrent. The areas most favourable to hypermarket development are those which contain small twons surrounded by an evenly spread but in total substantial ambient population.

This is the quite clear indication of the AID analysis. It is contrary to many previous assumptions and working hypotheses. It has not before been

quantified and shown to apply, at least as a generalisation, right across a European analysis.

There have, however, been many oblique indications that this finding would logically result when the data were subjected to this type of analysis.

Two discussions I had in Paris in 1975 are relevant. In the first, Mr.Etienne Thil, Public Relations Director and now Marketing Director of Carrefour, in answer to the question of what minimum town size Carrefour required for operation, gave the quite unexpected answer of "40,000 inhabitants". This was related later that day to the Vice-Chairman of the international retailing development consultants, Larry Smith Consulting, who was incredulous. He tactfully suggested that Thil was a public relations director and that that was a public relations statement. The analysis now suggests, however, that Thil's figure of 40,000 might have been, in fact, an operational one, provided always, according to the analysis, that there existed a sufficient density of population in the surrounding countryside. Given these conditions it is even possible that a figure of 40,000 for the town size might not be at all substantially below the optimal.

The first innovatory Carrefour hypermarket was, in fact, located adjacent not to a large town but a small one. Thil himself had made a conference comment on this in 1973 :

> "Everyone predicted the imminent bankruptcy of Carrefour when it opened its first hypermarket in 1963. They said Carrefour was mad to build such a huge store in such a small town". (17)

And it has been noted elsewhere that specifically in France:

> "Several relatively small towns, for example, Caen, Quimper, Besancon etc., have attached out-of-town hypermarkets to serve not only the town but also the surrounding countryside. For, given an increasing high level of personal mobility and good accessibility, people in rural areas can also shop at the hypermarket" (5).

The implication of this latter quotation, however, is that this is an exceptional circumstance, the siting decision perhaps a marginal one. The implication of the AID analysis is that in general in Europe at least up to 1973 these or broadly similar conditions were more conducive to hypermarket development than was the association of a hypermarket with a nearby highly concentrated urban population - not marginally so but by a ratio of more than two to one.

There are several possibly parallel hypotheses as to why this should be so.

8.3.2 Hypothesis 1 : The prior lack of organised retailing in small towns

The first hypothesis is that of the prior lack of organised retailing in small towns as causative. This hypothesis argues that a main causative variable affecting the rate of hypermarket development in Europe is the prior level of penetration of the retail trade (in particular, the retail grocery trade) by multiple firms. This argument assumes (1) that multiple retail operations are intrinsically competitive and cost-effective : they can achieve organisational economies of scale and more importantly buying power in the market without necessarily running operating units that each individually

achieve economies of scale; in consequence the price advantages that multiple stores already offer their customers do not encourage the establishment of hypermarkets that depend on a price advantage for their patronage.(2) It is additionally argued that existing multiple retail firms have vast amounts of capital sunk in their existing High Street and suburban premises. This will tend to restrain this movement to out-of-town or fringe locations. Woolworth's, for instance, at one stage stated they would restrict openings of out-of-town Woolco Stores: "We do not intend to compete against ourselves". And, in fact, J.B. Jefferys, Secretary General of the Paris-based International Association of Department Stores, categorically told a British Institute of Management meeting in London in 1972 that the reason hypermarkets were not being developed in Britain as they were on the continent had nothing to do with the character of the customer, the planning mechanism or geography - the real reason was the high degree of concentration that exists in British retailing, higher than anywhere else in Europe. And the British retail establishment, he said, "was planted fairly and squarely in the centre of towns in the High Street. And the retail establishment says 'What we have we hold'" (18). In the case of the Netherlands, in this context, one authority who wishes to remain anonymous suggested, in personal discussion in 1977, that the reason for the slow development of hypermarkets in that country is that shopping centre development is largely controlled there by the OBW group.

The argument then is that hypermarkets will be slow to develop within an already highly organised retail structure. If this is so, then there are some observers who maintain that a highly organised retail

structure for its part will only develop in regions that are highly urbanised, and will not develop in a country characterised by small towns.

Divorced from the hypermarketing context, the basic argument is long-standing. It was quantified in respect of Great Britain by Hall, Knapp and Winsten in 1961 (19) who, analysing the 1950 Census of Distribution, showed that multiple shop sales varied systematically with total size of town: the larger the town size, the larger the sales share of the multiple retailer organisations. However, it needs to be noted that Dawson (1979) (20) showed that this relationship, if it existed in 1950, no longer existed at the end of the 1960's - that is to say, at the time of the growth of the hypermarket. His similar analysis of data of the 1971 Census of Distribution, of a sample of 127 towns of over 20,000 inhabitants, showed that no systematic association between town size and multiple sales existed by that date in Britain. However, it obviously does not necessarily follow that such a relationship could not have existed, and could not still exist, in the regions of countries less strongly penetrated by the multiples. It has been argued that this is so, and can account for differential hypermarket development. The comparisons made to support this are invariable comparisons between the U.K. and France - as by Cameron in 1977:

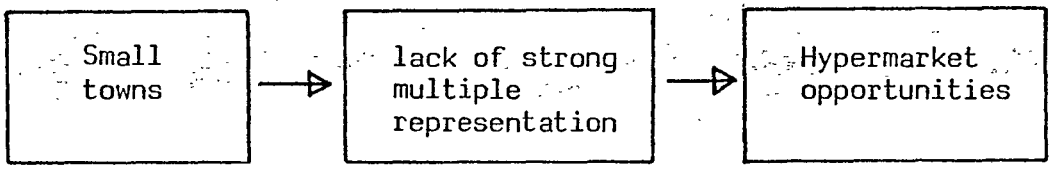
> "It is probably the lack of practical locations which has held back the growth of out-of-town centres in the U.K., but it has only held it back - what has positively stopped the growth is undoubtedly the pattern of retailing in Britain from the rest of Europe and the United States.
>
> Retailing in France, for example, has been influenced by the fact that there are only 35 towns with over 100,000 population, compared with 60 in the U.K., while only five French cities

have a population exeeding 300,000, against 12 in this country. This contrast has meant that there has been little opportunity for widespread growth of traditional multiple retailers in France. It is still common to find small communities served by very local traders, since the catchment population is too small to provide a viable market for multiple organisations.

In a recent survey of retailing in Europe, Healey and Baker point out that the restricted number of large centres in France makes it difficult to achieve true economies of scale, and the dispersed nature of the principal towns operates against an economic distribution and supervision system" (21).

Smith had made a similar comparison four years prevously (5).

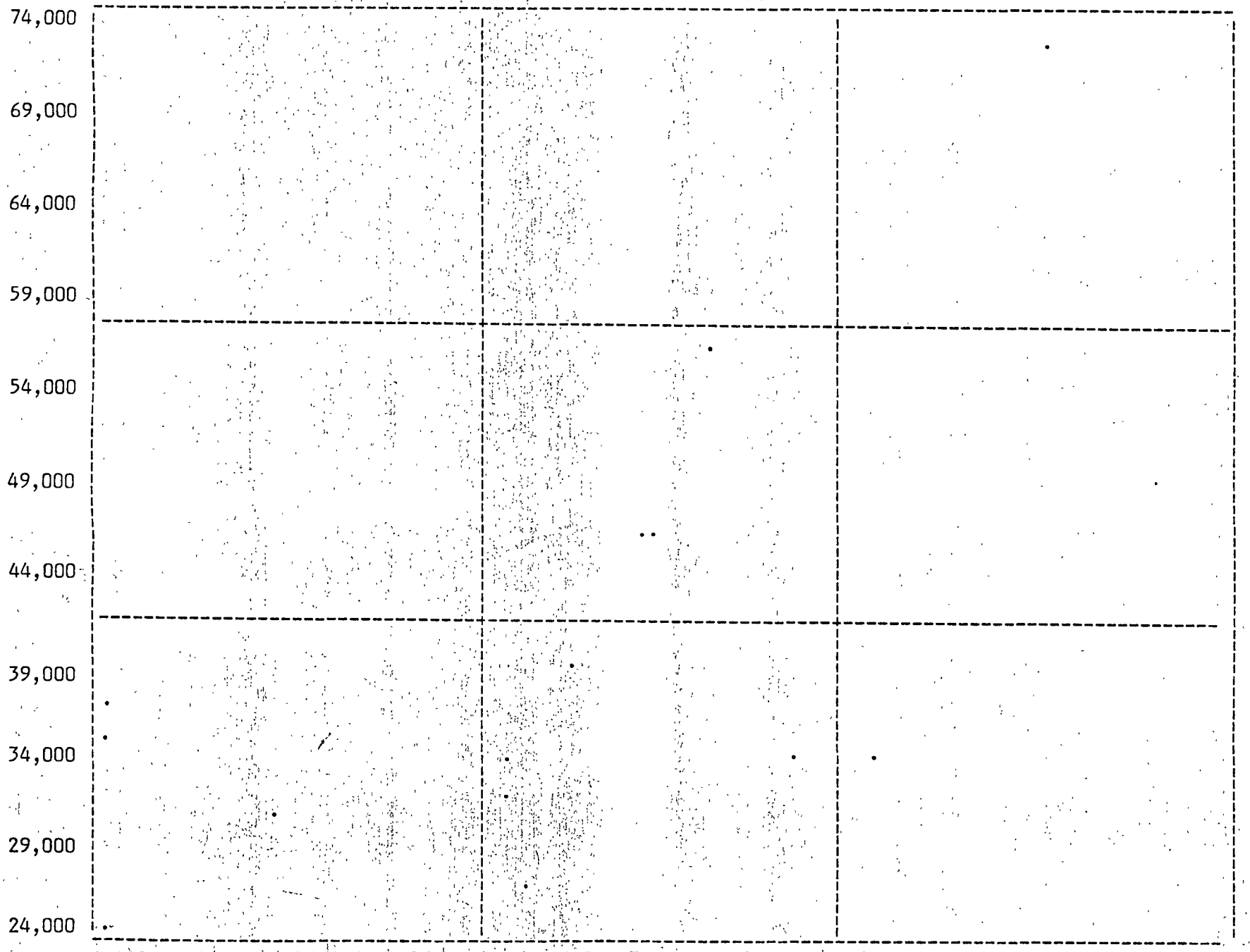
The argument, therefore, takes the form:



Both Cameron and Smith limit the detailed discussion to a comparison of the U.K. and France. If, however, the conclusion is valid then logically it should also be proportionately applicable between the other European countries, as Cameron suggests it is, and also between regions.

At regional level, in general, data on percentage penetration by the retail trade were not obtainable. At the level of the nation, however, a scattergram of the observations of "Integrated retail trade as per cent of total retail trade 1971" plotted against "Percentage of inhabitants living in urban agglomerations of 100,000 inhabitants or more 1970" is shown in Figure 8.2. The relationship is clearly positive. This sub-hypothesis is, therefore, to this extent supported

Figure 8.2 Integrated Retail Trade as Related to Urban Agglomeration



at least 500,000 inhabitants. These percentages are the highest in Europe. Up to 1973, the restrictions on hypermarket development in the U.K. were (together with Italy) the most severe in Europe. It is perhaps natural to assume cause and effect - that so great is the concentration of population into these large agglomerations that environmental problems of traffic congestion, access and green belt maintenance become acute: therefore a strict planning control procedure is imposed. It is obviously possible to generalise this as a hypothesis affecting variously the different regions of Europe.

However, in thus considering national-level data, other "urban agglomeration" figures need also to be noted. At the "100,000 inhabitant" level the next highest ranked country is Germany (55 per cent of inhabitants lived in agglomerations of at least this size in 1970), followed by France and the Netherlands (45 per cent of inhabitants). Yet of these there existed virtually no hypermarket planning restrictions in Germany or France up to 1973.

The more sensitive analysis is, of course, the regional analysis. For those who insist that planning control should be treated, as this hypothesis treats it, as in effect an independent variable, it should be emphasised that in the AID analysis the U.K. regions have not weighted the "town size" findings at all. None of the U.K. regions is included in thebase data on which the split on "town size" is made - all eleven U.K. regions having been eliminated (on the basis of low disposable income) in the first split from this branch of the tree, as have seven of the eleven regions of Italy, the other country where planning approval

was equally difficult to obtain. The conclusions as regards optimal town size are thus derived from regional observations in respect of countries with varying degrees of, in most cases, very much lighter planning restriction. This particular hypothesis, therefore, is unconvincing as an explanation of this pattern in the analysis data.

8.3.4 Hypothesis 3 : The factor of movement restriction

The third hypothesis is that adjacent extensive urban mass is a deterrent to hypermarket development in that it restricts traffic flows.

A revaluation of the relationship between the trading area of a shopping centre and its neighbouring urban agglomeration has been a feature of recent years. Desplanques, for example, analyses the catchment area of French regional shopping centres - which he considers according to their theoretically accepted sub-division into immediate (or pedestrian) zone, and primary, secondary and tertiary zones, with respective radii measured in time - distance* from the centre. He observes:

> "Unfortunately this entirely theoretical definition which irresistably conjures up the picture of an archery target is far from representing the reality .... The shape and compass of the different zones depend above all on the importance of the commercial centre, but depend also on the traffic routes.... , on the density of population, on the existence or otherwise of natural obstacles .... and, above all, on the competition (the presence or absence of other shopping centres or important shops which in themselves constitute a barrier to attraction).

*As regards continental Europe, "time-distance" conveniently means time or distance - since assuming an average driving speed of 60 km per hour, as is becoming accepted practice, in the calculation, then "distance in kilometers" and "time in minutes" produce the same figure.

> In this way, for example, the primary zone of Parly II shopping centre is limited to the south-west by Versailles and, taken together with the immediate zone, consequently assumes the shape not of a circle but a kidney" (22).

The reference is to a major out-of-town shopping centre. The hypermarket, like the shopping centre, attracts over distance. Therefore it is customary to measure a hypermarket catchment area in terms of travelling time. In the U.K., both the Department of the Environment researchers at the Eastleigh Carrefour and the Donaldson researchers at the Caerphilly Carrefour (23) assume a 20 minute driving time distance as effective in nominally defining the "catchment area". These studies found, however, that at Eastleigh one in five customers and at Caerphilly one third of customers lived outside this area. "Catchment area" definitions of the hypermarket operators themselves have been more inclusive - 25 minutes driving time in the case of the Eastleigh Carrefour as cited by the operating company in 1974 (24), and 30-35 minutes driving time in the case of the average Asda store as cited by Asda in 1971 (25) (though Asda stores were subsequently redefined in 1974 by their managing director as "neighbourhood stores" with a realistic catchment area of seven miles radius (26), such later definitions have a tendency to be political statements intended for the ears of planning authorities, therefore minimal. An Asda trade survey has shown that 21 per cent of Asda customers travel more than ten miles (27)).

By general agreement the decisive factor in patronage is travel time. The shapes of hypermarket catchment areas, invariably expressed in time - distance, are obviously determined by differential road congestion. They are also affected by the location and strength of competitive

shopping. Only on a flat featureless plain with an evenly spread population and no competitive attraction can the shape be circular. A kidney or triangular shape is the typical overall shape of the catchment area of a hypermarket sited outside or on the fringe of extensive urban agglomeration. Within such a catchment area ...

> "the general pattern is for market penetration rates to be higher in areas of low population density but to diminish as population density increases. In this the hypermarket reflects conventional features of marketing and distribution systems. The lower the density of population, the greater the propensity to movement and thus the greater likelihood of capturing trade" (28).

One of the few firm conclusions one can draw from the RORU Caerphilly Study (29) is that "penetration" in the densely populated Cardiff zones was very low compared with "penetration" in other zones of the catchment area of equal distance from the hypermarket. Nevertheless, for a hypermarket dependent on one densely populated city area, the sum of "penetration (low) x population (high)" could in theory provide it with a very substantial market. This type of location could therefore be preferentially attractive to the hypermarket operator. This was the original hypothesis of this thesis and a view almost universally accepted. The findings of this research correct this, to the extent at least that these are not the circumstances in which hypermarkets have in practice been developed in general in Europe.

Traffic routes and, perhaps as importantly, habits of travel for leisure and shopping converge on the city centre: and the derivations of Reilly's law of retail gravitation seem obviously to apply. However measured, in time-distance or psychologically, the "deterrence" factor of sideways

travel across congested traffic routes is considerable - and the counter-attraction of competing city centre and suburban shopping increases, the more one departs from the radial linking hypermarket to city centre. One would, therefore, expect that that part of a hypermarket's catchment area that projects into the neighbouring urban concentration to be a triangular segment with apex pointing to the city centre. Empirical studies of indentified catchment areas at least suggest that this is so.

It has been found, in the case of the out-of-town shopping-centre that in France ...

> "oddly enough, customers seldom travel out of town into a centre, but mainly stop off at a centre on their way towards a city from the provincial hinterland. Therefore, if a centre is simply sited on the outskirts of a big city it will not succeed unless it is within easy reach of a large out-of-town population as well. Its catchment area is shaped basically like a comet - 10 per cent in front and 90 per cent behind" (30).

The two splits in the AID analysis with which we are primarily concerned can be seen as being quite simply the expression of this statistically when applied to the hypermarket.

8.3.5 Optimum size of urban agglomeration

As regards the optimum size of urban agglomeration, it is difficult to be precise as to the maximum size above which hypermarket development was deterred. The difficulty arises because of the necesaary uses of categories of size. In the regional analysis, in common with general statistical practice, this research has used the following settlement categories:

(1) less than 10,000 inhabitants

(2) less than 20,000 inhabitants

(3) less than 30,000 inhabitants

(4) less than 40,000 inhabitants

(5) less than 50,000 inhabitants

(6) less than 100,000 inhabitants

(7) less than 250,000 inhabitants

In addition, using an "urban agglomeration" definition, as opposed to a "town" definition, indicators based on "100,000 inhabitants" and "250,000 inhabitants" were constructed.

In relating these to the hypermarket selling space variable (SHY), the correlation analysis showed no significant relationships. (Of the "town" indicators, however, the correlations with the "100,000 inhabitant" and the "250,000 inhabitant" categories were both negative; the correlations with all the lower town-size categories were positive). When the town-size variables and the variables of urban agglomeration are related to the "inhabitants per hypermarket" variable, the only significant correlation that is obtained is with the "100,000 inhabitant urban agglomeration" indicator - positively significant at the 0.1 significance level; that is to say, negatively related to hypermarket growth.

On the combined evidence of the correlation and AID analyses, therefore, we might summarise (1) that in the main up to 1973 hypermarkets were not associated with town sizes of under 50,000 inhabitants (2) equally, they were not associated with town sizes of over 250,000 inhabitants

(3) they were associated, however, and associated very positively in the AID analysis, with town sizes of 100,000 inhabitants and less
(4) therefore, on this evidence, hypermarkets were mostly associated with town sizes of between 50,000 and 100,000 inhabitants.

However, we have no indicator of, for example, "Percentage of population living in towns of 150,000 inhabitants". To that extent the ceiling of "100,000 inhabitants" is a product of the accepted statistical categorisation of towns. We can say, however, that this ceiling will be nearer 100,000 inhabitants than 250,000 inhabitants. The consequent working hypothesis is the hypothesis in (4) above.

8.3.6 The German Case

A limitation of this research conclusion is that, owing to the distinctive categorisation of the large-scale self-service units in Germany, it was not possible, at least in the time available for data search, to produce hypermarket statistics for the German regions that were comparable with those of the other European regions. In absolute (though not in comparative) terms, Germany has the largest number of hypermarkets in Europe. It is instructive therefore, in default of German regional data, to test the above conclusion against the evidence of German national data.

The hypothesis receives precise support from Germany. The Bundesforschungsanstalt Fur Landeskunde Und Raumordnung (31) juxtapose the two sets of figures shown in Tables 8.4 and 8.5.

TABLE 8.4 Population distribution by settlement size in West Germany (1965-1976) %

Settlement size	1965	1968	1971	1976
over 500,000	19.7	19.0	18.4	17.7
250,000/500,000	7.2	6.9	6.8	6.7
100,000/250,000	11.0	11.0	10.9	10.7
less than 100,000	62.1	63.1	63.9	64.9

Table 8.5 Distribution of retail turnover by settlement size in West Germany (1965-1976) %

Settlement size	1965	1968	1971	1976
over 500,000	26.7	24.8	25.7	25.0
250,000/500,000	8.2	7.3	8.0	9.1
100,000/250,000	13.2	12.2	13.4	14.2
less than 100,000	51.9	55.7	53.0	51.7

In Germany between 1965 and 1976 the percentage of population living in settlements of over 100,000 inhabitants progressively fell in all dissection categories. In contrast, the percentage of population living in towns of less than 100,000 inhabitants progressively rose.

Despite this pronounced trend, if we consider the percentage of total German retail trade conducted actually within towns in these different size categories, we observe an exactly opposite trend since 1968. The percentage of retail trade retained in the large towns has been steadily increasing, despite the percentage fall in population. In contrast the proportion of retail turnover in smaller settlements of less than 100,000 people has been steadily declining since 1968, despite the progressive increase in the proportion of population living in those towns. On this decline since 1968 of the share of retail trade held by towns of under 100,000 inhabitants, Shaw comments that "the date of this decline is particularly significant since it marks the main period of growth of hypermarkets and superstores in the Federal Republic" (32). In Germany on this evidence the main impact of hypermarkets and superstores has been on towns of under 100,000 inhabitants. This national-level evidence supports the findings in this research precisely.

This evidence stands despite possible qualifications to the drawing of this conclusion from these data. Cresswell, for example, has maintained as a general thesis that, since more convenience goods shopping is done at the town centre in a town of up to about 100,000 inhabitants than is done in towns of, say, 250,000 inhabitants, the impact of a hypermarket on central area trading will inevitable be greater in the smaller town(33). The German statistics, however, do not relate specifically to central area

trading but to the total of retail trade within the town. The observation therefore is not explanatory, or only very partially explanatory, of the pattern of the data in Table 8.5. Cresswell's hypothesis, however, is of interest regarding Germany. He logically maintains that the effect of a hypermarket on city centre trade would be comparatively small. But it seems that in Germany this effect was not even minimal.

Although it cannot be validly deduced from the statistics of Table 8.5, since these are expressed in percentages, there is evidence, in fact, that, even during the period in Germany of greatest hypermarket growth, retail trade increased absolutely in the large cities despite a declining city population - and increased also in the central areas of these cities. The experience of the Kaufhof Group of chain department stores, one of the two most powerful store groups in Germany, can be taken as indicative. Between 1970 and 1974 the total sales of the Kaufhof Group increased considerably. During this time, the proportion of its sales made in cities with a population of more than 500,000 rose from 30 per cent in 1970 to 35 per cent in 1974 - and the proportion of its sales made in the central areas of cities went up from 23.1 per cent in 1972 to 25.5 per cent in 1973 (34). Taking Kaufhof as typical of the city centre trader, as for example does The Financial Times in this context, at least after the initial impact of the hypermarket, the large towns regained or more than regained their percentage share of trade. The towns that lost retail share were the towns of under 100,000 inhabitants.

Certainly in Germany the first hypermarkets were all located near the largest towns. As early as 1970, however, Self-service and Supermarket was reporting that hypermarketing in Germany was, even by the end of 1969, into its "second phase". A feature of this "second phase" was that hypermarkets were being located near "the smaller, yet still heavily populated towns" (35).

From a national perspective the German case supports the conclusions of the regional analysis. These conclusions are:

(1) A very high urban density is a deterrent to hypermarket development.

(2) By 1973 the areas of extensive hypermarket development in Europe were areas characterised by towns of from 50,000 to 100,000 inhabitants (though the upper ceiling may be higher: possibly 150,000 inhabitants), provided that in these areas there was a significant level of population living outside these towns.

(3) One final observation is offered very tentatively indeed. There is possibly an optimum population density of the ambient population also - possibly between 150 and 200 persons per square kilometre. Above this level, the AID analysis suggests, by the split of Box J, the lack of freedom of movement may again become restrictive. This last observation, however, is based on the evidence of only seven regions.

8.3.7 Addendum : Population size necessary to support a hypermarket

The question of the population size that is necessary to support a hypermarket has been a subject of some discussion in the 1970's as a generalised topic. This has been mainly in the context of conjecture as to the total number of hypermarkets that would represent national "saturation point".

In 1973 Marcel Fournier, the founder of Carrefour, announced that a hypermarket is possible and viable for 100,000 inhabitants. From this he concluded that France, with 50 million inhabitants in 1973, could support 500 hypermarkets (36). At a count in Britain in 1978, it was estimated that in North West England there was one superstore for every 200,000 inhabitants (37) - a figure quoted subsequently in 1980 by Tesco Stores as ammunition supporting its planning application in the London Neasden area. ("The provinces are five years ahead of London") (38). Would it be logical then to assume that, even if its population were perfectly evenly distributed and not bunched into towns, North West England would still have been half way to absolute "saturation" in 1978?

As Rousseau (36) has pointed out, the definition of hypermarket has a bottom size limit (2500 m^2) but no top limit. Consequently "saturation point" estimates based on hypermarket numbers are meaningless unless an anticipated average size is included in the calculation. Rousseau quotes Defforey, also of Carrefour, as maintaining that a 20,000 m^2 hypermarket unit needs a 200,000 population to support it. Rousseau surmises that, on this basis, a market of 100,000 inhabitants might justify a 10,000 m^2 hypermarket - this is to say: 0.1 m^2 of hypermarket

space for every inhabitant. He recognises such a ratio is not, in practice, possible. In the Haute-Garonne, the department in France with the highest hypermarket provision, this ratio is, however, 0.08 m^2 per inhabitant: Therefore he takes this latter ratio as the practicable maximum, and suggests that a maximum figure for the "saturation point" could be calculated allowing for variation locally in population and consequent variation in hypermarket size, "from units of 2500 m^2 for small zones of about 50,000 inhabitants to units of over 20,000 m^2 for the zones with important and dense populations". If one accepts the validity of this calculating down the hypermarket size scale from Defforey's operational observation regarding the largest units, one is also, in effect, saying that a minimum of 12.5 catchment area inhabitants is needed for each square metre of selling space provided, if a hypermarket is to be viable.

At the bottom end of the scale this method of extrapolation is obviously challengeable: that a 2,500 m^2 hypermarket can be supported by a 31,250 population. Further investigating Rousseau's criterion of what is practicable (the level of profitable provision in Haute-Garonne), however, we see that it is midway down the size scale from 20,000 m^2 that this ratio is being achieved: in January 1973 Haute-Garronne's population of 729,600 supported five hypermarkets with a total selling space of 62,087 m^2 (39). Assuming no disproportionate inward migration of shoppers from neighbouring departments, these hypermarkets of 12,417 m^2 average size, therefore, were viable and presumably profitable when supported by only 11.75 persons per square metre of selling space. The French department ranked next highest by this criterion was Loiret, in which three hypermarkets of under 11,000 m^2 average size had a

"total population/sales space" ratio of a little under 14. It seems, therefore, that the population/sales space ratio of 12.5 is applicable as a measure of minimum population requirements at least down to hypermarket sizes of 10,000 m^2. In 1973 the average size of a hypermarket in France was under 6,000 m^2: in theory, therefore, the average French hypermarket could have been viable serving a population of 75,000 inhabitants, if the ratio were generally applicable at all size levels. In this case this would be the average minimum requirement for operation. However, most hypermarkets in France are substantially below the average size where "average size" is calculated from total national selling space. The average size, thus calculated, of all hypermarkets in Europe was 5,852 m^2 at the end of 1973 (40)*. It is not illogical to assume that the "average hypermarket" in Europe in 1973 needed a supportive population of 75,000 people.

*Though this figure varied considerably nationally - from over 12,000 m^2 for the few units that existed in Denmark (4 units) and Spain (2 units) down to the 3,571 m^2 average size in the U.K. Nevertheless in three countries (Germany, France and Austria), accounting for 75 per cent of all hypermarkets in Europe, the average hypermarket size was almost identical and slightly below 6,000 m^2.

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CHAPTER 9

CONCLUSIONS AND REVISED HYPOTHESES

9.1 This chapter outlines the major conclusions of this research and proposes revised hypotheses where this is applicable. The conclusions specific to particular indicators are contained in Chapters 6, 7 and 8, and are not in most cases reported here in detail. This is not to deny the importance of these more particularised findings.

9.2 THE FACTOR OF CAR-OWNERSHIP

Car-ownership is important to hypermarket development, but not as important as is popularly supposed: this is the research conclusion in this research area.

Car ownership has generally been hypothsised as the dominant and crucial environmental variable affecting hypermarket development and out-of-town retail development in general. The most publicised hypermarket catchment area reports have almost invariably signalised the dominant importance of car-ownership as deciding patronage. It was therefore originally thought that in the hypermarket analysis the "car ownership" variable might "swamp" all other variables and render the analysis insensitive to other factors. This is not the case.

Car ownership emerges in particular as subordinate to income factors, but in conditions of ever increasing car-ownership, only to some extent. The correlations in the regional analysis in our research

of the "prosperity" variables with the "car-ownership" variables are as follows:

	Cars 1966	Cars 1970	Cars 1973
Gross value added per inhabitant	.71	.66	.56
Consumption expenditure	.66	.63	.57
Disposable income	.58	.56	.48

The levels of correlation are not as high as might perhaps be supposed. Nevertheless, there is a significant degree of intercorrelation. The levels of correlation with the dependent hypermarket variables are as follows (figures in brackets denote significance levels):

		IHY (Inhabitants per hypermarket)	SHY (Hypermarket selling area per 1000 inhabitants)
CARS 66	(N=63)	-.52(.001)	.32(.05)
CARS 70	(N=68)	-.32(.02)	.32(.02)
CARS 73	(N=68)	-.17(-)	.22(-)
Gross Value Added	(N=68)	-.36(0.1)	.37(.01)
Consumption Expenditure	(N=46)	-.50(.001)	.59(.001)
Disposable Income	(N=68)	-.29(.05)	.42(.01)

Certainly for the more sensitive dependent variable, the "selling space" variable SHY, the "prosperity" indicators are more predictive than the "cars" indicators. In the regression analysis (section 6.4) the net effect of this is that the "cars" indicator is not represented as significant in the regression equation. Without the inclusion of a "prosperity" variable it might have emerged as a

significant factor. In the AID analysis in Figure 7.2 the crucial initial first split is made on the criterion of disposable income. Car ownership remains important and is the basis of two subsequent splits. But the evidence is that it is an important influence subordiante to the yet more important influence of the level of income of the consumer.

The conclusion is that the relationship between car-ownership and hypermarket patronage is not as close as is frequently, although not universally, supposed, and as widely quoted figures might suggest.

9.3 THE FACTOR OF INDIVIDUAL PROSPERITY

The level of consumer disposable income is a decisive factor in hypermarket development.

The factor of individual prosperity was the first factor selected for inclusion in the regression routine predicting hypermarket provision. In the AID analysis that excludes a supermarket input (Figure 7.2) it is the prime distinguishing factor segregating levels of hypermarket development. It subsumes the factor of car-ownership, but provides an explanation of variance greater than that of car-ownership.

The level of individual prosperity, as measured b y "gross value added per inhabitant" is also in the regional AID analysis seen to be the crucial distinguishing factor in predicting supermarket development (Figure 7.3).

9.4 THE FACTOR OF EXISTING SUPERMARKET PROVISION

The natural thrust of trading economics combined with increasing customer acclimatisation propels the supermarket operator progressively to expand his scale of operations. The ultimate of this progression is the hypermarket. The discussion is the discussion of Chapter 8. Hypermarkets develop in general proportionate to the prior level of the supermarket infrastructure. This very positive conclusion is contrary to most UK hypotheses. One notes parenthetically that the AID analysis that includes supermarket provision as an independent variable explains 90 per cent of the variance in hypermarket development, while the level of explanation omitting this variable is 71 per cent.

9.5 THE FACTOR OF SHORTAGE OF LABOUR

An associated factor in the trading economics that promote the successive developments of self-service is the fact that the relative shortage and cost of labour will correspondingly propel the retail operator progressively towards self-service operation. In the regression analyses the factor "unemployment" is dominant in explaining (negatively) both supermarket and hypermarket development. In the "supermarket" AID analysis (Figure 7.3) "unemployment" is the prime discriminator subsequent to the initial split on relative prosperity. In the AID "hypermarket" analysis (Figure 7.2) "unemployment" discriminates between regions of average hypermarket provision and those of low provision.

The hypothesis of environmental shortage of labour and the consequent high cost of labour as factors in the tradi ng economics promoting supermarket and hypermarket development is thus very strongly supported.

9.6 THE FACTOR OF MAJOR ROAD PROVISION

On an ascending scale of store size categories from the smaller supermarkets to the larger supermarkets, to the smaller hypermarkets, to the larger hypermarkets - so progressively does the provision of a major road network in the region become increasingly important to the retail operation. The evidence is the correlation analyses contained in sections 6.3.2 (3) and 6.3.3 (3). In the AID analysis (Figure 7.1) the extent of major road provision is the critical distinguishing factor for those regions with high hypermarket provision, after the influence of the existing supermarket infra-structure has so segregated those regions.

9.7 THE FACTOR OF CONCENTRATION OF POPULATION

Supermarkets and hypermarkets develop significantly more in urbanised as opposed to rural communities. Supermarket development is, however, independent of relative town size. Large urban mass as such is a deterrent to hypermarket development. The optimum demographic environment for hypermarket development is one of an adjacent town of under 100,000 inhabitants (the suggested optimum is 50,000 to 100,000 inhabitants), but with a sufficiently dense ambient population. In the main this important discussion is the discussion of Chapter 8.

9.8 THE FACTOR OF "FEMALE EMANCIPATION"

Of the indicators of "female emancipation", the preferred indicators are in general significantly correlated with supermarket and hypermarket provision (sections 6.3.2 (5) and 6.3.3 (5)). The indicator included in the regional regression and AID analyses to represent the factor of female employment, FECV1564 ("Females in civilian employment as per cent of all females aged 15-64. 1973") is significant in the regression on "Inhabitants per hypermarket" IHY, and significant at the secondary stage of the AID analysis of SHY in Figure 7.1. This is offered here, however, only as the best such indicator that can be currently constructed. The important female purchasers of routine purchases are, however, those who are married. Work is needed to construct at regional level the indicators of activity rates of married women proposed in Chapter 4 as optimal.

There is an indication, but indication only, in the regional analysis that refrigerator ownership may be highly predictive of supermarket development. The very low number of observations available prevents, however, a valid investigation of what is a commonly accepted but always unquantified hypothesis.

9.9 THE FACTOR OF INDUSTRIALISATION

The indicators of the innovative "industrialisation" model similarly need refinement, but are significantly correlated with hypermarket development however measured. The indicator "gross value added,

dollar equivalents, per occupied person, 1970" (GVAOCCUP) is the environmental predictor most highly correlated with SHY, relative hypermarket selling space - though with only 49 obse-vations. The lack of a full range of observations prevented its inclusion in the AID analyses. It may or may not have emerged as influential when subjected to this routine.

9.10 THE FACTOR OF RETAIL INTEGRATION

There is a significant relationship between levels of supermarket and hypermarket development and the degree of integration or association in the ambient retail trade. This conclusion is derived from the national analysis only. In this, retail organisation by legal integration and non-legal affiliation is more predictive than retail organisation purely considered in terms of formal integration.

We hypothesised no direction of cause and effect. In hypermarket and superstore innovation the prominent innovators in France and the UK were Carrefour and ASDA. These were unaffiliated independents at the time of their adoption of the concept.

Owing to the, in general, scarcity of data at the sensitive regional level, this important question was not able in this research to be examined in depth: we obtained regional indicators in the case of France only. Sensitive and more sophisticated indicators at the regional level are an important requirement for a full comparative distribution analysis.

9.11 THE VIABILITY OF THE DIRECT USE OF SOCIOECONOMIC DATA

It is possible to explain hypermarket development in terms of socio-economic and demographic influences on an assumption that government intervention is in general based on a rational interpretation of those influences.

9.12 THE VALIDITY OF AID ANALYSIS USING AGGREGATE DATA

It has been demonstrated that coherent conclusions that are valid can be drawn from an Aid analysis using considerably less than the 1000 cases proposed by Sonquist and his co-researchers as the requisite input using sample data. When this is in respect of aggregate data using named entities (in this case, European regions) that can be identified at each step and which constitute the universe, then valid conclusions can be drawn in respect of those particular entities - in this research, in respect of the regions of Western Europe. In AID analysis "exclusion does not imply insignificance", but, if the statistical claims of candidate predictors at each step are listed, the extent to which exclusion does or does not imply insignificance can be observed. Uniquely, this project examines the rival merits of predictors, and finds virtually no examples of extreme marginal splitting.

9.13 THE METHODOLOGY OF QUANTIFIED COMPARATIVE RESEARCH

In general literature the main conclusions as to, in particular, hypermarket development are based on micro-studies, on surveys of

the patronage and environment of particular stores. These are not numerous. Their findings are often contradictory. Quantified comparative studies are also few. In the main, such studies start with no hypothesis and are concerned with clustering or factor-analysing what data are available. The precision or specific relevance of the data is not, in this case, an immediate concern. There is no hypothesis to be confirmed or refuted as a result of the analysis. Ehrenberg has described such studies as "fishing trips": one simply sees what clusters the analysis produces.

This project proposes a methodological framework against which the findings of individual catchment area studies can be compared and within which they can be positioned. No such methodological framework or properly quantified analysis currently exists.

9.14 THE PREDOMINANT NEED FOR VIABLE MARKETING INDICATORS

Available indicators serving marketing are demonstrably inadequate. In this research the sensitive analysis is the analysis at regional level; and the main research thrust has been towards the construction of sensitive and comparative regional-level marketing indicators. At national level the readily available indicators are grossly insensitive and compiled for purposes other than marketing purposes. In this research more refined indicators have been proposed and prototypes constructed. At regional level, with the exception of major EEC countries in certain instances, readily-available comparative indicators do not exist. This project has been to a large extent concerned with laying the foundation for a relevant series of regional-level marketing indicators.

As a consequence of this research, the first steps have been taken, as noted in Appendix 3, towards the formation of a European Marketing Indicators Working Party that will work towards the production of regional level indicators specific to the requirements of marketing.

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APPENDIX 1. National Analysis. Variable Codes and Variable Descriptions.

1) ISM74X. Inhabitants per free-standing supermarket 400 - 2500m^2. 1.1.1974.
2) ISM74V. Inhabitants per supermarket (including supermarkets in Variety and Department Stores) 400 - 2500m^2. 1.1.1974.
3) IHY74. Inhabitants per hypermarket. 1.1.1974.
4) ISM4U74V. Inhabitants per self-service unit 400m^2 and over (including supermarkets in Variety and Department Stores) 1.1.1974. 1ADS/1SSO totals.
5) ISMNEW74. Inhabitants per self-service unit 400m^2 and over (including SMS in V and D Stores) 1.1.1974. Amended totals.
6) ISS62. Inhabitants per self-service food store 1962.
7) SSM74X. Selling space (M^2 per 100 inhabitants) in free-standing supermarkets 400 - 2500m^2. 1.1.1974.
8) SHY71. Selling space (M^{2}S per 100 inhabitants) in Hypermarkets. 1971.
9) SHY74. Selling space (M^{2}S per 100 inhabitants) in Hypermarkets. 1974.
10) SSMH74. Selling space (M^{2}S per 1000 inhabitants) in self-service units 400 m^2 and over (excluding supermarkets in Variety and Department Stores). 1.1.1974.
11) ISS70. Inhabitants per self-service food store - 1970.
12) PAGRIC60. Inhabitants per km^2 agricultural area 1960.
13) PAGRIC70. " " " " " 1970.
14) PDENS60. " " " of total territory 1960.
15) PDENS70. " " " " " " 1970.
16) AGRIC%61. % labour force employed in agriculture, forestry and fishing 1961.
17) AGRIC%70. % labour " " " " " and fishing 1970.
18) AGRIC%73. % labour " " " " " and fishing 1973.
19) WAGRIC 70. % of wage earners and salaried employees employed in agriculture etc. 1970.
20) WAGRIC 73. % of wage " " " " " " agriculture etc. 1973.
21) AGRGDP60. % GDP derived from Agriculture, forestry and fishing 1960.
22) AGRGDP73. " " " " " " " fishing 1973.
23) AGG10060. % population living in urban agglomerations of 100,000 inhabitants or more 1960.
24) AGG50060. % population living " " " " 500,000 inhabitants or more 1960.
25) LAR25062. % population living in urban catchment areas of 250,000 inhabitants or more 1960. LARRY SMITH CONSULTING.
26) AGG10070. % population living in urban agglomerations of 100,000 inhabitants or more 1970.
27) AGG50070. % population living in urban agglomerations of 500,000 inhabitants or more 1970.

28) GNPPC61. GNP per capita (dollar equivalents) 1961.
29) GNPPC70. " " " " " 1970.
30) GDPPC70. GDP " " (dollars) 1970.
31) GDPCPP70. " " " (adjusted for CPP) 1970.
32) GDPPC73. " " " (dollars) 1973.
33) GDPCPP73. " " " (adjusted for CPP) 1973
34) DI60. Gross Disposable Income of households (dollar equivalents) 1960.
35) DI70. Gross " " " " " equivalents) 1970.
36) DICPPP70. Gross " " " " (adjusted for CPP) 1970.
37) DI73. " " " " " (dollars) 1973.
38) DICPPP73. " " " " " (adjusted for CPP) 1973.
39) DI72. " " " " " (dollars) 1972.
40) CONS69. Private consumption expenditure per capita (dollars) 1969.
41) CONCPP69. " " " " " (adjusted for CPP) 1969.
42) VAWORK70. Value added per worker (dollars) 1970.
43) VAWCPP70. " " " " (adjusted for CPP) 1970.
44) VAWORK73. " " " " (dollars) 1973.
45) VAWCPP73. " " " " (adjusted for CPP) 1973.
46) MNHINC69. Median net household income (£s) 1969.
47) MINCCPPP. " " " " (adjusted for CPP) 1969.
48) FOOD%70 % of private consumption spent on food, drink and tobacco 1970.
49) CARS60. Cars per 1000 population 1960.
50) CARS70. " " " " 1970.
51) CARS73. " " " " 1973.
52) HHCA. % households owning cars 1969.
53) MVSRD61. Motor vehicles per km road 1961.
54) MVSRD70. " " " " " 1970.
55) MVSRD73. " " " " " 1973.
56) ENERGY61. Energy consumption per capita 1961.
57) ENERGY71. " " " " 1971.
58) ENERGY73. " " " " 1973.
59) STEEL613. Apparent steel consumption per capita 1961-1963 (annual average).
60) STEEL713. Apparent " " " " 1971-1973 (annual average).
61) ESINDEX. COMBINED INDEX Energy & Steel. 1973/1971-73.
62) ADPC70. Advertising expenditure (dollars) per capita 1970.
63) FE%LF60. Female labour force as % of total labour force 1960.
64) FE%CIV61. Females in civilian employment as % of total civilian employment 1961.
65) FEW%FE61. Females in labour force as % of female population 1961.
66) FE%WE61. Female wage and salary earners as % of all wage and salary earners 1961.
67) FE%LF70. Female labour force as % total labour force 1970.
68) FE%LF73. " " " " " " " " 1973.
69) FE%CIV73. Females in civilian employment as % total civilian employment 1973.

70) FE156470. Females in labour force as % of all females aged 15-64. 1970.
71) FE156473. Females " " " " " " " " aged 15-64. 1973.
72) FE15UP70. Females " " " " " " " " aged 15 and over.1970.
73) FE15UP73. Females " " " " " " " " aged 15 and over.1973.
74) FEW%FE70. Females " " " " " " total female population 1970.
75) FEW%FE73. Females " " " " " " " " population 1973.
76) XFAM70. Females in civilian employment (excluding unpaid family workers) as % of all persons in civilian employment (excluding unpaid family workers) 1970.
77) MA%MA70. Married women in labour force as % of all married women 1970.
78) MA%MA73. " " " " " " " " " " women 1973.
79) MARCIV70. Married women in civilian employment as % of all persons in civilian employment. 1970.
80) MARCIV73. Married women in civilian employment as % of all persons in civilian employment. 1973.
81) JDEP60. Population aged 0-14 years as % of population aged 15-64 years. 1960.
82) JDEP70. Population " " " " " " " " " " 15-64 years. 1970.
83) BIRTHS60. Live births per 1000 population 1960.
84) BIRTHS63. " " " " " 1963.
85) BIRTHS73. " " " " " 1973.
86) WIFEFT69. % housewives in paid employment (full-time) 1969.
87) WIFEALL. " " " " " (full time and part time) 1969.
88) EDUC1869. % females educated up to at least age 18. 1969.
89) EDUCHEC. % females with level 3 education (EEC 5 only)
90) FRIG73. % households owning refrigerator 1973.
91) FRIG69. " " " " 1969.
92) HDF74. " " " home deepfreezer 1974.
93) HDF69. " " " " " 1969.
94) VAC73. " " " vacuum cleaner 1973.
95) VAC69. " " " " " 1969.
96) INTEG62. Integrated retail trade as % of total retail trade 1962.
97) NATOT62. "non-associated" retail trade as % of total retail trade 1962.
98) INTEG71. Integrated retail trade as % of total retail trade 1971.
99) NATOT71. "Non-associated" retail trade as % of total retail trade. 1971.
100) NAFOOD71. "Non-associated" retail food trade as % of total retail food trade, 1971.
101) INTEG73. Integrated retail trade as % of total retail trade 1973.
102) NATOT73. "Non-associated" retail trade as % of total retail trade. 1973.

103) SALESEMP. Retail sales per person engaged in retail sales. 1971/72.

104) SALESM2. Retail sales per m^2 retail selling space 1971/72.

105) SALESPC. Retail sales per capita of population. 1971/72.

APPENDIX 1 (CONTINUED) 2

DISTRIBUTION ANALYSIS NATIONAL TOTALS

Correlation coefficients:

(1) = SIGNIFICANT AT THE .001 SIGNIFICANCE LEVEL
(2) = " " " .01 " "
(3) = " " " .02 " "
(4) = " " " .05 " "
(5) = " " " .1 " "

	N	ISM74X	ISM74V	IHY74	ISM4U74V	ISMNEW74	ISS62	SSM74X	SHY71	SHY74	SSMH74
ISM74X	14	1.00000	0.96247(1)	0.94860(1)	0.96289(1)	0.96242(1)	0.68592(2)	-0.71846(2)	-0.39974	-0.49099(5)	-0.66844(2)
ISM74V	14	0.96247(1)	1.00000	0.97613(1)	0.99984(1)	0.99964(1)	0.66854(2)	-0.68025(2)	-0.37094	-0.47121(5)	-0.63482(3)
IHY74	14	0.94860(1)	0.97613(1)	1.00000	0.97885(1)	0.97899(1)	0.77641(2)	-0.62721(3)	-0.35589	-0.47922(5)	-0.60661(4)
ISM4U74V	14	0.96289(1)	0.99984(1)	0.97885(1)	1.00000	0.99982(1)	0.67112(2)	-0.67487(2)	-0.37416	-0.47647(5)	-0.63406(3)
ISMNEW74	14	0.96242(1)	0.99964(1)	0.97899(1)	0.99982(1)	1.00000	0.67213(2)	-0.67308(2)	-0.37416	-0.47120(5)	-0.63060(3)
ISS62	14	0.68592(2)	0.66854(2)	0.77641(2)	0.67112(2)	0.67213(2)	1.00000	-0.57619(4)	-0.28911	-0.38679	-0.53453(4)
SSM74X	14	-0.71846(2)	-0.68025(2)	-0.62721(3)	-0.67487(2)	-0.67308(2)	-0.57619(4)	1.00000	0.65940(3)	0.68797(2)	0.93648(1)
SHY71	14	-0.39974	-0.37094	-0.35589	-0.37416	-0.36774	-0.28911	0.65940(3)	1.00000	0.96164(1)	0.86024(1)
SHY74	14	-0.49099(5)	-0.47121(5)	-0.47922(5)	-0.47647(5)	-0.47120(5)	-0.38679	0.68797(2)	0.96164(1)	1.00000	0.89788(1)
SSMH74	14	-0.66844(2)	-0.63482(3)	-0.60661(4)	-0.63406(3)	-0.63060(3)	-0.53453(4)	0.93648(1)	0.86024(1)	0.89788(1)	1.00000
ISS70	12	0.45962	0.42573	0.56252(5)	0.42823	0.42810	0.95393(1)	-0.50120(5)	-0.26010	-0.32947	-0.46006
PAGRI60	13	-0.38850	-0.32350	-0.28217	-0.32127	-0.31006	-0.15361	0.41653	0.43088	0.35549	0.40891
PAGRIC70	13	-0.45957	-0.39816	-0.34883	-0.39535	-0.38478	-0.19385	0.47893(5)	0.43600	0.36652	0.45172
PDENS60	14	-0.24224	-0.15683	-0.11192	-0.15492	-0.14608	0.04951	0.27234	0.37331	0.32026	0.30338
PDENS70	14	-0.24286	-0.15734	-0.11204	-0.15528	-0.14668	0.04448	0.27028	0.35645	0.30433	0.29384
AGRICX61	14	0.74036(2)	0.63136(3)	0.59168(4)	0.62684(3)	0.62572(3)	0.47811(5)	-0.73489(2)	-0.43751	-0.44618	-0.65702(3)
AGRICX70	14	0.73801(2)	0.65577(3)	0.58719(4)	0.64923(3)	0.64758(3)	0.42987	-0.77289(2)	-0.46033(5)	-0.45504	-0.68410(2)
AGRICX73	14	0.70631(2)	0.64528(3)	0.57778(4)	0.63809(3)	0.63682(3)	0.45163	-0.78113(1)	-0.46605(5)	-0.46020(5)	-0.69228(2)
WAGRIC70	14	0.95460(1)	0.91737(1)	0.92511(1)	0.91825(1)	0.91707(1)	0.74300(2)	-0.72379(2)	-0.45764(5)	-0.54747(4)	-0.69880(2)
WAGRIC73	14	0.93751(1)	0.91166(1)	0.93892(1)	0.91354(1)	0.91236(1)	0.79804(1)	-0.72787(2)	-0.47972(5)	-0.58630(4)	-0.71906(2)
AGRGDP60	13	0.67390(3)	0.58365(4)	0.52017(5)	0.58018(4)	0.58193(4)	0.31821	-0.67463(3)	-0.53150(5)	-0.49567(5)	-0.64660(3)
AGRGDP70	13	0.54445(5)	0.45921	0.40197	0.45458	0.45821	0.32423	-0.67009(3)	-0.52445(5)	-0.48033(5)	-0.63684(3)
AGG10060	14	-0.25733	-0.15338	-0.20915	-0.15585	-0.15637	-0.25032	0.02535	0.12397	0.06998	0.04364
AGG50060	14	-0.29493	-0.21199	-0.26646	-0.21499	-0.21437	-0.27474	-0.01214	0.12986	0.06088	0.01824
LAR25062	14	-0.30185	-0.18015	-0.23644	-0.18412	-0.18603	-0.22501	0.14144	0.20843	0.19791	0.18204
AGG10070	14	-0.25720	-0.14721	-0.19275	-0.14888	-0.14873	-0.23532	0.06273	0.16242	0.09183	0.07527
AGG50070	14	-0.30337	-0.23055	-0.26972	-0.23291	-0.23237	-0.26412	0.05468	0.21054	0.11816	0.08485
GNPPC61	14	-0.78851(1)	-0.76593(2)	-0.71356(2)	-0.76082(2)	-0.76337(2)	-0.58849(4)	0.80481(1)	0.45231	0.50934(5)	0.73977(2)
GNPPC70	14	-0.73808(2)	-0.72308(2)	-0.64461(3)	-0.71664(2)	-0.71889(2)	-0.52647(5)	0.83731(1)	0.49676(5)	0.53570(4)	0.77064(2)
GDPPC70	14	-0.72363(2)	-0.71360(2)	-0.62960(3)	-0.70668(2)	-0.70921(2)	-0.51577(5)	0.85760(1)	0.51334(5)	0.53581(4)	0.78246(1)
GDPCPP70	8	-0.66609(5)	-0.69263(5)	-0.52720	-0.67978(5)	-0.68878(5)	-0.54372	0.72650(4)	0.51401	0.50596	0.66568(5)
GDPPC73	14	-0.72456(2)	-0.70449(2)	-0.64239(3)	-0.69922(2)	-0.70115(2)	-0.57161(4)	0.82891(1)	0.52512(5)	0.58097(4)	0.78605(1)
GDPCPP73	8	-0.63388(5)	-0.67209(5)	-0.50185	-0.65634(5)	-0.66490(5)	-0.52003	0.66651(5)	0.33620	0.36922	0.56242
DI60	14	-0.76354(2)	-0.75912(2)	-0.70416(2)	-0.75382(2)	-0.75662(2)	-0.57550(4)	0.82048(1)	0.46597(5)	0.51467(5)	0.75140(2)
DI70	14	-0.72469(2)	-0.71573(2)	-0.62812(3)	-0.70866(2)	-0.71060(2)	-0.50102(5)	0.87077(1)	0.53494(4)	0.53787(4)	0.78936(1)
DICPPP70	8	-0.78173(4)	-0.80434(3)	-0.65614(5)	-0.79200(3)	-0.79995(3)	-0.67563(5)	0.77273(4)	0.47619	0.48582	0.67797(5)
DI73	12	-0.68581(3)	-0.72609(2)	-0.49678	-0.71187(2)	-0.71534(2)	-0.50831(5)	0.83534(1)	0.58404(4)	0.55788(5)	0.78167(2)
DICPPP73	8	-0.64415(5)	-0.68391(5)	-0.51105	-0.66681(5)	-0.67416(5)	-0.53092	0.68044(5)	0.28899	0.33189	0.54893
DI72	14	-0.75093(2)	-0.72381(2)	-0.64989(3)	-0.71768(2)	-0.71934(2)	-0.54491(4)	0.87459(1)	0.52479(5)	0.56927(4)	0.80739(1)
CONS69	13	-0.74862(2)	-0.70334(2)	-0.65259(3)	-0.69950(2)	-0.70376(2)	-0.51101(5)	0.78109(2)	0.41309	0.51065(5)	0.72423(2)
CONCPP69	8	-0.59311	-0.61428	-0.48106	-0.60278	-0.61454	-0.46607	0.64090(5)	0.31696	0.37910	0.55596
VAWORK70	14	-0.74801(2)	-0.72800(2)	-0.63345(3)	-0.72159(2)	-0.72228(2)	-0.44670	0.82904(1)	0.51617(5)	0.52595(5)	0.75566(2)
VAWCPP70	8	-0.52576	-0.55117	-0.39284	-0.53833	-0.54918	-0.38771	0.64600(5)	0.31843	0.33261	0.51833
VAWORK73	14	-0.76119(2)	-0.75131(2)	-0.66573(2)	-0.74652(2)	-0.74614(2)	-0.43679	0.79252(1)	0.54709(4)	0.58085(4)	0.75725(2)
VAWCPP73	8	-0.47388	-0.49621	-0.34350	-0.48671	-0.49575	-0.31504	0.66968(5)	0.46047	0.47382	0.61220
MNHINC69	14	-0.77758(2)	-0.73255(2)	-0.67166(2)	-0.72609(2)	-0.72997(2)	-0.60314(4)	0.81404(1)	0.36875	0.39725	0.68316(2)
MINCCPPP	8	-0.63620(5)	-0.64339(5)	-0.51862	-0.62748(5)	-0.63686(5)	-0.60611	0.52152	0.19080	0.11559	0.32583
FOODX70	14	0.41887	0.40432	0.37826	0.39663	0.39679	0.55883(4)	-0.71543(2)	-0.44329	-0.46293(5)	-0.65968(3)
CARS60	14	-0.68630(2)	-0.62201(3)	-0.59365(4)	-0.62083(3)	-0.62340(3)	-0.45076	0.70892(2)	0.46845(5)	0.51045(5)	0.68222(2)
CARS70	14	-0.76106(2)	-0.72293(2)	-0.62734(3)	-0.71815(2)	-0.71972(2)	-0.33624	0.75554(2)	0.50883(5)	0.52416(5)	0.71020(2)
CARS73	14	-0.71521(2)	-0.68304(2)	-0.57618(4)	-0.67878(2)	-0.68137(2)	-0.23457	0.70557(2)	0.51935(5)	0.52708(5)	0.68029(2)
MHCA	14	-0.77434(2)	-0.67725(2)	-0.62159(3)	-0.67370(2)	-0.67828(2)	-0.44152	0.67845(2)	0.26501	0.32200	0.57075(4)
MVSRD61	13	-0.31128	-0.24135	-0.16547	-0.23547	-0.23554	0.07836	0.19689	0.02384	-0.02840	0.10870
MVSRD70	14	-0.00057	0.07000	0.17971	0.07782	0.07895	0.31368	0.14668	0.16576	0.02250	0.08947
MVSRD73	14	0.17720	0.24504	0.35041	0.25232	0.25330	0.44810	0.00764	0.09883	-0.05562	-0.03179
ENERGY61	14	-0.69019(2)	-0.61072(4)	-0.60502(4)	-0.60829(4)	-0.60400(4)	-0.53301(4)	0.65207(3)	0.50195(5)	0.46854(5)	0.61988(3)
ENERGY71	14	-0.80790(1)	-0.79503(1)	-0.73852(2)	-0.78875(1)	-0.78586(1)	-0.60903(4)	0.83523(1)	0.52766(5)	0.49807(5)	0.74112(2)
ENERGY73	14	-0.77937(2)	-0.78211(1)	-0.74713(2)	-0.77697(2)	-0.77329(2)	-0.65197(3)	0.80768(1)	0.52720(5)	0.50484(5)	0.72357(2)
STEEL613	14	-0.59043(4)	-0.56386(4)	-0.46896(5)	-0.55859(4)	-0.56190(4)	-0.29606	0.76150(2)	0.65545(3)	0.60821(4)	0.75745(2)
STEEL713	14	-0.51442(5)	-0.49012(5)	-0.39708	-0.48423(5)	-0.48822(5)	-0.31034	0.77689(2)	0.66982(2)	0.62128(3)	0.77582(2)
ESINDEX	14	-0.72296(2)	-0.70972(2)	-0.63933(3)	-0.70368(2)	-0.70412(2)	-0.54191(4)	0.88643(1)	0.67284(2)	0.63460(3)	0.84138(1)
ADPC70	14	-0.63674(3)	-0.61323(3)	-0.56956(4)	-0.60542(4)	-0.60768(4)	-0.60553(4)	0.60285(4)	0.20846	0.22601	0.47764(5)

(1) = significant at the .001 significance level; (2) = .01 level; (3) = .02 level; (4) = .05 level; (5) = .1 level

	N.	ISM74X	ISM74V	IHY74	ISM4U74V	ISMNEW74	ISS62	SSM74X	SHY71	SHY74	SSMH74
ISM74X	14	1.00000	0.96247	0.94860	0.96289	0.96242	0.68592	-0.71846	-0.39974	-0.49099	-0.66844
ISM74V	"	0.96247	1.00000	0.97613	0.99984	0.99964	0.66854	-0.68025	-0.37094	-0.47121	-0.63482
IHY74	"	0.94860	0.97613	1.00000	0.97885	0.97899	0.77641	-0.62721	-0.35589	-0.47922	-0.60661
ISM4U74V	"	0.96289	0.99984	0.97885	1.00000	0.99982	0.67112	-0.67487	-0.37416	-0.47647	-0.63406
ISMNEW74	"	0.96242	0.99964	0.97899	0.99982	1.00000	0.67213	-0.67308	-0.36774	-0.47120	-0.63060
ISS62	"	0.68592	0.66854	0.77641	0.67112	0.67213	1.00000	-0.57619	-0.28911	-0.38679	-0.53453
SSM74X	"	-0.71846	-0.68025	-0.62721	-0.67487	-0.67308	-0.57619	1.00000	0.65940	0.68797	0.93648
SHY71	"	-0.39974	-0.37094	-0.35589	-0.37416	-0.36774	-0.28911	0.65940	1.00000	0.96164	0.86024
SHY74	"	-0.49099	-0.47121	-0.47922	-0.47647	-0.47120	-0.38679	0.68797	0.96164	1.00000	0.89788
SSMH74	"	-0.66844	-0.63482	-0.60661	-0.63406	-0.63060	-0.53453	0.93648	0.86024	0.89788	1.00000
ISS70	12	0.45962	0.42573	0.56252	0.42823	0.42810	0.95393	-0.50120	-0.26010	-0.32947	-0.44006
FE%LF60	14	-0.42460	-0.53344(4)	-0.58164(4)	-0.54093(4)	-0.54811(4)	-0.40048	0.18686	0.32129	0.44169	0.32839
FE%ICV61	11	0.05145	-0.32701	-0.34660	-0.33069	-0.34898	-0.34321	0.07823	0.14575	0.19705	0.13704
FEW%FE61	12	-0.37045	-0.50876(5)	-0.50459(5)	-0.51021(5)	-0.51907(5)	-0.33281	0.27442	0.22830	0.32062	0.32576
FE%WE61	12	-0.60136(4)	-0.70312(3)	-0.73644(2)	-0.70606(3)	-0.71396(2)	-0.57097(5)	0.28452	0.09085	0.19824	0.27263
FE%LF70	14	-0.43303	-0.55830(4)	-0.57197(4)	-0.55883(4)	-0.56690(4)	-0.50352(5)	0.42215	0.27667	0.38757	0.44979
FE%LF73	"	-0.28865	-0.40364	-0.41439	-0.40277	-0.41014	-0.43295	0.34137	0.22273	0.31030	0.37236
FE%CIV73	"	-0.31201	-0.42883	-0.44275	-0.42802	-0.43501	-0.45957(5)	0.34686	0.21828	0.32177	0.38128
FE156470	"	-0.46536(5)	-0.57545(4)	-0.58940(4)	-0.57441(4)	-0.58125(4)	-0.57201(4)	0.46739(5)	0.23643	0.34761	0.45957(5)
FE156473	"	-0.38397	-0.47576(5)	-0.48520(5)	-0.47318(5)	-0.47982(5)	-0.53793(4)	0.43016	0.19156	0.28127	0.41179
FE15UP70	"	-0.41348	-0.54271(4)	-0.55169(4)	-0.54081(4)	-0.54740(4)	-0.53927(4)	0.42307	0.18213	0.28693	0.40279
FE15UP73	"	-0.32930	-0.44247	-0.44707	-0.43910	-0.44534	-0.50669(5)	0.39220	0.14203	0.23136	0.36429
FEW%FE70	"	-0.42044	-0.54475	-0.53913	-0.54211	-0.54893	-0.51221	0.47002	0.22898	0.32619	0.45061
FEW%FE73	"	-0.34406	-0.45565	-0.44942	-0.45181	-0.45832(5)	-0.49064(5)	0.43026	0.18567	0.26732	0.40428
XFAM70	11	-0.65334(4)	-0.76641(2)	-0.71989(3)	-0.76235(2)	-0.76762(2)	-0.53011(5)	0.67166(4)	0.37850	0.47820	0.63676(4)
MA%MA70	12	0.17866	-0.43994	-0.33519	-0.43174	-0.48506	-0.47156	0.25790	0.07838	0.08977	0.22030
MA%MA73	9	0.41590	-0.21780	-0.18592	-0.21768	-0.24533	-0.03321	0.05569	0.02260	0.10903	0.13179
MARCIV70	14	-0.35156	-0.44207	-0.39178	-0.43705	-0.44323	-0.31201	0.46039(5)	0.28329	0.32265	0.44827
MARCIV73	13	-0.36097	-0.45689	-0.41137	-0.45232	-0.45827	-0.33360	0.46779	0.31314	0.37107	0.47648(5)
JDEP60	14	0.16562	0.07475	0.01536	0.07178	0.07773	-0.01716	-0.39458	-0.42140	-0.40457	-0.44944
JDEP70	"	0.26644	0.32665	0.21824	0.31843	0.32517	0.09193	-0.54364(4)	-0.36972	-0.37120	-0.51834(5)
BIRTHS60	"	0.56182(4)	0.58297(4)	0.49092(5)	0.57697(4)	0.58240(4)	0.28907	-0.72857(2)	-0.43142	-0.47062(5)	-0.68072(2)
BIRTHS63	"	0.47553(5)	0.51319(5)	0.42022	0.50676(5)	0.51147(5)	0.25644	-0.71579(2)	-0.47132(5)	-0.48079(5)	-0.67720(2)
BIRTHS73	"	0.44588	0.51058(5)	0.45087	0.50617(5)	0.51077(5)	0.34398	-0.57142(4)	-0.49905(5)	-0.50523(5)	-0.58892(4)
WIFEFT69	"	-0.32855	-0.47343(5)	-0.50696(5)	-0.47653(5)	-0.48364(5)	-0.43599	0.39333	0.26634	0.41922	0.44625
WIFEALL	"	-0.51049(5)	-0.58599(4)	-0.59391(4)	-0.58502(4)	-0.59377(4)	-0.54596(4)	0.54317(4)	0.24890	0.34604	0.50374(5)
EDUC1869	"	-0.43026	-0.47561(5)	-0.43789	-0.46930(5)	-0.47292(5)	-0.52068(5)	0.64392(3)	0.20557	0.29114	0.54221(4)
EDUCEFC	5	-0.59803	-0.59162	-0.67757	-0.60668	-0.61148	-0.59155	0.38766	0.44459	0.58646	0.53024
FRIG73	14	-0.48346(5)	-0.54597(4)	-0.41795	-0.54065(4)	-0.54727(4)	-0.08982	0.53913(4)	0.40895	0.38195	0.50683(5)
FRIG69	"	-0.44054	-0.40725	-0.31973	-0.40097	-0.41091	-0.24049	0.49184(5)	0.21093	0.22419	0.41182
HDF74	"	-0.51935(5)	-0.52745(5)	-0.46674(5)	-0.51933(5)	-0.52429(5)	-0.53622(4)	0.66969(2)	0.26544	0.26123	0.54101(4)
HDF69	"	-0.37527	-0.33034	-0.27008	-0.32239	-0.32758	-0.38068	0.57218(4)	0.16605	0.14529	0.42965
VAC73	"	-0.86810(1)	-0.81912(1)	-0.81289(1)	-0.81509(1)	-0.81715(1)	-0.79920(1)	0.78808(1)	0.35722	0.41206	0.67399(2)
VAC69	"	-0.80906(1)	-0.76234(2)	-0.73978(2)	-0.75638(2)	-0.75969(2)	-0.74825(2)	0.73059(2)	0.26079	0.29335	0.58177(4)
INTEG62	"	-0.48937(5)	-0.59287(4)	-0.60369(4)	-0.58736(4)	-0.59210(4)	-0.55953(4)	0.36930	0.08880	0.11583	0.27584
NATOT62	"	0.58471(4)	0.68820(2)	0.69841(2)	0.68623(2)	0.69122(2)	0.68302(2)	-0.48086(5)	-0.29207	-0.30409	-0.43324
INTEG71	11	-0.59650(5)	-0.55393(5)	-0.59218(5)	-0.55406(5)	-0.56813(5)	-0.62983(4)	0.35125	0.10359	0.12810	0.27452
NATOT71	11	0.69295(3)	0.68033(4)	0.64458(4)	0.67829(4)	0.69355(3)	0.71761(3)	-0.46344	-0.31548	-0.26030	-0.40568
NAFOOD71	11	0.69881(3)	0.68923(4)	0.67299(4)	0.69016(3)	0.70201(3)	0.74449(2)	-0.38063	-0.32285	-0.28067	-0.37055
INTEG73	14	-0.63558(3)	-0.68958(2)	-0.69757(2)	-0.68690(2)	-0.68924(2)	-0.62834(3)	0.50782(5)	0.22824	0.26688	0.43344
NATOT73	14	0.65809(3)	0.74040(2)	0.74556(2)	0.73880(2)	0.74350(2)	0.70923(2)	-0.53221(5)	-0.34363	-0.35042	-0.48768(5)
SALESEMP	13	-0.42377	-0.57330(4)	-0.36379	-0.55497(4)	-0.56637(4)	-0.41900	0.59496(4)	0.19971	0.20742	0.47522
SALESMP	13	-0.55402(4)	-0.53950(5)	-0.36902	-0.52604(5)	-0.54475(5)	-0.42827	0.64254(3)	0.16528	0.20111	0.50049(5)
SALESPC	13	-0.57221(4)	-0.64213(3)	-0.41216	-0.62287(4)	-0.63323(3)	-0.45261	0.74641(2)	0.30738	0.34145	0.63027(4)

APPENDIX 2. REGIONAL ANALYSIS

VARIABLE CODES AND VARIABLE DESCRIPTIONS.

1) ISM425X. Inhabitants per supermarket 400 - 2500m^2 (excluding supermarkets in Variety and Department Stores) 1.1.1973.
2) ISM825X. Inhabitants per supermarket 800 - 2500m^2 (excluding supermarkets in V and D Stores) 1.1.1973.
3) ISM1025X. Inhabitants per supermarket 1000 - 2500m^2 (excluding supermarkets in V and D Stores) 1.1.1973
4) ISM4UPX. Inhabitants per self-service unit 400m^2 and over (excluding supermarkets in V and D Stores) 1.1.1973
5) ISM8UPX. Inhabitants per self-service unit 800m^2 and over (excluding supermarkets in V and D Stores) 1.1.1973.
6) ISM10UPX. Inhabitants per self-service unit 1000m^2 and over (excluding supermarkets in V and D Stores) 1.1.1973.
7) SSM425X. Selling space per 1000 inhabitants in supermarkets 400 - 2500m^2 (excluding SMS in V and D Stores) 1.1.1973.
8) SSM825X. Selling space per 1000 inhabitants in SMS 800 - 2500m^2 (excluding SMS in V and D Stores) 1.1.1973.
9) SSM1025X. Selling space per 1000 inhabitants in SMS 1000 - 2500m^2 (excluding SMS in V and D Stores) 1.1.1973.
10) SSM4UPX. Selling space per 1000 inhabitants in self-service units 400m^2 and over (excluding SMS in V and D Stores) 1.1.1973.
11) SSM8UPX. Selling space per 1000 inhabitants in self-service units 800m^2 and over (excluding SMS in V and D Stores) 1.1.1973.
12) SSM10UPX. Selling space per 1000 inhabitants in self-service units 1000m^2 and over (excluding SMS in V and D Stores) 1.1.1973.
13) IHY. Inhabitants per hypermarket. 1.1.1973.
14) SHY. Hypermarket selling area per 1000 inhabitants. 1.1.1973.
15) ISM425V. Inhabitants per supermarket 400 - 2500m^2 (including supermarkets in V and D Stores) 1.1.1973.
16) ISM825V. Inhabitants per supermarket 800 - 2500m^2 (including SMS in V and D Stores) 1.1.1973.
17) ISM1025V. Inhabitants per supermarket 1000 - 2500m^2 (including SMS in V and D Stores) 1.1.1973.
18) ISM4UPV. Inhabitants per self-service unit 400m^2 and over (including SMS in V and D Stores) 1.1.1973.
19) ISM8UPV. Inhabitants per self-service unit 800m^2 and over (including SMS in V and D Stores) 1.1.1973.
20) ISM10UPV. Inhabitants per self-service unit 1000m^2 and over (including SMS in V and D Stores) 1.1.1973.
21) SSM425V. Selling space per 1000 inhabitants in supermarkets 400 - 2500m^2 (including SMS in V and D Stores) 1.1.1973.
22) SSM825V. Selling space per 1000 inhabitants in supermarkets 800 - 2500m^2 (including SMS in V and D Stores) 1.1.1973.
23) SSM1025V. Selling space per 1000 inhabitants in supermarkets 1000 - 2500m^2 (including SMS in V and D Stores) 1.1.1973.
24) SSM4UPV. Selling space per 1000 inhabitants in self-service units 400m^2 and over (including SMS in V and D Stores) 1.1.1973.
25) SSM8UPV. Selling space per 1000 inhabitants in self-service units 800m^2 and over (including SMS in V and D Stores) 1.1.1973.
26) SSM10UPV. Selling space per 1000 inhabitants in self-service units 1000m^2 and over (including SMS in V and D Stores) 1.1.1973.

27) POPAGRIC. Inhabitants per km^2 agricultural land 1970.
28) POPDENS. Inhabitants per km^2 total territory 1970.
29) NOTREE. Inhabitants per km^2 total territory minus forested areas 1970.
30) AGRIC%68. % labour force employed in agriculture, forestry and fishing 1968.
31) AGRIC%70. % labour force employed in agriculture etc. 1970
32) AGRIC%73. % " " " " " " 1973
33) IND70. % " " " " industry 1970
34) IND73. % " " " " " 1973
35) SERV70. % " " " " services 1970
36) SERV73. % " " " " " 1973
37) AGRICGDP. % GDP derived from agriculture etc 1970
38) AGRICHOH. % heads of households employed in agriculture etc. 1970/1971.
39) TOWNS250 % population living in towns of 250,000 inhabitants or more 1970-1973.
40) TOWNS100. % population living in towns of 100,000 inhabitants or more 1970-1973.
41) TOWNS50. % population living in towns of 50,000 inhabitants or more 1970-1973.
42) TOWNS40. % population living in towns of 40,000 inhabitants or more 1970-1973.
43) TOWNS30. % population living in towns of 30,000 inhabitants or more 1970-1973.
44) TOWNS20. % population living in towns of 20,000 inhabitants or more 1970-1973.
45) TOWNS10. % population living in towns of 10,000 inhabitants or more 1970-1973.
46) AGGLM250. % populations living in "urban agglomerations" of 250,000 inhabitants or more 1970-1973.
47) AGGLM100. % population living in "urban agglomerations" of 100,000 inhabitants or more 1970-1973.
48) CARS66. Cars per 1000 population 1966.
49) CARS70. " " " " 1970.
50) CARS73. " " " " 1973.
51) MVSROAD. Motor vehicles per km road.(minus minor roads) 1973.
52) MVSROADP. " " " " " (all roads) 1973.
53) RDSQKM Km roads (minus local roads) per km^2 of land 1973.
54) RDSQKMPL. Km roads (all roads) per km^2 land 1973.
55) RDPOPMIN. Km roads (minus local roads) per 1000 population 1973.
56) RDPOPPLU. Km roads (all roads) per 1000 population 1973.
57) PCFOO. % private consumption spent on food, drink and tobacco. 1973.
58) GVAHAB. GROSS VALUE ADDED (dollar equivalents) per inhabitant 1970.
59) GVAOCCUP. GROSS VALUE ADDED (dollar equivalents) per occupied person 1970.
60) CONSEXP. Private consumption expenditure (dollar equivalents) per capita 1970.
61) DISPINC. Gross Disposable Income of households (dollar equivalents) per capita 1970.

62) UNEMPLOY. Unemployed as % total labour force. Annual Average. 1965-1973.
63) FRIDGE. % households owning a refrigerator 1973.
64) HDF. " " " " home deep freezer 1973.
65) INDENERG. Industrial energy consumption per capita (T. cals. per 1000) 1970.
66) INDELECT. Industrial electricity consumption (kwh) per capita 1970.
67) FELF1564. Female labour force as % of all females aged 15-64, 1973.
68) FELF15UP. Female labour force as % of all females aged 15 and over 1973.
69) FECV1564. Females in civilian employment as % of all females aged 15-64. 1973.
70) FECV15UP. Females in civilian employment as % of all females aged 15 and over 1973.
71) FECV14UP. Females in civilian employment as % of all females aged 14 and over 1968.
72) FE%LF. Females in labour force as % of total labour force. 1973.
73) BIRTHS66. Live births per 1000 population 1966.
74) BIRTHS73. " " " " " 1973.
75) HHOLDS. Average number of persons per household 1970/1971.
76) GVACPPP. Gross Value Added (adjusted for purchasing power) per inhabitant 1970.
77) GDPCPPP. Gross Domestic Product (adjusted for purchasing power) per inhabitant 1970.
78) GVAWCPPP. Gross Value Added (adjusted for purchasing power) per occupied person 1970.
79) CONSCPPP. Private consumption expenditure (adjusted for purchasing power) per capita 1970.
80) DINCCPPP. Gross Disposable Income of households (adjusted for purchasing power) per capita 1970.
81) GFK "Purchasing power" (GFK definition) per capita 1970.
82) FEMSIND. Female workers in industry as % of all workers in industry 1973.
83) FEMSERV. Female workers in services as % of all workers in services 1973.
84) FEINDSER. Female workers in industry and services as % of all workers in industry and services 1973.

DISTRIBUTION ANALYSIS IN EUROPE : REGIONAL ANALYSIS

(1) = Significant at the .001 significance level (2) = at the .01 level
(3) = at the .02 level (4) = at the .05 level (5) = at the .1 level
N.C. = NOT CORRELATED.
N = NO. OF CASES

Correlation coefficients:

	N	ISM425X	ISM825X	ISM1025X	ISM4UPX	ISM8UPX	ISM10UPX	SSM425X	SSM825X	SSM1025X	SSM4UPX
ISM425X	30	1.00000	0.76636(1)	0.89504(1)	0.99999(1)	0.76825(1)	0.89649(1)	-0.59382(1)	-0.47590(4)	-0.42377(5)	-0.44393(2)
ISM825X	20	0.76636(1)	1.00000	0.81861(1)	0.76631(1)	0.99989(1)	0.81824(1)	-0.44109(2)	-0.38168(5)	-0.33058	-0.35403
ISM1025X	20	0.89504(1)	0.81861(1)	1.00000	0.89507(1)	0.81963(1)	0.99977(1)	-0.53488(3)	-0.45587(4)	-0.40661(5)	-0.43341(5)
ISM4UPX	39	0.99999(1)	0.76631(1)	0.89507(1)	1.00000	0.76821(1)	0.89655(1)	-0.59514(1)	-0.47809(4)	-0.42414(5)	-0.44605(2)
ISM8UPX	20	0.76825(1)	0.99989(1)	0.81963(1)	0.76821(1)	1.00000	0.81957(1)	-0.44087(4)	-0.37973(5)	-0.32917	-0.35376(5)
ISM10UPX	20	0.89649(1)	0.81824(1)	0.99977(1)	0.89655(1)	0.81957(1)	1.00000	-0.53590(3)	-0.45183(4)	-0.40316(5)	-0.43211(5)
SSM425X	30	-0.59382(1)	-0.44109(4)	-0.53688(3)	-0.59514(1)	-0.44087(4)	-0.53590(3)	1.00000	0.87617(1)	0.83094(1)	0.90325(1)
SSM825X	20	-0.47590(4)	-0.38168(5)	-0.45587(4)	-0.47809(4)	-0.37973(5)	-0.45183(4)	0.87617(1)	1.00000	0.98700(1)	0.93869(1)
SSM1025X	20	-0.42377(5)	-0.33058	-0.40661(5)	-0.42414(5)	-0.32917	-0.40316(5)	0.83094(1)	0.98700(1)	1.00000	0.92702(1)
SSM4UPX	30	-0.44393(2)	-0.35403	-0.43331(5)	-0.44605(2)	-0.35376	-0.43211(5)	0.90325(1)	0.93869(1)	0.92702(1)	1.00000
SSM8UPX	20	-0.37042(5)	-0.28529	-0.34747	-0.37284(5)	-0.28444	-0.34528	0.80018(1)	0.93841(1)	0.94864(1)	0.96558(1)
SSM10UPX	20	-0.34562	-0.26716	-0.32341	-0.34807	-0.26157	-0.32154	0.77560(1)	0.92195(1)	0.94047(1)	0.95600(1)
THY	59	0.56587(1)	0.38200(5)	0.47306(4)	0.56809(1)	0.38791(5)	0.48162(4)	-0.69264(1)	-0.68525(1)	-0.66869(2)	-0.64052(1)
SHY	52	-0.23422	-0.22952	-0.28355	-0.23670	-0.22921	-0.28229	0.66635(1)	0.87195(1)	0.89182(1)	0.92185(1)
ISM425V	54	0.98125(1)	0.68855(1)	0.86949(1)	0.98147(1)	0.69091(1)	0.87161(1)	-0.67302(1)	-0.54281(3)	-0.48808(4)	-0.51413(2)
ISM825V	28	0.45544(2)	0.89734(1)	0.65247(2)	0.45567(2)	0.89718(1)	0.65234(2)	-0.34470(4)	-0.29983	-0.26057	-0.27804
ISM1025V	28	0.89667(1)	0.81857(1)	0.99965(1)	0.89669(1)	0.81982(1)	0.99978(1)	-0.53499(2)	-0.44832(4)	-0.39854(5)	-0.42920(3)
ISM4UPV	63	0.98103(1)	0.68844(1)	0.86932(1)	0.98147(1)	0.69082(1)	0.87147(1)	-0.67426(1)	-0.54512(3)	-0.49062(4)	-0.51628(2)
ISM8UPV	28	0.45682(2)	0.89765(1)	0.65326(2)	0.45705(2)	0.89756(1)	0.65334(2)	-0.34513(4)	-0.29940	-0.26042	-0.27821
ISM10UPV	28	0.89730(1)	0.81835(1)	0.99951(1)	0.89733(1)	0.81975(1)	0.99985(1)	-0.53336(2)	-0.44590(4)	-0.39667(5)	-0.42747(3)
SSM425V	38	-0.47998(2)	-0.40044(5)	-0.48905(2)	-0.48122(2)	-0.40036(5)	-0.48899(4)	0.93051(1)	0.81737(1)	0.76959(1)	0.86830(1)
SSM825V	28	-0.46703(2)	-0.35920	-0.43233(5)	-0.46856(2)	-0.35839	-0.43128(5)	0.91229(1)	0.85048(1)	0.81105(1)	0.86680(1)
SSM1025V	28	-0.44157(2)	-0.33014	-0.40372(5)	-0.44308(3)	-0.32957	-0.40324(5)	0.89101(1)	0.81919(1)	0.78998(1)	0.85028(1)
SSM4UPV	38	-0.41262(3)	-0.35890	-0.43975(5)	-0.41454(2)	-0.35870	-0.43913(5)	0.89587(1)	0.91549(1)	0.89370(1)	0.97228(1)
SSM8UPV	28	-0.41511(3)	-0.31563	-0.38402(5)	-0.41727(3)	-0.31499	-0.38276(5)	0.88527(1)	0.93150(1)	0.92248(1)	0.97701(1)
SSM10UPV	28	-0.39640(4)	-0.29642	-0.36425	-0.39859(4)	-0.29598	-0.36327	0.86823(1)	0.91870(1)	0.91697(1)	0.97412(1)
POPAGRIC	68	-0.19298	-0.24913	-0.15713	-0.08425	-0.24522	-0.15193	0.44900(2)	0.58808(2)	0.55005(3)	0.39760(4)
POPDENS	68	-0.17841	-0.24219	-0.09795	-0.12028	-0.23748	-0.09163	0.40004(4)	0.58147(2)	0.55235(3)	0.33597(5)
NOTREE	50	-0.25998	-0.31851	-0.15442	-0.16097	-0.31817	-0.15388	0.44092	0.57152(5)	0.54099(5)	0.41594
AGRICX68	45	0.78414(1)	0.72334(2)	0.71531(2)	0.80007(1)	0.72451(2)	0.71490(2)	-0.79735(1)	-0.79826(1)	-0.74794(2)	-0.72356(2)
AGRICX70	68	0.70672(1)	0.62308(2)	0.66193(2)	0.70632(1)	0.61814(2)	0.65439(2)	-0.69611(1)	-0.72441(1)	-0.66049(2)	-0.54649(2)
AGRICX73	52	0.81692(1)	0.69338(2)	0.74292(2)	0.80776(1)	0.69495(2)	0.74481(2)	-0.76495(1)	-0.72273(2)	-0.67754(2)	-0.54882(2)
IND70	52	-0.43722(5)	-0.37540	-0.38866	-0.50721(3)	-0.37145	-0.38340	0.38292	0.35875	0.29349	0.32367
IND73	47	-0.49315(3)	-0.42623	-0.45247(5)	-0.47520(2)	-0.42706	-0.45429(5)	0.29390	0.18673	0.12298	0.15946
SERV70	52	-0.49444(5)	-0.42221(5)	-0.50668(4)	-0.42448(4)	-0.46851(5)	-0.50040(4)	0.63697(2)	0.67553(2)	0.66738(2)	0.58326(3)
SERV73	42	-0.40375(5)	-0.29300	-0.41841	-0.46297(4)	-0.29383	-0.41861	0.55716(2)	0.58505(4)	0.60520(3)	0.45453(4)
AGRICGDP	51	0.44213(4)	0.34473	0.35482	0.48940(2)	0.33415	0.41860	-0.57983(2)	-0.55901(4)	-0.51755(4)	-0.44505(4)
AGRICHOH	24	0.77509(2)	0.66559(2)	0.66861(2)	0.77660(2)	0.66693(2)	0.67060(2)	-0.77459(2)	-0.76270(2)	-0.71852(2)	-0.70283(2)
TOWNS250	68	-0.14947	-0.25574	-0.12997	-0.15362	-0.25259	-0.12597	-0.06614	-0.17728	-0.22958	-0.22035
TOWNS100	68	-0.15636	-0.23540	-0.14103	-0.16741	-0.23059	-0.14117	-0.13947	-0.19055	-0.21410	-0.22115
TOWNS50	32	N.C	N.C.	N.C.	-0.69631(3)	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
TOWNS40	32	N.C.	N.C.	N.C.	-0.75158(2)	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
TOWNS30	32	N.C.	N.C.	N.C.	-0.78491(2)	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
TOWNS20	32	N.C.	N.C.	N.C.	-0.81944(2)	N.C.	N.C.	N.C.	N.C	N.C.	N.C.
TOWNS10	18	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
AGGLM250	42	-0.24066	-0.37915	-0.39021	-0.24391	-0.37014	-0.37660	0.19451	0.22227	0.17453	0.01987
AGGLM100	42	-0.19679	-0.38417	-0.40719	-0.20111	-0.38004	-0.39937	0.16304	0.34434	0.30435	0.03094
CARS66	63	-0.66077	(1)-0.57633(3)	-0.62837	(2)-0.67092(1)	-0.57533(3)	-0.67604(2)	0.56677(2)	0.55883(4)	0.52981(4)	0.36567(5)
CARS70	68	-0.58500(1)	-0.51821(3)	-0.62369(2)	-0.59815(1)	-0.51433(3)	-0.61778(2)	0.41661(3)	0.42425(5)	0.37203(5)	0.31284(5)
CARS73	68	-0.48734(2)	-0.43491(5)	-0.54674(3)	-0.50815(2)	-0.42957(5)	-0.53851(3)	0.24504	0.24330	0.20883	0.15301
MVSROAD	66	-0.41478(4)	-0.39042(5)	-0.39029(5)	-0.15356	-0.39082(5)	-0.39124(5)	0.40900(3)	0.39530(5)	0.32110	0.17347
MVRSOADP	61	-0.16081	-0.37491	-0.24634	-0.09931	-0.37254(5)	-0.24317	0.02609	0.30531	0.14554	-0.01344
RDSQKMMI	66	0.31316(5)	0.13809	0.25152	0.27847	0.13993	0.25470	0.01980	0.50324(4)	0.54484(3)	0.33130(5)
RDSQKMPL	61	-0.42839(4)	-0.26660	-0.25209	-0.28474	-0.26933	-0.25714	0.66929(1)	0.69221(1)	0.72627(1)	0.66492(1)
RDPOPMIN	66	0.50144(2)	0.66465(2)	0.41768(5)	0.45948(2)	0.66486(2)	0.41832(5)	-0.35247(4)	-0.30918	-0.26252	-0.14170
RDPOPPLU	61	-0.18702	0.03412	-0.16579	-0.06940	0.03065	-0.17103	0.34853(4)	0.26597	0.40492(5)	0.37411(5)
PCFOD	21	0.01516	N.C.	N.C.	-0.08174	N.C.	N.C.	-0.23207	N.C.	N.C.	0.11337
GVAHAB	68	-0.55796(1)	-0.45394(4)	-0.54511(3)	-0.56151(1)	-0.45119(4)	-0.54164(3)	0.77294(1)	0.61024(2)	0.52756(3)	0.59057(1)
GVAOCCUP	49	-0.56053(2)	-0.56834(4)	-0.62767(2)	-0.52373(1)	-0.56382(4)	-0.62038(2)	0.69623(1)	0.77616(1)	0.75038(1)	0.71849(1)
CONSEXP	46	-0.68948(1)	-0.50614(5)	-0.64215(3)	-0.56263(1)	-0.50115(5)	-0.63433(3)	0.62723(2)	0.52154(5)	0.42324	0.57760(2)
DISPINC	68	-0.39508(4)	-0.43893(5)	-0.52637(3)	-0.43249(2)	-0.43589(5)	-0.52260(3)	0.65411(1)	0.66124(2)	0.57885(2)	0.59308(1)
UNEMPLOY	52	0.79684(1)	0.47716(5)	0.73951(1)	0.79140(1)	0.47818(5)	0.74055(1)	-0.67354(1)	-0.63185(3)	-0.59609(3)	-0.48191(3)
FRINGE	21	0.16048	N.C.	N.C.	0.27221	N.C.	N.C.	0.06940	N.C.	N.C.	-0.08751
HDF	10	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C	N.C.	N.C.	N.C.
INDENERG	42	-0.42286(5)	-0.32908	-0.42242	-0.31003(5)	-0.33077	-0.42468	0.48456(3)	0.63829(3)	0.62533(3)	0.44187(4)
INDELECT	51	-0.48019(4)	-0.41172	-0.54231(4)	-0.39958(4)	-0.41276	-0.54400(4)	0.45321(4)	0.43935	0.39537	0.42164(4)
FELF1564	68	-0.54139(2)	-0.28142	-0.38167(5)	-0.54328(1)	-0.28268	-0.38441(5)	0.70797(1)	0.40408(5)	0.32574	0.40350(3)
FELF15UP	68	-0.52941(2)	-0.27789	-0.36960	-0.53069(1)	-0.27906	-0.37231(5)	0.70092(1)	0.38322(5)	0.30330	0.39088(4)
FECV1564	68	-0.57906(1)	-0.31861	-0.43369(5)	-0.58167(1)	-0.32046	-0.43691(5)	0.69853(1)	0.48512(4)	0.41532(5)	0.40932(3)
FECV15UP	68	-0.57262(1)	-0.31697	-0.42375(5)	-0.57612(1)	-0.31871	-0.42692(5)	0.69619(1)	0.45880(4)	0.38641(5)	0.39878(4)
FECV14UP	41	-0.24341	-0.01588	-0.11695	-0.35241(5)	-0.01681	-0.11852	0.35203	0.35944	0.34507	0.28909
FEXLF	68	-0.48987(2)	-0.17100	-0.28602	-0.50353(2)	-0.17080	-0.28659	0.69253(1)	0.44477	0.37630	0.43073(3)
BIRTHS66	58	0.50486(3)	0.15433	0.51668	0.48806(2)	0.15551	0.51781	-0.40850(4)	-0.47464	-0.46398	-0.42270(4)
BIRTHS73	68	0.30797(5)	0.02648	0.23755	0.37187(4)	0.02205	0.23039	-0.35155(4)	-0.29836	-0.28117	-0.31740(5)
HHOLDS	68	0.46678(2)	0.31500	0.41116(5)	0.48061(2)	0.31084	0.40581(5)	-0.56218(1)	-0.49357(4)	-0.41606(5)	-0.44920(2)

DISTRIBUTION ANALYSIS IN EUROPE : REGIONAL ANALYSIS

APPENDIX 2 (CONTINUED) 3

	N.	SSM8UPX	SSM10UPX	IHY	SHY	ISM425V	ISM825V	ISM1025V	ISM4UPV	ISM8UPV	ISM10UPV
ISM425X	30	-0.37042(5)	-0.34562	0.56587(1)	-0.23422	0.98125(1)	0.45544(2)	0.89667(1)	0.98103(1)	0.45682(2)	0.89730(1)
ISM825X	20	-0.28529	-0.26216	0.38200(5)	-0.22952	0.68855(1)	0.89734(1)	0.81857(1)	0.68844(1)	0.89765(1)	0.81835(1)
ISM1025X	20	-0.34747	-0.32341	0.47306(4)	-0.28355	0.86949(1)	0.65237(2)	0.99965(1)	0.86932(1)	0.65326(2)	0.99951(1)
ISM4UPX	39	-0.37284(5)	-0.34807	0.56809(1)	-0.23670	0.98147(1)	0.45567(2)	0.89669(1)	0.98147(1)	0.45705(2)	0.89733(1)
ISM8UPX	20	-0.28446	-0.26157	0.38791(5)	-0.22921	0.69091(1)	0.89718(1)	0.81982(1)	0.69082(1)	0.89756(1)	0.81975(1)
ISM10UPX	20	-0.34528	-0.32154	0.48162(4)	-0.28229	0.87161(1)	0.65236(2)	0.99978(1)	0.87147(1)	0.65334(2)	0.99985(1)
SSM425X	30	0.80018(1)	0.77560(1)	-0.69264(1)	0.66635(1)	-0.67302(1)	-0.34470(4)	-0.53499(2)	-0.67426(1)	-0.34513(4)	-0.53336(2)
SSM825X	20	0.93841(1)	0.92195(1)	-0.68525(1)	0.87195(1)	-0.54281(3)	-0.29983	-0.44833(4)	-0.54512(3)	-0.29940	-0.44590(4)
SSM1025X	20	0.94864(1)	0.94047(1)	-0.66869(2)	0.89102(1)	-0.48808(4)	-0.26057	-0.39854(5)	-0.49062(4)	-0.26042	-0.39667(5)
SSM4UPX	30	0.96558(1)	0.95600(1)	-0.64052(1)	0.92105(1)	-0.51413(2)	-0.27804	-0.42990(3)	-0.51628(2)	-0.27821	-0.42747(3)
SSM8UPX	20	1.00000	0.99835(1)	-0.66519(2)	0.98738(1)	-0.43310(5)	-0.22515	-0.34109	-0.43581(5)	-0.22496	-0.33919
SSM10UPX	20	0.99835(1)	1.00000	-0.65302(2)	0.99249(1)	-0.40675(5)	-0.20728	-0.31705	-0.40951(5)	-0.20719	-0.31535
IHY	59	-0.66519(2)	-0.65302(2)	1.00000	-0.55598(1)	0.57021(1)	0.34840(4)	0.52790(2)	0.57583(1)	0.35182(4)	0.53121(2)
SHY	52	0.98738(1)	0.99249(1)	-0.55598(1)	1.00000	-0.35491(2)	-0.23611	-0.35508(4)	-0.35901(2)	-0.23683	-0.35398(4)
ISM425V	54	-0.43310(5)	-0.40675(5)	0.57021(1)	-0.35491(2)	1.00000	0.42428(3)	0.88139(1)	0.99992(1)	0.42622(3)	0.88222(1)
ISM825V	28	-0.22515	-0.20728	0.34840	-0.23611	0.42428(3)	1.00000	0.66613(1)	0.42482(3)	0.99998(1)	0.66603(1)
ISM1025V	28	-0.34109	-0.31705	0.52790(2)	-0.35508(4)	0.88139(1)	0.66613(1)	1.00000	0.88116(1)	0.66729(1)	0.99993(1)
ISM4UPV	63	-0.43581(5)	-0.40951(5)	0.57583(1)	-0.35901(2)	0.99992(1)	0.42482(3)	0.88116(1)	1.00000	0.42678(3)	0.88202(1)
ISM8UPV	28	-0.22496	-0.20719	0.35182(4)	-0.23683	0.42622(3)	0.99998(1)	0.66729(1)	0.42678(3)	1.00000	0.66725(1)
ISM10UPV	28	-0.33919	-0.31535	0.53121(2)	-0.35398(4)	0.88222(1)	0.66603(1)	0.99993(1)	0.88202(1)	0.66725(1)	1.00000
SSM425V	38	0.74036(1)	0.71587(1)	-0.57048(1)	0.66230(1)	-0.57754(1)	-0.33537(5)	-0.50804(2)	-0.57803(1)	-0.33511(5)	-0.50551(2)
SSM825V	28	0.77717(1)	0.75484(1)	-0.59362(1)	0.68197(1)	-0.55286(2)	-0.30453(5)	-0.44585(3)	-0.55324(2)	-0.30334(5)	-0.44227(2)
SSM1025V	28	0.76004(1)	0.74157(1)	-0.56836(1)	0.67256(1)	-0.52578(2)	-0.27906	-0.41759(3)	-0.52621(2)	-0.27795	-0.41407(3)
SSM4UPV	38	0.91804(1)	0.90460(1)	-0.63120(1)	0.89052(1)	-0.52243(1)	-0.31960(5)	-0.48284(2)	-0.52497(1)	-0.31977(5)	-0.48074(2)
SSM8UPV	28	0.95793(1)	0.94922(1)	-0.71401(1)	0.93169(1)	-0.54051(2)	-0.29144	-0.43228(3)	-0.54320(2)	-0.29128	-0.42985(3)
SSM10UPV	28	0.96101(1)	0.95537(1)	-0.70851(1)	0.94319(1)	-0.52383(2)	-0.27699	-0.41565(4)	-0.52671(2)	-0.27697	-0.41338(4)
POPAGRIC	68	0.46207(4)	0.43771(5)	-0.15228	0.10210	-0.16152	-0.14419	-0.10144	-0.07491	-0.14219	-0.09842
POPDENS	68	0.45070(4)	0.42852(5)	-0.20275	0.04466	-0.06353	-0.13530	-0.05077	-0.00860	-0.13314	-0.04751
NOTREE	50	0.43035(5)	0.40856(5)	-0.22944	0.14330	-0.04150	-0.15698	-0.07387	-0.09455	-0.15613	-0.07301
AGRICX68	45	-0.71222(2)	-0.69064(2)	0.62970(1)	-0.55581(1)	0.76405(1)	0.53243(2)	0.66720(1)	0.75644(1)	0.53295(1)	0.66736(1)
AGRICX70	68	-0.59375(2)	-0.56163(2)	0.46827(1)	-0.22442	0.64128(1)	0.44699(4)	0.59655(1)	0.64137(1)	0.44606(3)	0.59317(1)
AGRICX73	52	-0.63327(2)	-0.61368(2)	0.26978(1)	-0.14252	0.74462(1)	0.48663(4)	0.64194(1)	0.73992(1)	0.48746(4)	0.66232(1)
IND70	52	0.30394	0.27939	-0.40107(3)	0.35848(4)	-0.42424(2)	-0.27454	-0.37923(5)	-0.43457(2)	-0.27430	-0.37771(5)
IND73	47	0.11487	0.09092	-0.29517(5)	-0.03986	-0.39391(4)	-0.26971	-0.35723	-0.39139(2)	-0.26993	-0.35833
SERV70	52	0.58239(3)	0.57249(3)	-0.20159	0.15977	-0.43354(2)	-0.32532	-0.42437(4)	-0.38940(2)	-0.32408	-0.42106(4)
SERV73	47	0.56601(4)	0.57075(4)	-0.36474(4)	0.26314	-0.39301(4)	-0.23893	-0.33490	-0.36022(3)	-0.23960	-0.33420
AGRICGDP	51	-0.47382(5)	-0.45469(5)	0.32813(4)	-0.25889	0.44014(2)	0.27718	0.36951(5)	0.47115(1)	0.27476	0.36312(5)
AGRICHOH	24	-0.68764(2)	-0.66871(2)	0.68475(1)	-0.59878(2)	0.76979(1)	0.48768(4)	0.64567(3)	0.76924(1)	0.48845(4)	0.64625(2)
TOWNS250	68	-0.29602	-0.31589	-0.02134	-0.16527	-0.07748	-0.17600	-0.09274	-0.10216	-0.17578	-0.09285
TOWNS100	68	-0.30772	-0.32039	0.00687	-0.16634	-0.06168	-0.16705	-0.07609	-0.09461	-0.16566	-0.07482
TOWNS50	32	N.C.	N.C.	-0.30011	0.14691	-0.52411	N.C.	N.C.	-0.55261	N.C.	N.C.
TOWNS40	32	N.C.	N.C.	-0.35708	0.18983	-0.62522	N.C.	N.C.	-0.63178	N.C.	N.C.
TOWNS30	32	N.C.	N.C.	-0.42127	0.24298	-0.70960	N.C.	N.C.	-0.69643	N.C.	N.C.
TOWNS20	32	N.C.	N.C.	-0.35662	0.21413	-0.70566	N.C.	N.C.	-0.68373	N.C.	N.C.
TOWNS10	18	N.C.	N.C.	-0.40634	0.28801	-0.79174	N.C.	N.C.	-0.79086	N.C.	N.C.
AGGLM250	42	0.00875	-0.01332	-0.17322	-0.01894	-0.08524	-0.18651	-0.18816	-0.08226	-0.18649	-0.18236
AGGLM100	42	0.14807	0.12801	0.25458(5)	0.01950	-0.07767	-0.24588	-0.23917	-0.07760	-0.24967	-0.23802
CARS66	63	0.49464(5)	0.48132(5)	-0.51894(1)	0.32362(4)	-0.56955(1)	-0.41788(4)	-0.63851(1)	-0.56620(1)	-0.41909(4)	-0.63813(1)
CARS70	68	0.34168	0.31933	-0.31476(3)	0.32017(3)	-0.51340(1)	-0.38849(4)	-0.62494(1)	-0.51667(1)	-0.38842(4)	-0.62296(1)
CARS73	68	0.16234	0.13951	-0.17242	0.22209	-0.45760(1)	-0.33501(5)	-0.56440(1)	-0.46344(1)	-0.32415(5)	-0.56180(1)
MVSROAD	66	0.19509	0.16005	-0.15609	-0.17476	-0.15752	-0.20325	-0.23081	-0.10577	-0.20240	-0.22981
MVRSDADP	61	0.09166	-0.04940	-0.06236	-0.03429	-0.02831	-0.17317	-0.09178	-0.07792	-0.17093	-0.09000
RDSOKMMI	66	0.58745(2)	0.59794(2)	-0.31149(3)	0.46741(1)	-0.01733	0.00893	0.03146	-0.00177	0.00844	0.03087
RDSOKMPL	61	0.70742(1)	0.66965(2)	-0.47417(1)	0.13688	-0.20749	-0.22195	-0.36082	-0.17062	-0.22446	-0.36275
RDPOPMIN	66	-0.12855	-0.10190	-0.02388	0.14387	-0.12236	0.07598	-0.06883	-0.07682	0.07352	-0.07133
RDPOPPLU	61	0.45250(2)	0.53358(2)	-0.00647	0.14800	-0.23390	-0.05991	-0.26559	-0.15774	-0.06317	-0.26832
PCFOO	21	N.C.	N.C.	-0.55471(5)	0.97506(1)	-0.54701(3)	-0.77607(3)	-0.77320(3)	-0.68016(1)	-0.80824(2)	-0.82560(2)
GVAHAB	68	0.45204(4)	0.41425(5)	-0.36480(2)	0.37256(2)	-0.52157(1)	-0.35586(4)	-0.54047(2)	-0.53257(1)	-0.35508(4)	-0.53748(2)
GVAOCCUP	49	0.73879(2)	0.72507(2)	-0.55626(1)	0.65563(1)	-0.55140(1)	-0.41900(5)	-0.58337(2)	-0.56657(1)	-0.41866(4)	-0.58048(2)
CONSEXP	46	0.41750	0.32774	-0.50025(1)	0.58789(1)	-0.59123(2)	-0.33881	-0.55409(2)	-0.58163(1)	-0.33875	-0.55173(2)
DISPINC	68	0.51369(3)	0.47636(4)	-0.28669(4)	0.42151(2)	-0.44177(1)	-0.33915(5)	-0.51357(2)	-0.44059(1)	-0.33715(5)	-0.50962(2)
UNEMPLOY	52	-0.53468(4)	-0.51671(5)	0.75703(1)	-0.46192(2)	0.86033(1)	0.36190(5)	0.75105(1)	0.85705(1)	0.36365(5)	0.75230(1)
FRIDGE	21	N.C.	N.C.	0.01153	0.55011(3)	-0.12141	-0.92000(1)	-0.89837(2)	-0.21450	-0.93752(1)	-0.93059(1)
HDF	10	N.C.	N.C.	-0.13489	0.26339	0.76218(2)	0.35230	0.21554	0.73607(2)	0.28681	0.10259
INDENERG	47	0.73838(2)	0.73824(2)	-0.41112(2)	0.28362(5)	-0.30611(5)	-0.16041	-0.24236	-0.27102(5)	-0.16056	-0.24213
INDELECT	51	0.48641(5)	0.47522(5)	-0.39876(2)	0.30972(5)	-0.39957(2)	-0.28752	-0.44287(4)	-0.35453(2)	-0.28842	-0.44371(4)
FELF1564	68	0.26107	0.22784	-0.38617(2)	0.23994(5)	-0.51920(1)	-0.24464	-0.44367(3)	-0.51461(1)	-0.24593	-0.44330(3)
FELF15UP	68	0.23446	0.20051	-0.38451(2)	0.29847(4)	-0.50798(1)	-0.24113	-0.42838(3)	-0.50121(1)	-0.24231	-0.42788(3)
FECV1564	68	0.33817	0.30621	-0.53760(1)	0.32736(3)	-0.52378(1)	-0.26770	-0.48220(2)	-0.52574(1)	-0.26957	-0.48258(2)
FECV15UP	68	0.30447	0.27144	-0.52929(1)	0.32057(3)	-0.51718(1)	-0.26641	-0.47154(2)	-0.51768(1)	-0.26816	-0.47178(2)
FECV14UP	41	0.27932	0.26928	-0.51818(2)	0.41375(3)	-0.42329(4)	-0.16160	-0.32813	-0.40028(2)	-0.16420	-0.33063
FEXLF	68	0.32690(5)	0.29775	-0.36986(2)	0.24439(5)	-0.46704(1)	-0.16279	-0.37473(5)	-0.47432(1)	-0.16404	-0.37399(5)
BIRTHS66	58	-0.44706	-0.44202	0.18508	-0.27030(5)	0.45932(2)	-0.02775	0.48824(4)	0.45534(1)	-0.02679	0.48911(4)
BIRTHS73	68	-0.30353	-0.29674	0.17027	-0.21200	0.34406(2)	-0.08538	0.20269	0.36128(2)	-0.08678	0.19903
HHOLDS	68	-0.43639(5)	-0.40857(5)	0.37609(2)	-0.31046(4)	0.48807(1)	0.26699	0.44481(3)	0.48905(1)	0.26533	0.44116(3)

APPENDIX 2 (CONTINUED) 4 : DISTRIBUTION ANALYSIS IN EUROPE: REGIONALANALYSIS.

	N	SSM425V	SSM825V	SSM1025V	SSM4UPV	SSM8UPV	SSM10UPV	POPAGRIC	POPDENS	NOTREE	AGRICX68
ISM425X	30	-0.47998 (2)	-0.46703 (2)	-0.44157 (2)	-0.41262 (3)	-0.41511 (3)	-0.39640 (4)	-0.19298	-0.17841	-0.25998	0.28414
ISM825X	20	-0.40044 (5)	-0.35920	-0.33014	-0.35890	-0.31563	-0.29442	-0.24913	-0.24219	-0.31851	0.22336
ISM1025X	20	-0.48905 (4)	-0.43233 (5)	-0.40372 (5)	-0.43975 (5)	-0.38402 (5)	-0.36425	-0.15713	-0.09765	-0.15442	0.21533
ISM4UPX	39	-0.48122 (2)	-0.46854 (2)	-0.44308 (2)	-0.41454 (2)	-0.41727 (3)	-0.39859 (4)	-0.08425	-0.12028	-0.14997	0.18007
ISM8UPX	20	-0.40036 (5)	-0.35829	-0.32957	-0.35870	-0.31499	-0.29598	-0.24522	-0.23748	-0.31817	0.22451
ISM10UPX	20	-0.48899 (4)	-0.43128 (5)	-0.40324 (5)	-0.43913 (5)	-0.38274 (5)	-0.36327	-0.15193	-0.09163	-0.15386	0.21690
SSM425X	30	0.93051 (1)	0.91229 (1)	0.89101 (1)	0.89587 (1)	0.88527 (1)	0.86823 (1)	0.44900	0.40064	0.43299	-0.79235
SSM825X	20	0.81737 (1)	0.85048 (1)	0.81919 (1)	0.91549 (1)	0.93150 (1)	0.91870 (1)	0.58008	0.58147	0.57152	-0.79826
SSM1025X	20	0.76959 (1)	0.81105 (1)	0.78998 (1)	0.89370 (1)	0.92248 (1)	0.91697 (1)	0.55005	0.55235	0.54099	-0.74794
SSM4UPX	30	0.86830 (1)	0.86680 (1)	0.85020 (1)	0.97228 (1)	0.97701 (1)	0.97412 (1)	0.39760	0.34597	0.41594	-0.72456
SSM8UPX	20	0.74036 (1)	0.77717 (1)	0.76004 (1)	0.91804 (1)	0.95793 (1)	0.96101 (1)	0.46207	0.45070	0.43035	-0.71229
SSM10UPX	20	0.71587 (1)	0.75484 (1)	0.74157 (1)	0.90460 (1)	0.94922 (1)	0.95537 (1)	0.43771	0.42852	0.40854	-0.69044
IHY	59	-0.57048 (1)	-0.59362 (2)	-0.56836 (2)	-0.63120 (1)	-0.71401 (1)	-0.70851 (1)	-0.15228	-0.20275	-0.22944	0.62970
SHY	52	0.66230 (1)	0.68197 (1)	0.67256 (1)	0.89052 (1)	0.93169 (1)	0.94319 (1)	0.10210	0.04466	0.14330	-0.55581
ISM425V	54	-0.57754 (1)	-0.55286 (1)	-0.52578 (2)	-0.52243 (1)	-0.54051 (2)	-0.52383 (2)	-0.16152	-0.06353	-0.04150	0.76405
ISM825V	28	-0.33537 (5)	-0.30453 (5)	-0.27906	-0.31960 (5)	-0.29144	-0.27699	-0.14419	-0.13530	-0.15690	0.53243
ISM1025V	28	-0.50804 (2)	-0.44585 (3)	-0.41759 (3)	-0.48284 (2)	-0.43228 (3)	-0.41565 (3)	-0.10144	-0.05077	-0.07387	0.66720
ISM4UPV	63	-0.57803 (1)	-0.55324 (2)	-0.52621 (2)	-0.52497 (1)	-0.54320 (2)	-0.52671 (2)	-0.07491	-0.00860	-0.09455	0.75644
ISM8UPV	28	-0.33511 (5)	-0.30334 (5)	-0.27795	-0.31977 (5)	-0.29128	-0.27697	-0.14219	-0.13314	-0.15613	0.53295
ISM10UPV	28	-0.50551 (2)	-0.44227 (3)	-0.41407 (3)	-0.48074 (2)	-0.42985 (3)	-0.41338 (3)	-0.09842	-0.04751	-0.07301	0.66736
SSM425V	38	1.00000	0.97341 (1)	0.96338 (1)	0.93062 (1)	0.87640 (1)	0.85756 (1)	0.35146	0.27077	0.28827	-0.74047
SSM825V	28	0.97341 (1)	1.00000	0.99338 (1)	0.92688 (1)	0.90103 (1)	0.88332 (1)	0.43593	0.39419	0.39380	-0.72274
SSM1025V	28	0.96338 (1)	0.99338 (1)	1.00000	0.91605 (1)	0.89223 (1)	0.88023 (1)	0.38551	0.35127	0.27556	-0.68571
SSM4UPV	38	0.93062 (1)	0.92688 (1)	0.91605 (1)	1.00000	0.98663 (1)	0.98045 (1)	0.28067	0.20397	0.23931	-0.68179
SSM8UPV	28	0.87640 (1)	0.90103 (1)	0.89223 (1)	0.98663 (1)	1.00000	0.99803 (1)	0.33317	0.30227	0.23771	-0.66526
SSM10UPV	28	0.85756 (1)	0.88332 (1)	0.88023 (1)	0.98045 (1)	0.99803 (1)	1.00000	0.29817	0.27180	0.20620	-0.64262
POPAGRIC	68	0.35146 (4)	0.43593 (3)	0.38551 (4)	0.28067 (5)	0.33317 (5)	0.29817 (5)	1.00000	0.94992	0.96346	-0.74436
POPDENS	68	0.27077	0.39419 (4)	0.35127 (4)	0.20397	0.30227 (5)	0.27180	0.94992	1.00000	0.99846	-0.34094
NOTREE	50	0.28827	0.32380	0.27556	0.23931	0.23771	0.20620	0.96346	0.99846	1.00000	-0.34992
AGRICX68	45	-0.74247 (1)	-0.72274 (1)	-0.68571 (1)	-0.68179 (1)	-0.66526 (1)	-0.64262 (2)	-0.24436	-0.34094	-0.34992	1.00000
AGRICX70	68	-0.46169 (2)	-0.60077 (1)	-0.54962 (2)	-0.38202 (3)	-0.55708 (2)	-0.52571 (2)	-0.18810	-0.32250	-0.36624	0.98765
AGRICX73	52	-0.53169 (3)	-0.63653 (2)	-0.60274 (2)	-0.38112 (5)	-0.56828 (2)	-0.54666 (2)	-0.02763	-0.06597	-0.34228	0.98450
IND70	52	0.32827	0.28414	0.26325	0.33504	0.32014	0.31229	0.04440	0.08075	0.10880	-0.57864
IND73	47	0.07436	0.05895	0.03448	0.02008	0.05560	0.04515	0.00987	0.04089	0.06226	-0.47970
SERV70	52	0.58322 (2)	0.60629 (2)	0.57958 (2)	0.49596 (3)	0.48910 (4)	0.46684 (4)	0.20585	0.27710	0.28023	-0.56661
SERV73	47	0.51344 (2)	0.61208 (2)	0.60133 (2)	0.40308 (3)	0.54265 (2)	0.53155 (2)	0.19691	0.29499	0.32456	-0.51413
AGRICGDP	51	-0.47418 (2)	-0.52770 (3)	-0.50268 (3)	-0.38149 (3)	-0.48449 (4)	-0.46811 (4)	-0.18969	-0.31680	-0.39676	0.92194
AGRICHOH	24	-0.74573 (1)	-0.71494 (1)	-0.68124 (1)	-0.68794 (1)	-0.66705 (1)	-0.64679 (2)	-0.57773	-0.51632	-0.54566	0.97923
TOWNS250	68	-0.18176	-0.26038	-0.31109 (5)	-0.26493	0.31301 (5)	-0.33790 (5)	0.51044	0.54342	0.57381	-0.27583
TOWNS100	68	-0.30200 (5)	-0.34259 (5)	-0.40158 (4)	-0.38812 (3)	-0.40111 (4)	-0.43032 (3)	0.50902	0.56015	0.59542	-0.33189
TOWNS50	32	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	0.54684	0.58680	0.61655	-0.77010
TOWNS40	32	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	0.53377	0.58240	0.62084	-0.82448
TOWNS30	32	N.C.	N.C	N.C.	N.C.	N.C.	N.C.	0.50391	0.56253	0.60544	-0.84368
TOWNS20	32	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	0.47271	0.53851	0.58134	-0.87043
TOWNS10	18	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	0.54606	0.24920	0.62139	-0.97548
AGGLM250	42	0.04980	0.06594	-0.01085	-0.04305	-0.04796	-0.09301	0.71519	0.60774	0.69538	-0.62454
AGGLM100	42	0.01533	0.07947	-0.00360	-0.00562	0.07401	0.03394	0.68808	0.60638	0.68591	-0.65150
CARS66	63	0.50047 (2)	0.53570 (3)	0.50556 (3)	0.39751 (4)	0.52680 (3)	0.51281 (3)	-0.03753	-0.01879	-0.01374	-0.57133
CARS70	68	0.39800 (3)	0.43366 (3)	0.40697 (4)	0.38797 (3)	0.45369 (2)	0.44100 (3)	-0.05616	-0.06267	-0.07002	-0.48053
CARS73	68	0.26546	0.28509	0.25794	0.24946	0.28154	0.26768	-0.07134	-0.07945	-0.09850	-0.40674
MVSROAD	66	0.13474	0.34689 (5)	0.29255	-0.03538	0.12497	0.07976	0.97741	0.97127	0.97873	-0.27834
MVRSOADP	61	-0.04794	-0.05608	-0.13998	-0.14870	-0.19913	-0.25492	0.99834	0.95640	0.97109	-0.27306
RDSQKMMI	66	0.21218	0.19956	0.18099	0.46406 (2)	0.50786 (2)	0.52217 (2)	-0.09208	0.00041	-0.03895	-0.09900
RDSQKMPL	61	0.45622 (2)	0.63641 (1)	0.61321 (1)	0.43123 (2)	0.70505 (1)	0.69070 (2)	-0.15785	0.06317	-0.00629	-0.14593
RDPOPMIN	66	0.04086	-0.07938	-0.07540	0.21371	0.13496	0.15546	-0.13853	-0.30197	-0.33060	0.19310
RDPOPPLU	61	0.37451 (4)	0.34540 (5)	0.38627 (5)	0.51286 (2)	0.53052 (2)	0.56370 (2)	-0.21010	-0.38589	-0.37898	0.27205
PCFOO	21	0.73415 (1)	0.58674 (5)	0.61787 (5)	0.93751 (1)	0.88416 (2)	0.90606 (1)	-0.23317	-0.30363	-0.16755	0.51911
GVAHAB	68	0.75228 (1)	0.71664 (1)	0.68063 (1)	0.64421 (1)	0.58863 (1)	0.55702 (1)	0.13184	0.15081	0.15052	-0.73187
GVAOCCUP	49	0.70419 (1)	0.67950 (1)	0.65743 (1)	0.70331 (1)	0.68015 (1)	0.66807 (1)	0.19948	0.27399	0.27579	-0.86628
CONSEXP	46	0.75342 (1)	0.70442 (1)	0.75627 (1)	0.71572 (1)	0.71840 (1)	0.69351 (1)	0.38253	0.45400	0.46565	-0.79446
DISPINC	68	0.78998 (1)	0.80027 (1)	0.76167 (1)	0.69027 (1)	0.61966 (1)	0.58188 (1)	0.09508	0.08284	0.09535	-0.65922
UNEMPLOY	52	-0.62226 (1)	-0.59945 (2)	-0.57372 (2)	-0.54997 (2)	-0.60993 (2)	-0.59828 (2)	-0.12673	-0.16022	-0.15791	0.74958
FRIDGE	21	0.48665 (4)	0.65290 (5)	0.61386 (5)	0.57381 (3)	0.75613 (3)	0.72923 (4)	0.06038	-0.02634	-0.19291	0.08145
HDF	10	-0.35602	-0.40436	-0.30733	-0.09583	-0.06673	0.03411	-0.34254	-0.38049	-0.35192	0.54859
INDENERG	47	0.30289 (5)	0.35411 (5)	0.35152 (5)	0.30412 (5)	0.39938 (5)	0.40023 (5)	-0.12851	-0.10950	-0.09071	-0.36476
INDELECT	51	0.28864	0.29627	0.28692	0.32874 (5)	0.39424 (5)	0.39656 (5)	-0.19296	-0.19393	-0.20743	-0.32834
FELF1564	68	0.61341 (1)	0.63465 (1)	0.62136 (1)	0.45249 (2)	0.50220 (2)	0.48172 (2)	0.11080	0.09024	0.09116	-0.45058
FELF15UP	68	0.61124 (1)	0.62383 (1)	0.61061 (1)	0.43852 (2)	0.47478 (2)	0.45295 (2)	0.04640	0.03251	0.03394	-0.44884
FECV1564	68	0.55348 (1)	0.60906 (1)	0.59222 (1)	0.43343 (2)	0.53771 (2)	0.52074 (2)	0.12863	0.13068	0.14397	-0.49198
FECV15UP	68	0.55611 (1)	0.60173 (1)	0.58488 (1)	0.42183 (2)	0.50987 (2)	0.49116 (2)	0.04641	0.07516	0.08679	-0.49268
FECV14UP	41	0.43272 (5)	0.34670	0.33507	0.40575 (5)	0.36439	0.36037	0.08933	0.04412	0.05672	-0.32495
FEXLF	68	0.60109 (1)	0.61200 (1)	0.59469 (2)	0.49509 (2)	0.54823 (2)	0.53185 (2)	0.21164	0.19544	0.20085	-0.42983
BIRTHS66	58	-0.40443 (3)	-0.41396 (5)	-0.39942 (5)	-0.39061 (4)	-0.40483 (5)	-0.39715 (5)	0.36507	-0.35982	-0.39212	0.35322
BIRTHS73	68	-0.28593	-0.35057 (4)	-0.34634 (4)	-0.23127	-0.29953 (5)	-0.29093	0.25961	-0.29347	-0.33537	0.49219
HHOLDS	68	-0.51599 (1)	-0.61851 (1)	-0.57358 (1)	-0.44948 (2)	-0.55905 (2)	-0.53066 (2)	0.37732	-0.40639	-0.43709	0.66086

APPENDIX 2 (continued) 5 - DISTRIBUTION ANALYSIS IN EUROPE: REGIONAL ANALYSIS

Correlation coefficients:

	ISM425X	ISM825X	ISM1025X	ISM4UPX	ISM8UPX	ISM10UPX	SSM425X	SSM825X	SSM1025X	SSM4UPX
GVACPPP 52	-0.62367(1)	-0.49810(4)	-0.59724(2)	-0.61458(1)	-0.49537(4)	-0.59369(2)	0.75080(1)	0.59895(2)	0.51361(3)	0.54429(2)
GDPCPPP 52	-0.61060(1)	-0.50570(4)	-0.60700(2)	-0.60201(1)	-0.50320(4)	-0.60365(2)	0.74877(1)	0.59318(2)	0.50995(3)	0.55124(2)
GVAWCPPP49	-0.64572(1)	-0.64217(2)	-0.71314(1)	-0.59270(1)	-0.63806(2)	-0.70659(2)	0.65343(1)	0.69535(2)	0.65676(2)	0.61967(1)
CONSCPPP46	-0.72112(1)	-0.53637(2)	-0.68130(2)	-0.63002(1)	-0.53250(4)	-0.67508(2)	0.66532(1)	0.60140(4)	0.52076(5)	0.61935(2)
DINCCPPP52	-0.42285(3)	-0.45915(4)	-0.54858(3)	-0.45108(2)	-0.45485(4)	-0.54296(3)	0.62251(1)	0.65088(2)	0.56521(2)	0.55883(2)
GFK 68	-0.48095(2)	-0.39823(5)	-0.49837(4)	-0.48477(2)	-0.39494(5)	-0.49411(4)	0.73110(1)	0.63190(2)	0.55452(3)	0.60678(1)
FEMSIND 21	-0.57621(3)	-0.35451	-0.43436(5)	-0.57679(3)	-0.35533	-0.43533(5)	0.41083	0.39407	0.36029	0.28179
FEMSERV 21	-0.60223(3)	-0.24391	-0.56159(3)	-0.60372(3)	-0.24947	-0.56828(4)	0.63463(2)	0.55426(4)	0.54866(4)	0.57229(3)
FEINDSER21	-0.64842(2)	-0.30876	-0.55619(3)	-0.64957(2)	-0.31327	-0.56162(4)	0.56594(4)	0.51708(4)	0.50085(4)	0.45482(5)

	SSM8UPX	SSM10UPX	IHY	SHY	ISM425V	ISM825V	ISM1025V	ISM4UPV	ISM8UPV	ISM10UPV
GVACPPP 52	0.42238(5)	0.38283(5)	-0.49049(1)	0.29486(5)	-0.63596(1)	-0.37290(5)	-0.56770(2)	-0.63314(1)	-0.37215(5)	-0.56504(2)
GDPCPPP 52	0.41708(5)	0.37830(5)	-0.48324(1)	0.31158(5)	-0.62645(1)	-0.37677(5)	-0.57438(2)	-0.62415(1)	-0.37631(5)	-0.57198(2)
GVAWCPPP49	0.62508(2)	0.60616(2)	-0.53155(1)	0.53873(1)	-0.57609(1)	-0.45914(4)	-0.63523(2)	-0.59006(1)	-0.45872(4)	-0.63260(2)
CONSCPPP46	0.50814(5)	0.42758	-0.49671(1)	0.42324(2)	-0.65348(1)	-0.35844(5)	-0.59370(2)	-0.63421(1)	-0.35826(5)	-0.59154(2)
DINCCPPP52	0.48732(2)	0.44820(4)	-0.29322(4)	0.35715(3)	-0.47912(2)	-0.33463(5)	-0.50731(2)	-0.49150(1)	-0.33218(5)	-0.50293(2)
GFK 68	0.49991(4)	0.46528(4)	-0.31216(3)	0.41495(2)	-0.46015(1)	-0.29497	-0.47745(3)	-0.47341(1)	-0.29370	-0.47400(3)
FEMSIND 21	0.24804	0.22686	-0.12113	0.17315	-0.37311	-0.19899	-0.43606(5)	-0.37350	-0.19982	-0.43722(5)
FEMSERV 21	0.53210(4)	0.52725(4)	-0.58997(2)	0.50703(4)	-0.62560(2)	-0.11906	-0.56387(4)	-0.62721(2)	-0.12142	-0.56750(4)
FEINDSER21	0.41359	0.40081	-0.38981(5)	0.35508	-0.54976(3)	-0.15355	-0.55961(4)	-0.55080(4)	-0.15563	-0.56269(4)

	SSM425V	SSM825V	SSM1025V	SSM4UPV	SSM8UPV	SSM10UPV
GVACPPP 52	0.69071(1)	0.66932(1)	0.62727(1)	0.56426(1)	0.53211(2)	0.49730(2)
GDPCPPP 52	0.70188(1)	0.66106(1)	0.62001(1)	0.57863(1)	0.52415(2)	0.48992(2)
GVAWCPPP49	0.65223(1)	0.61794(2)	0.58753(2)	0.61664(1)	0.59280(2)	0.57559(2)
CONSCPPP46	0.70170(1)	0.71420(1)	0.67044(1)	0.60406(1)	0.61141(2)	0.57890(2)
DINCCPPP52	0.72594(1)	0.73308(1)	0.68838(1)	0.61618(1)	0.54505(2)	0.50424(2)
GFK 68	0.71074(1)	0.69286(1)	0.65644(1)	0.62764(1)	0.57812(2)	0.54774(2)
FEMSIND 21	0.37398	0.33208	0.30335	0.28418	0.24909	0.22911
FEMSERV 21	0.59225(3)	0.51970(4)	0.50536(4)	0.56135(3)	0.52442(3)	0.51831(4)
FEINDSER21	0.53464(4)	0.47927(5)	0.45745(5)	0.45764(5)	0.41857	0.40412

APPENDIX 3

Up to the time of writing, the following have agreed to participate in conjunction with ourselves, in a European Marketing Indicators Working Party. This will be specifically oriented towards the production by sub-national region of comparative indicators relevantly affecting retail distribution. Each will work to produce these indicators in respect of his own particular country, once the bases and methods of compiling these indicators have been mutually agreed. Final results will be published.

Professor Angelmar, Institut European d'Administration des Affaires (INSEAD) France
Professor Juan Farran, Universidad de Navarra, Barcelona, Spain.
Professor Bjarke Fog, Institute of Managerial Economics, The Copenhagen School of Business Administration, Copenhagen.
Professor Dr A Heirman, Economische Hogeschool, Limburg, Belgium.
Dr Lars Lindqvist, Swedish School of Economics & Business Administration, Helsinki, Finland.
Professor Aldo Spranzi, Director, Centro di Studi Sul Commercio, University L Bocconi, Milan.
Professor Bruno Tietz, Director, Handelsinsitut, University of Saarbrucken, Germany.
Jens Vestergaard, Aarhus School of Business Administration & Economics, Aarhus, Denmark.

It is hoped to complete this list by the addition of representatives of the following remaining countries: Sweden, Norway, Netherlands (although Professor Heirman has indicated his willingness to research all Benelux countries), Austria, Switzerland, Ireland, Portugal.

It is thought that the work to produce this prototype set of marketing indicators will take two years.

Long-term Objectives. Once the first set of indicators has been constructed and published, this will have highlighted the indicators needed to be produced and establish the methods of constructing them. It will then be up to the working party to decide whether its work is finished or whether to continue in existence to produce these indicators as a yearly or two-yearly series. If, at the end of the programme, the working party does decide that its role was exploratory and is now finished, it will endeavour to persuade such bodies as the EEC and OECD to produce these indicators for the future, using the methods established by the working party.